ANNEX 7 – CASE STUDIES

CASE STUDIES – EXPERIENCE AND LESSONS

There are many varied examples of the introduction and usage of digital tax administration tools by tax administrations. While each country and tax administration has its own unique challenges and circumstances, the experience of others can provide new perspectives and ideas, help avoid pitfalls, solve common challenges, and overall accelerate progress of its digital transformation journey.

This section sets out a small selection of international examples of tax administrations introducing and implementing new technologies. It also considers some lessons their experience can offer other jurisdictions.

1. MEXICO – E-INVOICING

1.1 Background and technology

In 2004, the Mexican SAT (Servicio de Administración Tributaria, or Tax Administration Service) created the legal framework that defined the implementation of the CFDI (Comprobante Fiscal Digital por Internet), its e-invoicing system.

The invoices are verified and certified by a digital signature service provider (PAC). Before using the CFDI method to generate electronic invoices, the organizations must set up a web service connection to an authorized PAC. For the CFDI method, they send an XML message from Finance to the PAC. The PAC validates each invoice, assigns a folio number, and then incorporates the digital stamp that the service tax authorities provide. After the PAC completes the approval process, they receive the approved XML message, and can then submit the invoice to the customer in XML or PDF format.

Over a short span of time, the use of the CFDI has become compulsory in e-accounting throughout Mexico, and hence used in 100% of economic transactions.

1.2 Impact on tax administration and taxpayers

The introduction of Mexico's digital tax administration system (including e-invoicing) has[1]:

- increased the declared tax base by around 150% since 2010.
- directly and indirectly reduced tax evasion and non-compliance, with overall tax revenue and social security contributions increased by about 95% between 2010 to 2016
- Seen total tax evasion fall from 35.7% to 16.1% between 2012 and 2016.

[1] Better than cash alliance. (October 2020), *Tax Digitalisation in Mexico: Success factors and pathways forward*, Tax Digitalisation in Mexico: Success Factors and Pathways Forward · Better Than Cash Alliance Digitalisation

Large businesses have encouraged smaller businesses to send e-invoices instead of paper invoices. This has helped include micro-enterprises into the formal, digital economy. For small and micro-enterprises, digitalisation has reduced the time taken to comply with tax obligations. Tax authorities have access to real-time information on the transactions by registered taxpayers while access to accurate, real-time information has improved the tax collection and auditing process.

Digitalisation changed the public perception of SAT, the Mexican Tax Administration, and there was an increase in trust in the organisation. There was also an increase in awareness of the penalties associated with non-compliance. There has been greater compliance as taxpayers realise the potential costs of non-compliance.[2]Where small entities previously used accountants to file their tax returns, returns can now be filed online by the owners without needing extensive knowledge of the tax system, thus reducing the cost of compliance. However, for entities without an IT system who were unable to access the SAT IT support centres, the cost of compliance increased as they had to invest in an IT system of their own.

Continuous updates and changes to the digital tax system has made the uptake difficult among smaller businesses. With every change to the system, owners need to invest time in understanding the rule change. In Mexico, this has been challenging for small business owners, especially women who have more domestic obligations, less free time, and money available to them.

1.3 Lessons from Mexico's experience

Table 1: Lessons from Mexico's experience – Taxpayer behaviours and response

Experience	Lesson
Despite strong progress with Mexico's digital programme, a lack of trust or understanding of digital platforms led some taxpayers to still present in person to tax offices and engage manually to be certain that they were meeting their obligations correctly.	Lack of trust can limit use of technology tools and undercuts the benefits of digitalisation. Tools and measures should be accompanied by communications with taxpayers about the full benefits of digitalisation.
There was confusion among some taxpayers about which systems to use in which circumstances.	To maximise the benefits from new technologies, a clear articulation of which

[2] ibid

	technology to use in which circumstance can be helpful for intended users.
Continuous updates and changes to the digital tax system may have reduced the uptake among smaller businesses.	Upgrades and changes should be kept to a minimum or made automatic, if possible. Updates and changes that require action from business owners should be batched.
Low levels of digital payments overall in the Mexican economy are reflected in a low level of digital tax payments.	Measures that incentivise non-cash payments should be considered alongside digital measures. Tax Administrations would benefit from working with banks, mobile money providers and other similar stakeholders to support the expansion of digital payment methods and channels including mobile banking.

Table 2: Lessons from Mexico's experience – Government and tax administration actions

Experience	**Lesson**
Support from Congress and access to long-term financing that was not tied to annual budgeting processes allowed the SAT to invest in technology and deliver a multi-year transformation process.	Securing the highest-level support and access to long term funding that is not tied to annual budgets provides certainty to pursue long term multi-year strategic transformation.
A clear vision and strategy for Digital Tax Administration was set out early and has guided implementation for over almost two decades and under six different heads of SAT.	Setting out a comprehensive clear and compelling vision and roadmap is critical to maintain direction and continuity for the DTA transition strategy.
Mexico included a data strategy as a core part of its DTA journey from an early stage to improve internal Tax Administration operations and taxpayer services.	The roadmap should address data as the core input, and sources should be identified, and its role understood.
During the initial phases of the digitalisation process, separate components of the ICT system were designed independently, eventually resulting in issues with interoperability. This not only increased the total cost of the	The development of a common technological standard to improve information-sharing and establish output requirements for all relevant technologies. For example: product requirements, user requirements, and programme and product information for each

ICT system, but also created operational difficulties.	ICT component (rather than mandating how technology should be developed). This provides flexibility to procure and develop technology in the most cost-efficient way while ensuring that the components will be interoperable.
SAT streamlined its external and internal processes before starting the digitalisation process. For example, a change from multiple payment forms to a single federal tax form with multiple input lines.	Technological solutions will be more impactful if instead of simply replicating existing processes, those processes are reviewed and reconsidered in anticipation of changes in technology. Options may include streamlining, simplifying, or combining external and internal business processes.
The use of change management frameworks helped staff to develop new models for business operations, and subsequent organizational changes. New teams were created, such as the Administration of Digital Payments team, which works with banks to enable digital tax payments.	Developing a robust change management plan can help identify the internal human resource changes to deliver the digitalisation vision and strategy. The plan could identify the staff, skills, capabilities, and incentives required as training programmes to teach staff new skills.
A lack of competition in the banking sector impedes financial inclusion and incentivizes the use of cash. Limited channel options for digital payments also make it more difficult to develop and execute a more comprehensive strategy for digital tax payments.	An analysis of the wider context, such as local banking and financial services would assist in understanding characteristics that might disincentivise digital payments, and therefore digital tax payments. Non-tax issues (and addressing them) may have a critical impact on the success of tax solutions.
Lack of co-ordination between regional and central tax authorities can undermine the impact of digital tax measures.	Improving and ensuring coordination between different levels of government is key to the success coordinated, simplified, and integrated digital tax tools.
SAT put taxpayers at the centre of the digitalisation process. This was particularly important given the diversity of Mexico's taxpayer landscape.	Tailoring solutions for segments of taxpayers will be essential to increase uptake and financial inclusion.

2. RUSSIAN FEDERATION - DIGITAL TAX ADMINISTRATION SYSTEM

2.1 Background and technology

The Russian Federation has implemented an economy-wide movement of small businesses to electronic record keeping, mandating the use of electronic/online cash registers since 2017. Tax authorities immediately process sales data, and buyers can use QR codes to verify receipts. The system is linked to a mobile app for SMEs, is integrated with the Russian automatic VAT control system and integrates with the Radio Frequency Identification (RFID) goods tagging system.

The Russian tax authority also has introduced a smartphone app called My Tax mobile app[3], specifically for self-employed persons. They can register in just a few minutes for this new tax regime with a mobile device, and keep income records, issue payment invoices, and pay professional income tax. Those participating in the programme pay a 4% tax on turnover, which is lower than the default rate. All the recordkeeping, tax payments and accounting are done "on the go" by the system, and the software solution also includes an API that allows banks and digital platforms to integrate taxes into their environment.

The app had more than 4 million users in early 2022, and offers multiple services, including:

- Specialist participating entrepreneurs
- Connecting the self-employed to customers seeking services
- Enabling tax registration
- Issuing receipts and documents receipt history
- Allowing self-employed persons to pay taxes
- Offering training courses via a messaging app
- Offering specialist services such as liability insurance, pension insurance and CRM.

2.2 Impact on tax administration and taxpayers

In Russia, the tax authority matches the amount of VAT paid to the amount of VAT claimed. All data is processed and analyzed in real-time (within eight hours). This data analysis allows the tax authority to identify tax risks quickly and efficiently. This system also allows for the monitoring of the tax authority and local authorities performance in tackling evasion.

These give the tax authority a real-time country-wide view of all transactions, affording a deep and powerful data pool to which to apply analytics and data tools. Russia is also seeking to use the data to analyse price and market trends in real-time for use in a regulatory context.

[3] Federal Tax Service of Russia (2022), *Mobile Tax Application "My tax",* Приложение «Мой налог» (nalog.ru)

This system led to an increase in VAT collection by 16.8%, 12.2% and 8.5% in 2014, 2015 and 2016, respectively. In 2017, there was a 38% increase in VAT collection compared to the previous year. The VAT gap has fallen from 20% to 1% between 2014 and 2018. There was also a reduction in the number of field audits required, reducing the cost of administering the Russian tax system.

