I☰TA Book

APPLYING NEW TECHNOLOGIES AND DIGITAL SOLUTIONS IN TAX COMPLIANCE

ARTICLES FROM PRESENTERS OF THE IOTA ANNUAL INTERNATIONAL CONFERENCE – TAX COMPLIANCE TECHNOLOGY SHOWROOM

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FOREWORD

Dear Readers,

There is a growing demand in the new technology from many tax administrations worldwide and in Europe in particular in order to improve the tax compliance, reduce the cost of operations and make it easier for the taxpayers to comply.

The pace of digitalising tax administration in IOTA member countries has increased exponentially. Tax authorities are adopting new technologies and deploying advanced solutions in delivery of citizen-centric customized services, fraud detection and prevention, use of big data, advanced analytics, blockchain and artificial intelligence. The new technologies can provide a lot of benefits to tax compliance, but also pose risks from an information security and safety perspective.

The speed of change in the digital era forces the Tax Administrations to be SMART in taxation and to be FAST and SMART in fighting tax fraud and assuring tax compliance.

Do we acknowledge fully that we are at the tipping point of the IT development TODAY? How can tax compliance be adapted to the digital era? How to align the tax compliance processes to the increasingly digital and automated business models? How can digital transformation help tax agencies to create and deliver compelling services for their customers?

Tax Administrations are typically more advanced in adopting new digital solutions than other public services. Yet, at the same time they lag behind the business community when it comes to full understanding of the speed of technological development.

The 3rd IOTA International Conference - The Tax Compliance Technology Showroom which was hosted by the Georgian Revenue Service in Tbilisi on 16-17 October 2019, reiterated and emphasized the importance of PARTNERSHIP between tax authorities, software developers, businesses and academia when building a bridge between the technology world and a very focused tax environment.

We tax what we see but the world is changing rapidly and there are more and more transactions which are invisible for Tax Administrations and this challenge needs to be addressed NOW.

In the following pages you will find some of the innovative projects and potential solutions utilising cutting-edge technology that empowered tax administrations to facilitate, improve and encourage compliance with tax obligations. I hope that you find this IOTA Book useful and we look forward to your feedback.

František Imrecze
EXECUTIVE SECRETARY
Intra-European Organisation of Tax Administrations

INTRODUCTORY SPEECH

It is a great honour for Revenue Service of Georgia to host Tax Compliance Technology Showroom. Proved and possible technology solutions, tax administrators and business representatives, members of different international organizations, showroom and parallel sessions, here is everything what is needed for a good tax compliance technology event.

We all have been observing how new developments require new solutions and how our administrations have been changed by influence of new era of technologies. New technological tools developed by our administrations as well as outsourced from outside the organization play inevitable progressive role in our daily operations.

Aspiration for innovations, extensive use of electronic services and development of user-friendly applications have always been among top priorities for our administration aiming at enhancing compliance, both by improving tax administration as well as easing interaction between tax payer and tax authority.

We have recently undergone number of big projects, from this year we have launched automated VAT refund project, also unified two electronic documents such as e-VAT invoice and e-WAYBILL. To understand the importance and scale of the reform in regards to mentioned unification I would like to mention that more than 72 million e-WAYBILLS and 23 million e-VAT invoices had been issued in our system in 2018.

When we talk about future of our administrations I think Blockchain technology has its place as a huge room for exploration on possible usage in tax area. With this regard I should mention that Revenue Service, as a customs authority is launching the project concerning issuance of certificate of origin in blockchain which gives unique possibility for a global system of validation of the issued document.

I must admit that taking into consideration the developments towards digitalization and simplification, we may observe the dramatic paradigm shift in relation to e-services and using technology in the field of tax administration. What we all need is reliable information on time and maybe in the nearest future information will be available in such amount and format that the core function for tax administration such as tax return filling will not be so vital, thus contrary use and coverage of pre-filling returns will become more and more comprehensive. More data also changes ways we may look on risk analysis as well as on tax audit and technology solutions definitely have a big say in this dramatic transformation.

Taking all above-mentioned into consideration this event is another opportunity to present existing technological solutions and share practices. This I do believe will further facilitate dialogue and will serve as a solid ground for future ideas, cooperation and development.

Mr. Levan KAKAVA
DIRECTOR GENERAL
Georgia Revenue Service

IOTA Annual International Conference, 16-17 October 2019, Tbilisi, Georgia

TAX COMPLIANCE
AND TECHNOLOGY

The data journey: from reporting obligations to advanced analytics!