The My Tax mobile app is seen by the tax authority as key to improving the quality of services provided to the self-employed, enabling them to work legally without submitting reports or physically visiting the tax authorities[4]. For users of the app, there is no need to submit any reporting or returns. Taxes are deducted automatically on a transaction-by-transaction basis. Thus, the software solution provides an end-to-end seamless experience for this category of taxpayers. This reduces the time they must spend on compliance, giving them more time for other productive activities.

2.3 Lessons from Russia's experience

Table 3: Lessons from Russia's experience

Experience	Lesson
The inclusion of an incentive, such a lower tax rate for those adopting online or digital tools, can facilitate uptake.	Tax authorities can benefit from using incentives to positively change taxpayer behaviour and encourage update of digital tools. These may include not only incentives for taxpayers to use technology, but also demand side incentives to encourage consumers to demand digital transactions and receipts from businesses.
The introduction of a simplified tax (4% tax on turnover) in conjunction with the app incentivised taxpayer adoption, making compliance simpler and easier.	New technology can make existing analogue practices quicker, but it can be even more transformational if coupled with a rethink and simplification of existing processes.
The introduction of real-time data analysis, led to an increase in VAT collection, while the VAT gap fell from 20% to 1% in just four years.	Technology can be a valuable tool for tax administrations in reducing the tax gap. Russia's experience shows VAT as one tax

[4] The Moscow Times (2022), *New tax scheme lures 4 million Russians to self-employment*, New Tax Scheme Lures 4 Million Russians to Self-Employment - The Moscow Times https://www.themoscowtimes.com/2022/01/24/new-tax-scheme-lures-4-million-russians-to-self-employment-a76132

	where technology may particularly make a big difference.
Real-time monitoring and data analysis reduced the number of field audits required by tax authorities, lowering the cost of tax administration.	New technologies can enhance the productivity of supervision and enforcement by increasing the number of productive audits and reducing the number of non-productive interventions

3. KENYA - TAXPAYER APP

3.1 Overview and technology

Kenya benefits from a population with a high level of adoption of digital payments – it ranks first in the use of digital payments across Africa[5]. It is therefore particularly suited among developing countries for increased digitalisation of tax payment and collection. Kenya began a process of implementation of mobile technologies in tax administration in 2013, under the umbrella term M-Service. In 2020, the Kenya Revenue Authority (KRA) introduced a mobile phone application that simplifies access to various KRA services. Branded as KRA M-Service App, the system enables taxpayers to access various services offered by the Authority such as taxpayer registration and verification, filing of returns and payment of tax.

The system aims to widen taxpayer reach, increase revenue collection, and enhance tax compliance by making tax payment process more convenient and reducing the cost of compliance by removing intermediaries. KRA M-Service App is intended to expand the tax base by on boarding the shadow economy players who cannot use computers. It enhances remote operations while addressing the capabilities of the shadow economy and micro-enterprise sector through e-commerce and m-commerce transactions.

3.2 Impact on tax administration and taxpayers

Through the App, taxpayers can register, pay, and file tax returns for Monthly Rental Income and for Turnover Tax obligations. Taxpayers are also able to register for Personal Identification Number (PIN), as well as perform checks on PIN, Payment Registration Number, Tax Compliance Certificate and confirm identity of tax authority staff. The App allows taxpayers to file nil tax returns for Income Tax-Residents and Non-Residents, Income Tax Partnership and Income Tax-Company, Value Added Tax, Pay as You Earn, Excise tax and Monthly Rental Income.

The App was accompanied by a review and simplification of compliance processes to make it easier for taxpayers to use. For example, registering a taxpayer required about 36 fields in the past. This was reduced to just four. The App has been downloaded over 100,000 times as of December 2022. It was initially introduced solely on the Android platform but is now also available on the Apple store. For taxpayers without smartphones, there is an Unstructured Supplementary Service Data (USSD) accessible by dialling USSD short code.

[5] Business Insider Africa (2022), *Kenya ranks first in the use of digital payments across Africa, according to Visa,* Kenya ranks first in the use of digital payments across Africa ahead of South Africa, Nigeria | Business Insider Africa

Online reviews are currently mixed – with several users reporting difficulties in using the app. However, there are also positive reviews, with some taxpayers noting they can file their returns quickly, or able to use the app once given more information on how to use it. KRA reports that the app has expanded the tax base, with 23,000 Kenyans registered as new taxpayers on the app in 2020/21. Furthermore, compliance had increased with more than 14,000 taxpayers applying for a tax compliance certificate and 73,000 filing their nil returns.[6]

In the longer term, KRA expects the key benefits to be an increase in compliance amongst the informal sector taxpayers, an increase in tax revenues from sectors with low compliance levels, and a broadening of the tax base by recruiting more taxpayers. There are also plans to add new functionalities, such as enabling taxpayers to track the status of their refund applications, check the status of exemption and excise certificates etc.

3.3 Lessons from Kenya's experience

Table 4: Lessons from Kenya's experience

Experience	Lesson
Kenya has the highest level of adoption of digital payments in Africa.	External social and economic factors, including the adoption of wider digital technology, may make certain digital measures by tax administrations more or less likely to succeed. Leveraging technology and mechanisms that taxpayers are familiar with makes the task of tax administrations easier.
There were challenges to overcome before the app could be developed – alteration of existing laws was required. Some tax officers were also resistant to change.	Technology is only part of the solution. It is also necessary to first build the legal framework, as well as to secure the buy in within the tax administration for change. In the last respect, the support from senior management for change was valuable, as was the deployment of business transformation leaders within user departments to advocate for the changes.

[6] OECD (2022), *Tax Administration 2022: Comparative Information on OECD and other Advanced and Emerging Economies*, OECD Publishing, Paris, https://doi.org/10.1787/1e797131-en.

Internal tax administration challenges included low skill levels of staff, and lack of equipment for testing and development.	Staff skill levels were addressed through training, while the lack of equipment was addressed through purchasing the necessary equipment.
While the mobile app was introduced in 2020, there was also a long-term strategy to use mobile technologies to deliver taxpayer services being implemented since 2013.	Having a long-term strategy and roadmap can assist tax administrations to make incremental and strategic progress towards their goals.
The App was accompanied by a review and simplification of compliance processes. For example, the number of fields required for a taxpayer to register was reduced from 36 to just four.	New technology can be more effective when it is accompanied by a rethink and simplification of existing processes.

4. BRAZIL - E-INVOICING SYSTEM

4.1 Overview and technology

The Brazilian tax system is among the most complex in the world – with 64 different types of income and corporate taxes, four different VAT taxes, and layers of federal, state, and municipal tax all laid atop one another. Brazilian tax compliance is estimated to be one of the most arduous in the world – one measure estimated that hours required for an average business in Brazil to comply with its tax obligations in 2021 was five times the regional average, and ten times the average of high-income countries.[7]

Since 2002, the Brazilian authorities have been building a regulatory regime that is based on four pillars of modernisation: electronic invoicing, accounting, tax, and payroll. The largest change has been the rollout of a mandatory standard electronic format invoice for goods, applicable to all companies, starting in certain sectors and for larger companies and steadily rolling out since 2009. The Nota Fiscal eletrônica (NF-e) form must be created whenever a taxable act takes place, and the process of issuing this form automatically passes a copy to the tax authority for approval. In this way, in theory, all sales and purchases are in real time submitted to the authority, allowing for robust analysis of the Brazilian economy and the detection of sales tax fraud.

When an invoice is submitted, it is passed to the tax authority first for recording and format approval checks, before then being passed on to the customer. This way Transactional accounting and tax data also must be submitted electronically and according to a prescribed format. In addition to the digitalisation of invoices, Brazil also requires all companies to submit transactional accounting information in a prescribed electronic format to the tax authorities, again providing the Brazilian government extensive insight into companies' activities[8]. This has made it easy for tax authorities to verify if taxes declared and paid coincide with the invoicing, increasing tax transparency and compliance.

To further help reduce the size of the grey economy, many states provide consumers with a small VAT rebate when their purchases are lodged with the tax authority.

4.2 Impact on tax administration and taxpayers

The implementation of the electronic invoice (the Nota Fiscal eletrônica) was expensive, both for the government and for companies to comply with. Nowadays many off-the-shelf ERP

[7] World Bank Group (2021), Ease of doing business in Brazil, Doing Business in Brazil - World Bank Group
[8] IADB (2022), *Brazil reaps benefits of digitizing its invoices,* Brazil reaps benefits of digitizing its invoices (iadb.org)

solutions that comply with the NF-e legislation are available, but these took some time and expense to implement – the cost of bringing in a system was estimated by one interviewee as 10–15% of the cost of a full new accounting system.

Tax authorities have gained real-time insight into transactions and greater compliance with VAT reporting. Transactions which would have previously been audited by tax authorities on a sample basis, can now all be verified, in real time, with less staff and paperwork.[9] The provision by some States to consumers with a small VAT rebate when their purchases are lodged with the tax authority motivates consumers to report missing transactions, improving compliance, and identifying fraud and error. New and innovative uses of the data obtained by tax authorities from e-invoicing are being found and developed. The state of Rio Grande do Sul has developed a free app menor preço (low price) that uses real-time information obtained by e-invoicing and allows users to find the lowest price of a product in their location.[10] The information is updated in real time every time an establishment makes a retail sale.

4.3 Lessons from Brazil's experience

Table 5: Lessons from Brazil's experience

Experience	Lesson
While the tax system and complex government of Brazil are substantial challenges, the fact that the system has been built nonetheless shows that even a difficult digitalisation process can be implemented.	The electronic invoicing regime in Brazil is an example for any other government considering similar measures that the challenges of tax system complexity, and a combination of local, state, and federal taxes, can both be overcome.
The implementation of e-invoicing required multiple federal entities and the central government to agree and act in a coordinated manner. A new Fiscal Management Commission (Coget) was created to coordinate implementation, bringing together representatives of the states, the Ministry of Economy, and the federal revenue service.	Where reforms involve multiple departments or levels of government, co-ordination is a major challenge. Existing structures may not be best placed to cooperation. Brazil solved this with the creation of a new entity focused on coordination, giving all major stakeholders a role in the decision making.

[9] Ibid.
[10] Menor Preço Nota Gaúcha - Apps on Google Play

Standardization of documents and procedures among the states was promoted to improve the effectiveness of the system.	The standardization and simplification of documents and procedures is valuable, especially so where multiple bodies may be involved.
Digitalisation and simplification of procedures lowered the cost of tax compliance, and even contributed to an increase in workers in the formal sector of the economy.	Digitalisation can increase tax revenue both by improving efficiency of collection of existing taxpayers and grow the tax base by bringing in new taxpayers. Lower compliance time and cost are positively correlated with higher compliance rates.[11]
To ensure states could process the e-invoices, there was a programme to help them update their technology, as well as guaranteed training for public servants.	Different levels of government should also be considered when designing funding, investment, and skills training programmes for digital tax initiatives.
Looking forward, Brazil is examining ways (under a programme called Profisco II) of making the most of the possibilities provided by big data to use the tax information available to achieve better fiscal management, especially with regards to finances and public spending.	Beyond the benefits for tax administration, it can be possible for the data collected to be used for broader government objectives, e.g., financial management and spending governance.

[11] "Coolidge, Jacqueline. 2010. Tax Compliance Cost Surveys : Using data to design targeted reforms. Investment Climate in Practice; No. 8. World Bank, Washington, DC. © World Bank.

5. THAILAND – DIGITAL TRANSFORMATION STRATEGY

5.1 Overview and technology

The Thai Revenue Department (TRD) developed a D2RIVE strategy to encourage digitalisation throughout the TRD. As part of this strategy, the TRD created a specific division – the Centre for Data Innovation and Intelligence. The purpose of this division is to use data analysis to enhance tax collection and the effectiveness of taxpayer services. The TRD also uses this division to improve the knowledge of officials by implementing learning through a variety of tools, where officials are required to upskill and develop their knowledge on topics such as data science. The TRD uses a platform called RD tax school which contains a high number of online courses which officials can access at any time.

The National Digital Identity Platform (NDID) was created as a form of self-identification for Thai nationals which relies on official forms of identification held by the user of the platform. The TRD has implemented the NDID to provide users with enhanced protection of their identity and to provide further security for transactions carried out online. The Bank of Thailand and the producers of the platform are testing a project in which the NDID is used in the e-filing of personal income tax returns.

5.2 Impact on tax administration and taxpayers

In the Centre for Data Innovation and Intelligence division, the TRD has hired technical experts to solve technological problems and drive digitalisation in line with the strategy. The division is split into several areas of expertise such as Application Architecture. The hiring of digital experts allows more efficient implementation of technology, and the sectioning of the division into specific areas allows the development of specialist expert knowledge.

The NDID platform pilot for use in the filing of tax returns was launched on 18 March 2021. Since the launch, a reasonable number of taxpayers have used the service and partner banks and the creators of the platform continue to encourage its use.

Taxpayers will have a smoother customer experience because of this initiative and the filing of their tax information has been made more secure. The tax administration also benefits from the increased security of the tax information as this helps to prevent fraud. Additionally, the use of this system has resulted in lower operational costs for the tax administration.

5.3 Lessons from Thailand's experience

Table 6: Lessons from Thailand's experience

Experience	Lesson
Potential users are not aware of the NDID platform.	Measures to educate and increase, awareness may increase uptake and use of taxpayer facing digital tax administration tools.
The NDID platform pilot for use in the filing of tax returns was launched and partners and creators continue to encourage its use.	Pilots are useful in proving business cases for digital tax administration tools. They can also allow tools to be modified to best meet needs and objectives. Early adopters can be powerful advocates for initiatives.
Different skill sets are required by tax administrations to implement digital tax initiatives.	Collecting digital and technical expertise within a 'centre of excellence' can drive digital tax administration innovation and incubate best practice.
New digital skills are needed throughout the tax administration.	External specialists as well as online learning platforms can be a quick way to access specific expertise and can be used to build the technical capacity of a tax administration.

6. SINGAPORE - DIGITAL IDENTIFICATION OF TAXPAYERS

6.1 Overview and technology

Whilst not a low-or middle-income country, Singapore is an optimal example of what a relatively small country can successfully achieve in terms of tax digitization. Singapore have been the leading pioneers in tax digitization, using a National Digital Identity (NDI). NDI consists of Singpass (Individual) and CorpPass (Business), which are connected to multiple government agencies that include tax authorities, providing ease for taxpayers to conduct transactions with the government via a mobile-friendly user interface.

Each taxpayer has a unique Tax ID registered under their National Registration Identity Card (NRIC) that creates a distinct digital identity within the tax administration system.
User data is highly protected as account passwords are required to be changed regularly. Since 2015, the app has also implemented security enhancement methods such as two-factor authentication (2FA), face verification, and one-time password (OTP).

6.2 Impact on tax administration and taxpayers

Taxpayers can obtain information on their paid and payable taxes amounts. Furthermore, that information can also be used to claim other benefits based on specific touchpoints such as housing application, pension savings, insurance purchase, etc.
The digital identity facilitates advanced profiling and improves risk management and the audit process. This improves overall enforcement and increases the chance of identifying traders operating in the shadow economy. This technology also has the added benefit of making the payment process more efficient and user friendly for taxpayers.

6.3 Lessons from Singapore's experience

Table 7: Lessons from Singapore's experience

Experience	Lesson
High level of data security built into digital tax administration tools and processes	Data security and protections are important in building taxpayer trust in digital tools and systems. Data protections and security need to be built in from the beginning to preserve taxpayer confidentiality and build taxpayer trust.
NDI has become a reliable source on citizen's information and credentials	A secure, reliable, and credible national identity system can become a widely used

	verification of any citizen's identity, information, and credentials.
The NDI has become a 'one-stop-solution' app for all tax related purposes	A universal national digital identity can be designed as a cross government platform for delivery of many government services.
The government can use data that utilizes NDI to monitor the activities of its citizens.	A universal government digital identity can allow visibility over broader economic indicators, trends, and processes on a more timely basis.

7. SERBIA - DIGITAL TRANSFORMATION STRATEGY

7.1 Overview and technology

Serbia tax authorities started their digitalization journey in 2005, when online reading of cash registers was introduced. Some years later, tax forms for VAT, pay roll taxes and personal income taxes were digitalized, and today it is possible to submit all tax forms online through the TA's web portal ("ePorezi"). By 2017, the Office for IT and e-Government was formed, when projects such as the State Data Centre, e-Payment, e-Paper and e-Inspector started.

In addition, Serbian TA recognizes the potential of digital platforms assistance in enhancing tax collection strategies and tax enforcement actions. Serbia is identifying non-compliant segments of the economy through the collection of third-party databases and big data analysis. Based on this, Serbia is developing a compliance plan and proposing tools for reducing identified gaps. The country is using soft tools, rather than tax audits, to approach taxpayers. The pandemic has reinforced the use of virtual platforms and hence, TAs need to be prepared for virtual interactions with their taxpayers. Digital platforms can play an important role in tax collection.

7.2 Impact on tax administration and taxpayers

During the digitalization process, following the principles of a digital roadmap, the TA compared the reality in an analogue age with the one of the current digital age. It was observed that taxable transactions and information about them used to have a separated time flow (i.e., there was a time gap), but in a digital age taxable transactions and information about them has similar time flow (i.e., information in real time). The number of audits were less than the number of transactions before, but now these numbers are equal. The goal is to direct physical audits to the right people and complete online, distant audits. The delivery of documents in a digital age is also faster. There was an automatic creation of tax obligation from databases and pre-filling by TAs.

It is recognized that digitalization, as one of the priorities of the Government of the Republic of Serbia, transforms the way of work of public administration and raises its economy, transparency and quality of work.

7.3 Lessons from Serbia's experience

Table 8: Lessons from Serbia's experience

Experience	Lesson
The digitalization of revenue authorities is a comprehensive process that requires a robust legal framework. The regulatory framework, which is not aligned with the needs of the digital environment may pose constrains for the usage of innovative solutions. The lack of flexibility in adapting legal frameworks is often an obstacle and taxpayers may experience slower adaptation of modern solutions in providing tax services.	The implementation of digital innovations by tax administrations should be accompanied by the legislative reform. Drafting new laws or updating the existing ones requires input from multiple stakeholders in order to obtain insights into the challenges related to a particular area and the ways to overcome them.
Tax authorities of developing countries often experience challenges in data acquisition and data protection.	Tax administration has to ensure valid sources for taxation through access to data in public registers and data from taxpayers' books, as well as the balance between the protection of personal data. The need of the TA to dispose of data always has to be 'filtered' by the provisions of legislation (e.g., Law on personal data protection; Commissioner for information of public importance; EU directives, such as General regulation on data protection).
Serbian tax administration needed to ensure that both tax officers and taxpayers possess necessary level of digital literacy in order to use the new digital tools.	The governments of developing countries should provide capacity building programs for the tax administration's employees' upskilling and reskilling. Additionally, the taxpayers should have access to training programs to obtain knowledge on tax compliance and the use of digitalized systems.
The implementation of innovations in the work of tax authorities necessitates addressing the challenge of resistance to change.	The digitalization reforms should imply change management programs that include implementing strategic oriented documents, which requires

	dedicated, strong team with skills in project management; for employees within TA, dedicating reform activities while avoiding a conflict with day-to-day job; monitoring and timely identification of risks; developing a robust system of incentives and sanctions.

8. THE REPUBLIC OF NORTH MACEDONIA - DIGITAL TRANSFORMATION STRATEGY

8.1 Overview and technology

North Macedonia has a vision to become a professional recognizable model of best practices and quality standards in the digitalization area. The mission is to provide simplified tax procedures and high-quality services to taxpayers, accurate tax returns and timely collection. The use of ICT has always been an important and integral part of the effective functioning of the tax administration, ever since the older tax registries and taxpayers' accounts to todays' modern integrated tax administration system (TAMIS).

From November 1, 2017 to January 31, 2019, the project for "Development and reengineering of business processes for the new tax integrated IT system" was implemented to define work processes and introduce modern ICT to provide reliable and secure IT system, for a service-oriented tax administration system. The new structure of the ITC model is already established with the help of the EU, while the completion of the implementation of all stages of the new systems is expected to end in the next years.

In 2017, TAMIS, a new integrated system, was introduced in PRO in order to provide optimal processes for collection, reporting, analysis, and management. TAMIS offers a holistic view of both taxpayers' and tax administration's needs. TAMIS focuses on operative efficiency, increasing revenue by monitoring compliance, improving taxpayers' services, optimization, and risk management by taking into account relevant legal regulations.

The IT Strategy of PRO from 2019-2022 was structured in priority items:
Priority 1: Introduction of electronic tax administration and digitalization of the tax services through Introduction of integrated tax information system (ITIS) - the new ITIS is being developed as its own instead of commercial off-the-shelf system (COTS) due to budget, time constraints and sustainability issues.
Priority 2: Service oriented organization for managing the IT operations.
Priority 3: Advancing policies for security, safety and sustainability of the IT systems.

The components of the new ITIS include:

- Registration: new Masterfile (Registers of entities – taxpayers; Registers for tax purposes; Auxiliary registers and ciphers; Registration of system users; Taxpayer registration file and reports; Data exchange with other institutions and other parts of PRO's IS Services for taxpayers; Registers of taxpayers for the registration of which other institutions are responsible (Central Registry, chambers, etc.)

- New tax accounting (Duty records; Generation and administration of posting orders; Payment processing; Calculation, generation and posting of interest; Reports and reviews; Procedures for data exchange with other systems in the PRO; Synthetic and analytical tax cards; Automatic procedures for offsetting claims and debts and refunding and redirecting overpaid tax; Administration of warnings/notifications and prohibitions; Debt management software will be launched this year).

- New e-tax (on-line registration of taxpayers – electronic filling, signing and submission of electronic tax returns and other types of submissions; review of submitted tax returns and other electronic submissions by status, possibility for their printing; insight into tax records by types of taxes; establishing an electronic order for payment of tax and other obligations; electronic payment of orders through a virtual POS terminal; electronic tax reminder services; 24x7 availability of electronic services).

- Tax assessment (the software solution for determining the taxation on the basis of PIT, except for the part of salaries, is in operation from 01.01.2018; upgrade of the software solution for monthly calculation for integrated collection and personal income tax, tax balance is in process; this year, the development of software for determining the taxation on the basis of profit tax and VAT will begin).

- Tax procedure: the development of a software solution started in 2021 for conducting tax procedures in the area of tax assessment and audit/inspectorate file.

Currently, there are several ongoing reforms in North Macedonia, aiming at promoting voluntary taxation, improving the effectiveness of tax administration and of business environment. These initiatives require further strengthening of the IT systems and the development of appropriate functionalities. The future projects to complete IT IS are the introduction of modules for e-commerce and e-invoice, establish a Data Warehouse, establish Business Intelligence Tools as Components for Risk Management, Compliance and Fact-Based Decision Making, establish Disaster Recovery Center and perform activities to increase the safety and security of IS.

8.2 Impact on tax administration and taxpayers

The introduction of the revised user-friendly procedure for computing and settling personal income tax liabilities not only brought numerous advantages but also resulted in a reduction of administrative burdens and the elimination of certain obligations for submitting returns and reports to the PRO.

However, the administration still faces issues to be dealt with in the future: How to achieve real time compliance, transparency, service orientation, constant availability, automation of processing, e-administration, monitoring tax assessment and verifying tax liabilities (i.e. tax subjects, type of tax, tax period), customer relations and management taxpayers' compliance.

8.3 Lessons from the experience of the Republic of North Macedonia

Table 9: Lessons from the experience of the Republic of North Macedonia

Experience	Lesson
The previous experience of digitalization of tax function in North Macedonia was associated with partial and compartmentalized systems, which resulted in higher risks. In the beginning of the digital journey, the tax administration had problems with the procurement of software, which led to them building their own partial modules.	The digital transformation of tax administration is a gradual process that requires robust procurement policies. Countries, especially those facing funding issues, might consider building the new tax solutions on the existing cloud-based infrastructure, which mitigates a lot of risks. The digitalization can start from a limited number of tax functions, such as the personal income tax, and then be expanded on registration and accounting. Integrating partial modules in the system has less risks than a massive integration.
The process of digitalization requires a comprehensive reform. Developing countries often lack resources and capacity to achieve the goals stated in their digitalization strategies.	Developing countries should consider cooperation with international organizations (e.g., the World bank, IMF, EU) to get access to various programs implying funding, technical assistance, trainings. The Government of North Macedonia is working with international partners to achieve its goals, in particular the EU (The Twining project "Improving Revenue Collection and Tax and Customs Policy"), the IMF (Tool for diagnostic assessment of the tax administration (TADAT), the World Bank (project for Supporting the Public Revenue Office IT system Design and project for financing the development of the new IFMIS and the expansion of the new information system of the PRO).

9. KAZAKHSTAN - DIGITAL TRANSFORMATION

9.1 Overview and technology

In Kazakhstan, the development of the IT infrastructure is focused on the launch of three new information systems: electronic invoicing, risk management system, and an integrated database. The tax administration has been working actively on improving tax compliance and the behavior of taxpayers. The approach has been shifting to a client-oriented approach, transforming from supervision and policing in relation to taxpayers to partnership, consultancy and mentoring of taxpayers.

The country's TA applies a risk management system and monitoring in which taxpayers are classified in different groups. There are taxpayers with good will (for them, the goal is to create the most favorable conditions); a second group of taxpayers are those that pose some risks (for them, there should be assistance to improve their compliance); and a third group are the ones who apply fraudulent schemes (for them, rules should be enforced). The authority applies AI and big data collected from electronic invoice, tax accounting, databases from third parties and declaration of goods in order to categorize the taxpayers, identify hidden irregularities and anomalies and apply advanced analytics and linkage identification. There is a horizontal monitoring in this system: large taxpayers provide access to their accounting systems. For taxpayers with a high violation level, the system sends a remote notification for elimination of violations without tax audit.

In 2020, the TA launched the 'e-Salyq-Azamat' electronic tax wallet mobile app. The app can be downloaded free of charge and enables citizens to check imminent tax amounts prior to the date of its payment as well as making payments based on indicated bank details. Previously, a taxpayer had to visit a bank, wait in a queue, pay a bank fee and select bank details and codes to make a payment for a tax. In addition, the tax wallet allows for electronic requests to authorized agencies for correction of data related to taxation objects, avoiding the need for taxpayers to visit a number of different agencies. [12]

The roadmap for the introduction of the 'e-Salyq-Azamat' app was the following:

- Updating databases of authorized bodies on property, transport, land
- Work with territorial divisions and amendments to legislation

[12] See "e-Salyq-Azamat" Electronic Tax Wallet mobile app | Electronic government of the Republic of Kazakhstan (egov.kz)

- Automatic integration with government agencies
- Launch of the 'e-salyq-azamat' mobile application
- Popularization of a mobile application for paying taxes.

The advantages of paying taxes through e-Salyq-Azamat are the exclusion of filling-in a lot of details, auto payment, auto writing off and online replenishment within 2 minutes due to repayment of debt and upcoming payments, receiving alerts, direct integration with banks, viewing and adjusting objects of taxation and overpayment management.

9.2 Impact on tax administration and taxpayers

In Kazakhstan, the electronic invoicing system has contributed to an increase in VAT revenue by almost 1 billion USD. The use of the electronic invoicing system and ICT helps prevent fraud and VAT evasion, ensuring transparent movement of goods.[13] In addition, implementation of the Resk management Systems contributed to generating an additional revenue of 204 million USD for the national budget.[14] According to the recent estimates, digitization of tax administration has led to a 9% reduction in tax audits and nearly a 20% increase in revenues to the budget of Kazakhstan.[15]

Over the last years, the TA in Kazakhstan has been receiving positive feedback from the implementation of the mobile application 'e-Salyq-Azamat'. In 2020, there was 775 thousand mobile app users; 369 thousand accepted forms of reporting on general declarations; 10 thousand individuals submitted applications for the adjustment of transport; 116 million KZT by recharging a wallet and 599 million KZT used the overpayment. But the TA is constantly improving their strategy and efficiency, focusing on improving the efficiency of systems, information security of systems, digitalization of tax and customs administrations, and focusing on professional team of IT employees.

The Kazakhstan State Revenue Committee recognizes that modern trends such as social networks, mobile technologies, active social society and emerging technologies such as blockchain, AI and big data create new challenges to TAs with regard to the traditional way of doing business. It also opens up new opportunities to improve TAs approach. Some of the key challenges are cultural and behavior challenges, lack of understanding of digital trends, lack of talent for digital, lack of IT infrastructure, organizational structure not aligned, lack of

[13] Казахстан: На пути к более динамичной экономике через эффективное электронное администрирование доходов (vsemirnyjbank.org)
[14] Казахстан: На пути к более динамичной экономике через эффективное электронное администрирование доходов (vsemirnyjbank.org)
[15] https://primeminister.kz/ru/news/press/cifrovizaciya-nalogovogo-administrirovaniya-pozvolila-uvelichit-postupleniya-v-byudzhet-pochti-na-20-b-sholpankulov

dedicated funding, lack of internal alignment, business process too rigid, lack of data and lack of senior support.

9.3 Lessons from Kazakhstan's experience

Table 11: Lessons from Kazakhstan's experience

Experience	Lesson
Strengthening the relationship between a tax administration and taxpayers needs conceptual change, which could be achieved through remote operational access to information. However, the access to the taxpayer information is limited due to a relatively small number of taxpayer services provided digitally.	The interaction and exchange of information between governmental agencies and taxpayers should be facilitated using digital technologies. The limited number of digital taxpayer services needs expanding, while procedures for providing existing services should be revised and improved. The real-time access to the large taxpayers' data can be gained through launching a horizontal monitoring program facilitated by the use of technologies.
The functioning and development of information systems at the Committee of State Revenues were carried out in violation of the legislation of the Republic of Kazakhstan in the field of informatization.[16]	Implementation of digital reforms in the area of tax administration requires not only developing a legislative framework, but also establishing a set of robust measures for the enforcement of the regulations and monitoring the compliance with them. Censuring the compliance with the regulations needs the political buy in and strong leadership.
Notwithstanding the digitalization reform, there was a large underpayment in the consolidated budget, which was increasing in 2021-2022.	Simplification of taxpayer services is not a panacea. Tax administrations might consider improvement of tax audits based on digital technologies as well as implementation of electronic fiscal cash devices to combat informal economy.
The plan of development of the Ministry of Finance of the Republic of Kazakhstan does not include target indicators for the digitization of tax control and the	The digitalization reforms require setting up a set of Crucial Success Factors and Key Performance Indicators for monitoring the progress and identifying and addressing the challenges in a timely manner.

[16] https://www.gov.kz/memleket/entities/esep/press/news/details/614624?lang=ru

effectiveness of measures for forced collection of arrears.	

10. REPUBLIC OF KOREA - DIGITAL TRANSFORMATION

10.1 Overview and technology

Korea has been developing its ICT systems in tax administration and its strategy toward digital tax transformation since 1967 (Awasthi et al., 2019). In 1967 the National Tax Service (NTS) system was founded. Later, Korea aimed for a Tax integrated system (TIS). The latter is a full-fledged implementation of an e-tax administration system that was launched in 1997. It relied on the collection and analysis of massive amounts of taxpayers' financial data in 1994-1996. The TIS however was basically designed to enhance the proficiency of the tax administration's workflow and has provided less improvement in tax services. The TIS has been complemented by the Home Tax Service (HTS) initiative in 2002. HTS provided for an internet-connected electronic filing system that simplified the computerized work of tax officials and enabled the taxpayer to file and pay taxes from home and work through the internet.

In particular, the services provided by the HTS include:

- E-fling, covering direct/indirect taxes and surtaxes by creating tax returns and attached documents on a PC.
- E-notice provided by HTS via the internet or mobile devices,
- E-payment for all taxes, simply by entering bank account information on a payment interface.
- Simplified Year-End Tax Settlement Service to collect tax deductible or creditable payment information from hospitals, schools or financial institutions through IT networks.
- Online submission and issuance of tax related documents, such as tax exemption documents, tax-related forms, business registration certificates and tax payments certificates, by using Civil Certification Internet Access Service, and
- Automatic calculation of income taxes, tax exemptions, and gift taxes, and submission of taxation data in written or computer forms, such as daily working income payment statement, liquor sales records, etc.

In 2011, Korea established the mandatory Electronic Tax Invoices (ETI) system for claiming VAT input tax credits. Initially, ETI was offered as a voluntary alternative to paper-based invoices but due to limited or no use by taxpayers, the Korean government decided to make the ETI compulsory. This was done first by preparing the necessary regulatory framework and

secondly, by certifying ETI issuers and service providers. In 2009, Korea launched a dedicated website e-Invoice Issuance System (e-sero), through which taxpayers who could not prepare the ETIs on their own could log into the system and obtain one for free.
In 2012, the NTS launched an early-warning system (EWS) to combat VAT fraud and identify input tax credit fraud. One of the key functions of EWS is to electronically verify VAT return information at an early stage, by cross-checking taxpayers' sales and purchases and screening suspicious refund claims (Awasthi et al., 2019, p. 51). Because of VAT fraud incidents and the focus on addressing B2C transactions (especially cash transactions), the primary focus of the Korean TA was to be able to electronically trace payments by promoting credit/debit card payments and by asking retailers for electronically traceable cash receipts (ETCR). As a result, electronically traceable payments (ETPs) were increased sharply.

Furthermore, Korea decided to address taxpayer services improvement quite recently by the creation of the Next-Generation Tax Integration System (NTIS) which was launched in 2015 and provided an integrated taxpayers' service portal for external users and a NTS single-window portal for internal users. These portals allowed tax authorities to analyze big data and provided tools to better manage taxpayers' tax and other information. NTIS is a renovated system that runs on Java, generating and processing of data by setting up its Data Quality Management System to speed up the system and to reduce data error (Awasthi et al., 2019, pp. 31–32). Tax services currently offered digitally in Korea are online filing, online payment, integrated taxpayer accounts, other online services and digital mailboxes.

10.2 Impact on tax administration and taxpayers

The introduction of digitalization in tax administration has yielded numerous positive outcomes in terms of tax compliance and collection. It has significantly enhanced the tax authority's ability to identify taxable income more effectively. The establishment of a fair and user-friendly e-taxation system has minimized tax resistance, promoting voluntary tax payments. These factors, in combination, have led to a substantial increase in overall tax revenue in Korea, which has surged from 1996 to approximately 320.8 billion USD. [17] The tax-to-GDP ratio excluding social security contributions increased by 3.2 percent points from 1996 to 2018, reaching 20 percent by 2018. Similarly, the tax-to-GDP ratio, including social security contributions, experienced an 8.6 percentage point rise during the same period, reaching 28.4 percent in 2018. [18]

[17] A Roadmap for Digitalization of Tax Systems: Lessons from Korea (iadb.org)
[18] A Roadmap for Digitalization of Tax Systems: Lessons from Korea (iadb.org)

Digitalizing tax administration has played a pivotal role in uncovering concealed sources of taxable income, especially among the self-employed, resulting in a broader tax base overall. Since the introduction of the Tax Information System, the number of taxpayers has soared from 6.8 million in 1996 to 18 million in 2018. The tax base for the three main tax types, constituting 81 percent of total taxpayers, has expanded significantly: doubling for PIT, increasing fivefold for CIT, and growing 2.5 times for VAT. [19]

Advancements in technology, coupled with various tax schemes promoting a cashless economy and encouraging electronic evidence usage, have enabled the tracking and cross-referencing of transactional information for businesses and individuals. In 2018, 95.4 percent of private consumption expenditure could be traced through credit and debit card transactions or cash receipts. [20]

In terms of operational costs for tax administration, there has been a reduction in administrative expenses. Tax revenue collected per NTS official has increased from 3.29 million USD in 1996 to 12.42 million USD in 2018, indicating a 3.7-fold improvement in revenue collection efficiency compared to two decades ago. Simultaneously, the cost of collecting revenue of KRW 100 has nearly halved, decreasing from KRW 0.93 to KRW 0.58. [21] Moreover, e-taxation has lowered taxpayers' compliance costs and played a role in fostering a taxpaying culture. As of 2018, over 90 percent of tax returns for the four main tax types were filed electronically. [22]

10.3 Lessons from Korea's experience

Table 12: Lessons from Korea's experience

Experience	Lesson
In Korea, the introduction of e-taxation has not only enhanced efficiency but has also bolstered both the horizontal and vertical equity of the tax system. This, in turn, has significantly contributed to fostering trust among taxpayers.	Digitalization of tax administration can become a powerful tool for strengthening the equity of the tax system and achieving and contributing to the sustainable development. In the developing countries experiencing a high degree of informality, lack of infrastructure and low financial inclusion, corruption, fraud, etc. improvement of tax administration based on digitalization of

[19] A Roadmap for Digitalization of Tax Systems: Lessons from Korea (iadb.org)
[20] A Roadmap for Digitalization of Tax Systems: Lessons from Korea (iadb.org)
[21] A Roadmap for Digitalization of Tax Systems: Lessons from Korea (iadb.org)
[22] A Roadmap for Digitalization of Tax Systems: Lessons from Korea (iadb.org)

	revenue authorities should be based on a strong social consensus on the role of tax revenues as an important financing source for a country's sustainable development. This requires efficient promotion to ensure the public buy-in of the reforms.
The efficient implementation of the mandatory e-invoicing system (ETI) in Korea required creating the necessary regulatory framework and standardizing and certifying ETI issuers and service providers. Additionally, the Korean government established an institutional framework to streamline an inter-agency information-sharing mechanism, ensuring the integrity, compatibility, and confidentiality of the data.	Incoherent policies and lack of coordination among institutions both within the government and between the private and public institutions may hinder efficient management of taxation data. The implementation of digital innovations in the work of tax administration should imply prior creation of the necessary regulatory and institutional frameworks.
The NTS hired over 350 IT specialists through the government's professional position system. These specialists are trained to serve as intermediaries between the NTS and externally contracted IT companies. They operate in dual roles: translating the specific needs of tax officials into the intricacies of IT systems and scrutinizing the systems developed by external companies to ensure alignment with tax regulations.	Governments should prioritize placing their policy objectives at the core of learning and adopting technologies from the private sectors of foreign governments. It is crucial to have professionals with expertise and extensive knowledge of information technology, tax laws, and administration to achieve this objective. Their active involvement in the system development and management process significantly increases the likelihood of successful digitalization. Relying on internal staff who take full charge of system development not only enhances information security but also ensures coherence and sustainability in the digitalization process.
The digitalization journey of the Korean tax administration started in mid-1990s, and it is constantly improving.	The digital transformation of tax administration is a gradual and comprehensive reform that necessitates significant socio-economic and legal

	changes. In developing countries, it might take generations to develop tax morale and assimilate the technical changes.

11. CHINA - AUTOMATIC TAX CALCULATION FOR INDIVIDUAL INCOME TAX

11.1 Overview and technology

The Individual Income Tax Management System is the primary platform used by Chinese tax authorities to provide "contact-free" services to individual taxpayers. This system has been instrumental in enhancing tax compliance and driving the digital transformation of China's tax administration. With its mobile application, the Individual Income Tax (IIT) app, now boasting hundreds of millions of registered users, it has become one of the largest government service platforms in China.

The system leverages advanced technologies like cloud computing, big data, and mobile internet to ensure smooth operations and facilitate annual tax settlements and payments. Through real-time identity authentication, the system guarantees precise and secure identification of individuals. By utilizing big data, the system offers pre-filled tax returns and personalized reminders to millions of taxpayers, along with intelligent accounting and tax calculation features. The adoption of a "machine review + manual review" model for tax refund audits has significantly reduced the workload for tax officials, enabling fully electronic tax payments and refunds. Furthermore, mobile internet technology ensures that all key services are 100% "contact-free," allowing the entire process of tax payment and refund to be managed electronically.

11.2 Impact on tax administration and taxpayers

The Individual Income Tax Management System has established the largest tax-related service network in China. Through the IIT app, taxpayers can access 24/7, concierge-style tax services that fully support individual income tax processes. These services are categorized into "self-service," "reminder service," "consultation service," "interactive service," and "friendly service," enhancing the precision and convenience of tax management:

Self-Service: Empowers taxpayers to manage their tax matters independently through a secure and reliable mobile platform, making it easy to file taxes conveniently.

Reminder Service: Enhances tax compliance by sending personalized reminders to taxpayers and withholding agents through in-app messages and notifications, guiding them in meeting their tax obligations.

Consultation Service: Provides instant access to tax-related consultations, allowing taxpayers to submit inquiries about tax policies, system operations, and troubleshooting, with responses available for review. The system also pilots intelligent consultation services.

Interactive Service: Establishes an online channel for communication between taxpayers, withholding agents, and tax authorities, fostering effective dialogue and a harmonious tax relationship. For instance, in the "dispute appeal" scenario, taxpayers can log into the IIT app to address discrepancies in their identity or income information, initiating an appeal that tax authorities will verify and resolve.

Friendly Service: Integrates emotional design elements into the system, with features like the "Tax Memory" annual statement, which uses warm animations and thoughtful language to help taxpayers review their tax situation and cultivate a sense of pride.

11.3 Lessons from China's experience

Table 12: Lessons from China's experience

Experience	Lesson
Data-Driven Taxation	Automates and intelligently manages tax operations based on data and rules, with human oversight ensuring accuracy. Business processes are consistently driven by the same data and rules.
People-Centric Approach	Focuses on the user, continuously refining tax processes, improving service levels, and enhancing user experience and satisfaction.
Integrated Management	Emphasizes a unified approach to design, construction, and operation, integrating business, technology, and data to promote coordinated development.
Ecological Development	Aims to foster social co-governance in tax matters, creating a sustainable and harmonious tax ecosystem that empowers broader social governance.

12. ZAMBIA - DIGITAL TRANSFORMATION

12.1 Overview and technology

The reform of tax administration in Zambia initiated in 2006 was part of a broader modernization program, which resulted in Zambian Revenue Authority's (ZRA) Corporate Strategic Plan. Its primary purpose was to increase the efficiency and effectiveness of tax administration by streamlining its business processes and, hence, improve revenue collection. The need to reform the tax administration could be explained, first of all, by the fact that paying taxes in Zambia was time consuming and costly for both tax authorities and taxpayers due to manual processing of tax returns, a fragmented and outdated administration system, lack of a single authoritative database, which increased the risk of errors.

The work on the digitalization project began in 2012, when the ZRA set up a project team to guide the development and implementation of the new electronic system, called *TaxOnline*. Due to time constraints, the ZRA opted for the commercial off-the-shelf product and contracted with Tata Consultancy Services (TCS), a private vendor that had developed and adapted an e-tax model for Uganda. As the result of the research on Zambian tax law and gap analysis, the project team members identified the differences between the e-system implemented in Uganda and the needs of ZRA (i.e., different types of taxes and tax returns, identification of taxpayers in the system, timeframes for debt collection, the turnover threshold below which a business paid only a flat tax, etc.).

Based on the study as well as active consultations with stakeholders, the project team determined the elements to be included in the modules and prepared blueprints for each of them, which were used by TCS for engineering works. The developer performed customization, while the responsibilities of the ZRA's ICT team included quality assurance, migration of data to the new system, and handling of infrastructure. *TaxOnline II* system, the next step of the digitalization of ZRA, was an in-house solution co-developed with the Copperbelt University ICT department.

The system launched in 2013 included the basic functionality a taxpayer needed to register with the ZRA, file tax returns and manage tax payments. The developments introduced at a later stage (*TaxOnline II*) included such modules as refunds, auditing, debt collection, investigations, simplified objections and appeals. The technologies used to implement the e-system in Zambia are reflected in the table below:[23]

[23] Efficient Implementation and Maintenance of ICT Tax Systems in Africa: Compilation of Good Practices, Success Stories, and Lessons Learnt, ATAF 2021.

Table 13: Technologies used by the Zambian tax administration

Platform	Technology
Primary Server Infrastructure	EXADATA X8
Primary Operating System	Oracle Linux | Visualization
Storage	Net-App, HP | On Premise Cloud
Primary Programming Languages	JAVA
Databases	Oracle 12C, MS SQL Server

The implementation of tax reform encountered several challenges. Firstly, the ZRA faced unsustainable costs on support and maintenance of the new system, which was exacerbated by budget shortfalls. During the first two years of TaxOnline, the ZRA invested a total of $8 786 550 for the system, which included the setup cost and support and maintenance over that time period. The majority of the funding of the tax administration reform came from government of Zambia, but part of financing as well as technical assistance was provided by the Investment Climate Facility for Africa.

Second, implementation of the electronic system was challenged by tight deadlines related to customizing the solution according to the needs of the ZRA and launching the project. As a result, the tax administration had limited time to test the system before its actual implementation and for training the employees and taxpayers, which could have helped preventing some of the problems.

Third, ZRA had no access to source code to the system developed by the TCS, and its ICT staff received no training on the system, which made the tax administration dependent on expensive services of the vendor company if any further customization was required.

Fourth, there was the need for moving data to the new system. Migration of the demographic information on the taxpayers and closing balances for VAT and income tax for each taxpayer implied extracting data from the old fragmented systems and enriching the data by formatting them in a way that would work in the new system. To move other types of data, ZRA employees reconciled accounts on the old systems and manually inputted balances on the new systems, which allowed the ZRA team to prepare the system relatively quickly for the new users.

Finally, transitioning to an electronic tax administration system faced strong resistance from both the tax authorities and taxpayers, which required change management in order to promote cooperation and build trust. Institutional resistance within the ZRA was associated with the potential reduction of work of data entry officers and employees of ZRA cash offices, which

could have put those jobs at risk. At the same time, many taxpayers preferred conducting their tax compliance procedures manually, regardless the benefits of the electronic system, which could have also made tax avoidance more complicated and resulted in higher payments to ZRA.

Moreover, a significant part of the population of Zambia had limited access to the internet, low computer literacy and low tax literacy. In order to overcome this challenge, the project team employed the Change Management Officer whose primary role was to communicate with ZRA staff and taxpayers about the coming change and how it would impact them. The revenue authority ensured that employees would be redeployed to other assignments if their position became redundant as the outcome of the project implementation. Over 700 ZRA staff received training in how to process registrations, returns and payments through the TaxOnline system in order to be able to assist others. In addition, the ZRA held workshops and meetings with taxpayers to present the new system and teach how to register for and use it as well as to provide training in basic ICT to solve the issue of low computer literacy.

In order to promote the new system and reach out a large audience, the ZRA corporate communication office produced advertisements for radio, television, billboards, and newspapers. After the electronic system was launched, the tax administration established a call center and added more staff to its help desk to give taxpayers instant assistance. Moreover, the ZRA had to introduce new regulation in order to enhance online compliance. In particular, online filing became mandatory for VAT returns and for companies with ten or more transactions. Taxpayers filing online received a number of incentives including extended deadlines and amnesty for penalties and interest accrued in the period between 2013 and 2017 provided that the principal tax was paid, and all returns filed.

12.2 Impact on tax administration and taxpayers

Implementation of the TaxOnline system resulted in a number of financial and non-financial outcomes, which included the following:

- increase in timely payments from 59% to 65%;
- by 2019, over 90 percent of registrations were processed electronically;
- implementation of TaxOnline resulted in an increase in the number of tax returns filed online. In 2017, 98 percent of tax returns were filed and submitted online, while 2 percent were filed manually, which referred to small taxpayers who lacked internet access;
- by 2019, around 70 percent of payments were submitted to ZRA electronically;
- the time for filing, payment and processing of tax returns decreased from 10-16 days to 1 day;

- reduction of tax compliance costs for SMEs.

12.3 Lessons from Zambia's experience

Table 14: Lessons from Zambia's experience

Experience	Lesson
The time constraints experienced by the ZRA when implementing the digital reform, resulted in opting for the commercial off-the-shelf product that was customized in accordance with the ZRA's needs. At a later stage, the tax administration adopted an in-house solution.	The tax administrations of developing countries, facing a shortage of in-house IT professionals for developing their own digital solutions and under time pressure to implement digital reforms, may consider acquiring commercial off-the-shelf products. These products can be customized to align with strategic goals and specific socio-economic conditions.
In Zambia, the online system launched in 2013 initially provided basic functionality for taxpayers to register with the ZRA, file tax returns, and manage tax payments. Subsequent developments introduced additional modules, including refunds, auditing, debt collection, investigations, and simplified objections and appeals.	In the least developed countries, the digitalization of revenue authorities, while a desirable process, necessitates the gradual implementation of various digital tools. Countries can commence by developing an online portal that provides basic tax functions such as e-registration, e-filing, and e-payments. As digital maturity and experience grow, more advanced modules can be introduced at a later stage.
The ZRA encountered very high costs for the support and maintenance of the new system, exacerbated by budget shortfalls.	Developing countries might consider mixed financing digitalization reforms, which would include own resources as well as attracting technical assistance and funding provided by international organizations.
The tight deadlines set by the ZRA for customizing and launching the electronic system did not allow for proper testing before its actual implementation. As a result, the tax administration employees and taxpayers faced numerous problems when using the new digital system.	The strategy of digitalization of tax administration should include well-defined deadlines and control points. It is crucial to ensure that the developers have sufficient time for testing the digital tax systems and fixing the errors to prevent potential issues.

In Zambia, the transition to an electronic tax administration system encountered significant resistance from both tax authorities and taxpayers.	Overcoming the resilience requires adopting a robust change management strategy and hiring an expert whose role implies communicating the upcoming changes with the tax administration's employees and taxpayers as well as the future impacts. It is important to reassure the tax administration's employees that their working places are secured (e.g., by redeployment to other assignments), and they receive a proper training on how to use new technologies. Taxpayers should be provided with training to improve their computer literacy. Tax administrations might consider other methods to address taxpayers' concerns and potential issues, such as establishing call centers or help desks to provide advice.

13. LIBERIA - THE DIGITALIZATION OF TAX ADMINISTRATION

13.1 Background and technology

The effective and transparent administration of taxes represents an important role of any government. This function ultimately determines the scope of government's operations which includes its ability to provide basic public goods and services to its citizens, improve income distribution, support social programs, and ensure oversight and accountability. Efficient and equitable taxation is essential to long-term development, and a lack of tax revenue can force governments to rely on foreign aid which are less reliable and unsustainable as a development strategy.

After years of suboptimal performance in its tax administration, the Liberian Government in 2013 took up the challenge of instituting a modern semi-autonomous revenue authority. This move separated the function of revenue collection from the Ministry of Finance. This was meant to ensure the effective and transparent collection of both domestic revenues which would help the government finance much-needed public services. However, this feat seemed particularly challenging in the context of a post war period largely characterized by secrecy, unaccountable civil servants, the lack of reliable data on public finance for the periods before 2006, and a very tight fiscal space.[24]

Following years of preparation, the Liberia Revenue Authority (LRA) was enacted into law in 2013 and operationalized on July 1, 2014. The Institution is charged with the responsibility to oversee the administration and enforcement of Liberia's revenue laws for the purpose of assessing, collecting, auditing, and accounting for all national and international revenues. The LRA is also charged with facilitating international trade and customs borders management and enforcement. The role includes administering legitimate trade, customs clearance through the borders and social protection through policies and procedures that promote efficient, simplify, and enhance taxpayer compliance.

After the establishment of the LRA, it was immediately realized that the optimization of domestic revenue collection was an essential component to Liberia's long-term fiscal independence and economic development. With the demand for improved domestic resource mobilization and accountability on the rise from both the government and taxpayers, the LRA had the herculean task of realizing efficiency and effectiveness in tax administration. To realize this task such that the provision of public goods and services, and the distribution of income are met considerably, tax administration had to be drastically enhanced and automated. By

[24] Fallah, S. S. (2011) Public finance in Liberia: Re-starting from scratch. Development and Cooperation. https://www.dandc.eu/en/article/re-starting-liberias-tax-system-scratch

digitizing the local tax administration systems, the government could broaden its tax base, increase domestic revenue, reduce the governments over reliance on foreign aid and natural resource revenue, reduce tax compliance related costs, and improve transparency and accountability.

13.2 Impact on tax administration and taxpayers

In 2005, immediately after the Country's fourteen years of civil unrest, tax administration was still being run as one of the many functions under the Ministry of Finance. During this time, Liberia had not eliminated physical human contact as far as revenue collection was concern and the system faced several challenges and limitations. This manual mode of tax administration, which was associated with weak administrative capacity, gave rise to high level of manual record keeping that correlated with a severe compliance cost. Revenue collection through this highly manual system of tax administration over time increased the tax collection gap negatively, as well as increasing gross levels of corruption and inefficiencies.

A benchmark study was conducted in 2016 in which Liberia's tax administration, including tax policies and processes, were benchmarked against international best practices to assess the level of effectiveness and reliability. The study identified major gaps and resultantly set up the stage for major tax reforms in Liberia. Some of the gaps identified included:

- The lack of an automated/ electronic filing and payment platforms.
- Limited avenues to make payments (i.e., mobile payments, etc.)
- Little to no tax payments through commercial banks.
- Non-existent tax-return processing centre and low data availability as a result.
- Lack of an automated compliance monitoring system.
- Limited role of the LRA call centre in promoting taxpayer education; and
- No regular taxpayer surveys.

The year 2009 represented a major milestone in the history of digitization of tax administration in Liberia. The Government initiated one of its first digital systems, the Automated System for Custom Data (ASYCUDA). In addition, the Standard Integrate Government Tax Administration System (SIGTAS) and the Tax Administrative System (TAS) were also adopted by the Government.

Liberia deployed the ASYCUDA system to its major customs ports covering approximately 85% of trade. Whilst the system conducts most of customs transactions, payments are yet to be made electronically. Before the introduction of ASYCUDA, all of Customs declarations were manually handled through physical human interaction on a document called the Single

Administrative Document (SAD), which during these periods facilitated the movement of goods from the port of entry to the payment of duties.
The entire process and the standard procedures associated with the declaration of goods at the time was manually conducted in Liberia, which was very convoluted and time consuming. In addition, it spread out sufficient room for collusion, which adversely impacted domestic revenue collection. As it is now, a lot of success stories are associated with the introduction of the ASYCUDA as well as challenges. The Department of Customs at the LRA can boast of a paperless transaction, that is, from the point at which the importers purchase their imports to a point where it is cleared at the various ports of entries in Liberia.

The LRA's administrative efficiency to collect import duties using ASYCUDA have improved tremendously. With the use of the ASYCUDA, Customs administration in Liberia is now able to:

a. Track the movement of goods.
b. Track the supply chain of goods.
c. Conduct Time Release Study (TRS), that is, how long it takes to clear a container from our ports.
d. Combat evasion.
e. Conduct audit risk profiling on an automatic platform.
f. Deal with voluminous importation.

The use of the ASYCUDA has also improved the processes of exemption (Tax Expenditures). That is, it takes at most 5 or less minute to complete an entire exemption documentation, a process that took up to two weeks to complete a single entry. The digital skills of the ASYCUDA conducts approximately 90% of Customs e-audits as it stands today at the LRA.
The Domestic Tax Department is the one of the core organs of the LRA. The Department is responsible for assessing, collecting, enforcing, and auditing all domestic taxes including property taxes. It collects 70% of Liberia's domestic revenue.

The Standard Integrate Government Tax Administration System (SIGTAS) and the Tax Administrative System (TAS) were legacy systems introduced by the Government of Liberia to improve the business process of the tax administration. However, due to the fact that these systems did not have e-tax capabilities, the LRA made a decision to discontinue their usage and procured a new tax administration system.

The Liberia Integrated Tax Administration System, (LITAS) is a tailored made tax administration system that was piloted in October 2022 and fully rolled out in February 2023. Major features of LITAS include:

a. Accessible using internet.
b. Mobile adaptable.
c. Online taxpayer registration.
d. Online filing.
e. Online payment.
f. Taxpayer access to tax accounts.

The LRA has also introduced other digital platforms in its digital journey to ensure that convenience is brought to the taxpayers in their dealings with the LRA.

a. Introduction of Electronic Fiscal Devices – October 2021. Cash machines are deployed to the premises of the taxpayers for the collection of sales data and the payment of sales tax.
b. Mobile money – March 2018. Use for the payment of taxes and other administrative fees.
c. Excise Tax Stamps – April 2022. It is a digital track and trace system that enables the LRA to monitor the production and importation of both alcoholic and non-alcoholic beverages.
d. Real Property Registration App. – March 2018. The App enables the mobile registration of real property.
e. Real Property Valuation App. February 2023. The App enables the mass valuation or appraisal of real property.

A major component of the Liberia Revenue Authority digitalization journey is the integration of LITAS into other digital platforms to ensure and increase the efficiency of tax administration. To date, the System has been integrated into the National Identification Registry and three commercial banks. Efforts are afoot to expend the coverage.

13.3 Lessons from Liberia's experience

Table 15: Lessons from Liberia's experience

Experience	Lesson
The Implementation of ASYCUDA	❖ Timely processing of declaration ❖ Significant reduction in collusion ❖ End to end paperless transaction with real time monitoring. ❖ Increase in Domestic Revenue ❖ Improved efficiency in Custom Administration ➢ Classification Goods ➢ Country of Origin

	➢ Time release study ➢ Track movement of Goods ➢ Track supply chain of Goods. ➢ Combat evasion. ➢ Automated risk profiling ➢ Dealing with voluminous Importation ❖ Track Duty Free
The Implementation of Standard Integrated Tax Administration System	❖ Increase Compliance and Efficiency in Tax Administration by automating Processes and Procedures ➢ Registration ➢ Filing ➢ Payment ➢ Arears Management ➢ Audit ➢ Return Processing ❖ Reduce Collusion
Implementation of Liberia Integrated Tax Administration System	❖ Reduce Compliance Cost on the part of Taxpayers by introducing Self-services. ➢ Online Portal to Tax Information ➢ Online Registration ➢ Online Filing ➢ Online Payment ❖ Improve data quality. ➢ All services are online allowing data entry to be done by the taxpayers. ➢ Integration with all Commercial Banks to allow for real time debit and credit into the tax accounts of taxpayer. ➢ Integration with Government Ministries, Agencies, and Commissions for push and pull of data to do analytics. ➢ Integration with Utilities Companies for intelligence gathering and data analytics.
Implementation of Electronic Fiscal Device	❖ The implementation allows for the deployment of electronic cash machine at the premises of taxpayers for the sole purpose of recording sale transactions and

	adequately reporting tax revenue. Some were integrated with existing solutions while others were stand alone. They all have the capabilities of recording, storing, and transmitting sales data in real time. ❖ It serves as a deterrence to undeclaration of sales revenue by taxpayer.
Mobile Money Implementation	❖ This targeted taxpayers without Bank Account but needed to make settlement of tax liabilities or payment of administrative fee.
Excise Stamp Implementation	❖ To combat smuggling ❖ To fight tax evasion through under declaration or production by taxpayers. ❖ To improve the certainty and predictability of tax revenue.
Real Property Registration and Valuation App	❖ Capturing, Registering, enumerating, and appraisal of real property. ❖ Increased Domestic Resource Mobilization.

14. JAMAICA - THE DIGITALIZATION OF TAX ADMINISTRATION

14.1 Background and technology

Tax Administration Jamaica (TAJ) accomplished the successful implementation of its Revenue Administration Information System (RAiS) project in December 2016. The primary emphasis of this initiative was on establishing an efficient tax system rooted in the principles of simplicity, transparency, maintaining revenue adequacy, and broadening the tax base.[25]

The RAiS implementation included three distinct phases:
Phase 1 – Consumption taxes (2015),
Phase 2 – Income tax and FATCA,
Phase 3 – Withholding and other income sources such as Stamp Duty, Betting and Gaming, and contractors' levy.

This substantial investment represents a customized Internet-based solution equipped with sophisticated risk models aligned with international best practices. The implementation also involved the reengineering of workflow management and the transformation of core business processes through the application of modern techniques in TAJ's operations. Particular emphasis was placed on the system's ability to facilitate a comprehensive range of predictive modelling and risk assessment capabilities, a crucial feature given the organization's challenge of handling a substantial volume of data from various sources. The system's capacity to assemble and utilize this data marks a significant improvement, offering insights into compliance risks that were virtually impossible to address in previous years. The foundation is now in place to provide a structured and direct path to the insights needed for informed decision-making.

The adoption of RAIS facilitated the establishment of an integrated end-to-end system encompassing all core tax activities and non-RAIS payments. Within RAIS, all processes are effectively managed, covering case selection and management, returns processing, assessment, reporting, debt management, and real-time monitoring of payment servers. The key modules include the following:

a. Registration of taxpayers and customer access to eServices,
b. Filing tax returns and paying all types of taxes,
c. Compliance management, which identifies non-compliance and facilitates payment arrangements;

[25] http://jota.website/index.php/JoTA/article/view/303

d. Modules with auto-corrections and audit selection based on rules coded as well as predictive modelling tools.
e. Managing the objection processes.

The implementation of RaiS was associated with the following challenges:

a. Human factor (the need to hire the professionals and to find the right persons for the right jobs; managing the resistance to change; keeping on track with the project).
b. Capacity building (training of the entire staff of the tax administration and the taxpayers to educate them how to use the new system).
c. Legacy of the information systems (Finding the balance in maintaining system to provide services while the new system being developed).
d. Funding (need for robust financing to acquire and customize the IT systems, refresh of technology and launch the promotional campaign).

14.2 Impact on tax administration and taxpayers

The implementation of RAiS has significantly influenced TAJ's strategy, leading to improved customer service standards and notable enhancements in compliance rates related to registrations, filing, payments, and accurate reporting. The analytical models embedded in RAiS have served as the foundation for crafting targeted strategies to encourage voluntary compliance, enabling TAJ to actively pursue tax avoiders and evaders through intelligence and enforcement actions. [26]

Since the implementation of RAiS, there has been a substantial reduction in the time taken by taxpayers to fulfil their tax obligations. The system's user-friendly features have facilitated smoother business operations and tax payments, evident from the increasing number of positive testimonials from taxpayers and a surge in the use of the electronic services platform. For instance, the financial year 2020/2021 witnessed a remarkable 3,353% increase in electronically processed payments, with the transaction amount soaring by 819% compared to the financial year 2014/2015 (pre-RAiS implementation). [27]

The successful outcomes since the implementation of RAiS have enabled TAJ to surpass its original collections targets, leading to the continued implementation of focused compliance strategies guided by this innovative technology. In general, the implementation of Rais is associated with the following benefits for Taxpayers:

a. Streamlined processing time for both individual and business transactions.

[26] http://jota.website/index.php/JoTA/article/view/303
[27] http://jota.website/index.php/JoTA/article/view/303

b. Access to online services for major tax types.
c. Real-time access to taxpayers' accounts.
d. Reduction in operating expenses.
e. Enhanced transparency.
f. More convenient way of conducting transactions.

For TAJ, the key benefits of digital transformation are the following:

a. Efficient assignment of work to team members,
b. Real-time monitoring of assigned work,
c. Quick access to information,
d. Timely reporting,
e. Reduced processing time,
f. Lower operational costs,
g. Increased revenue collection and achievement of revenue targets,
h. Enhancement in enforcement and other compliance actions.

14.3 Lessons from Jamaica's experience

Table 17: Lessons from Jamaica's experience

Experience	Lesson
TAJ experienced the lack of professionals who would be able to work with the new Information System.	The digital transformation policies and projects should foresee the capacity building to build the competences and skills necessary for working with digital tools. The change management strategies should be implemented.
Taxpayers often lack digital literacy and the knowledge on how to work with new information systems.	It is important to set up trainings to provide taxpayers with the basic digital knowledge and to educate them how to use electronic tax services. Tax administrations might consider establishing call-centres to help taxpayers and develop a FAQ page on the online tax portal.
Jamaica had to find the balance in maintaining the existing system to provide services while the new system was being developed.	Migrating from the legacy systems to new ones is a long process that often results in coexistence of the old and new systems. An agile approach to project management plays a crucial role in its transformation, particularly when there is limited documentation and

	knowledge about the new system. This approach fosters valuable behaviors and values, such as collaboration, continuous learning, and trust among policymakers, developers, and service providers.[28]
TAJ had limited resources to implement and promote the new information system.	Tax administrations should consider all types of costs associated with acquiring and customizing new technologies. A significant amount of expenses is not related to procurement and might arise due to promotion of the new technologies withing the tax agency and among the taxpayers. Developing countries cannot rely on own resources only and might consider obtaining mixed financing, e.g., from international organizations, and technical assistance.

[28] https://www.sciencedirect.com/science/article/pii/S0740624X22001204