The data journey starts with the creation of reporting obligations and concludes with advanced analytics. I will provide two examples of advanced analytics from the perspective of the European Commission.

Camil-Cristian Largeanu

Policy Officer, Unit C4 - Tax administration and the fight against tax fraud
DG TAXUD, European Commission

1. TAX AUTHORITIES AND THE NEED FOR DATA

Technologies and related innovation are driving a paradigm shift: tax administrations are moving towards a more integrated model to become digital tax administrations. Since digital tax administrations need data, they introduce different reporting obligations. The use of third-party data - such as data from banks, platforms, or clients - allows not only to crosscheck the information provided by taxpayers, but also to pre-fill tax returns. The administrations are introducing real-time reporting: they not only need data, they need it quicker, sometimes pushing the reporting to happen before the moment of the transaction. E-services and other administrative simplification measures, such as chatbots or online portals consume data intensely. The purpose of data acquisition is to enhance tax collection and to make compliance easier for taxpayers.

2. DATA REPORTING

The downside of the reporting obligation is that it can create additional burdens for businesses. Indeed, companies have to handle taxes that are not their own or provide data about transactions they are not involved in. Businesses are also required to use specific (and sometimes different) electronic formats. This obligation usually demands a certain degree of automation, firstly because of the data volumes, and secondly because of mandatory quality checks before sending the data to tax authorities.

Companies ask for better harmonization of reporting obligations and the Commission supports this request: it is often preferable to have one common standard rather than several reporting obligations in different Member States.

3. DATA ANALYSIS

The reporting circle closes: tax authorities receive the requested data and they have to get the most out of this data. No matter what the subject of data processing is, technology steps in with a promise: from fraud detection to error checking. Tax administrations run numerous analytical and data mining processes. By using data from various sources, tax authorities can verify if a business is VAT registered, or if the partners of a legitimate business are VAT registered and if they have fulfilled their tax obligations. Such risk-based audits require tax administrations to be capable of reviewing millions of lines of data analytically, in a short time-span.

At the European Commission, data processing and automation are empowering advanced analytics techniques.

A. TNA

The "Transactional Network Analysis" (TNA) tool provides a system inspired by social media analysis that allows Member States to exchange information and process VAT data. TNA improves fraud detection by applying advanced analytics methods. Additionally, it automates the collection of targeted information and its risk analysis. The system visualises suspicious networks without manual intervention. The figure below describes an example of such visualisations.
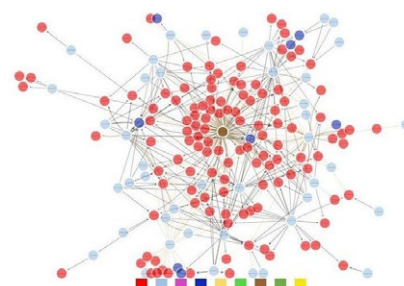

Figure 1 - Transactional Network Analysis

TNA has three main modules:

1. Data collection from several information sources like Eurofisc inputs or the VAT Information Exchange System (VIES);

2. Data processing to calculate indicators and apply business rules to score traders and networks of traders;

3. Data visualisation to give experts a current picture of the situation and allow them to provide feedback.

B. CESOP

The European Commission tabled a legislative proposal aimed at enhancing data collection on e-commercial transactions. In order to fight e-commerce VAT Fraud, Payment Services Providers (banks and e-wallets) will transfer information to Member States about cross-border payments received by economic operators. This information will then be centralised in a European database, the Central European System of Payment information (CESOP).
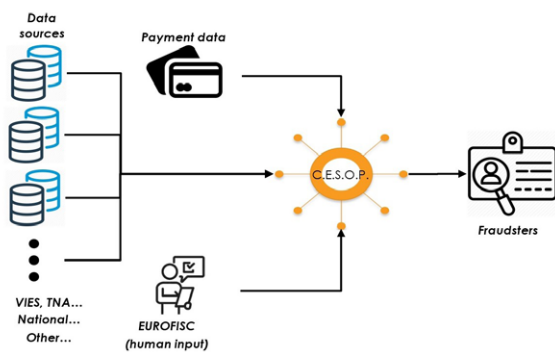

Figure 2 - Central European System of Payment information (CESOP)

CESOP will offer tax administrations a unified and evolving platform allowing advanced analytics operations on available data sources to detect VAT fraud. CESOP will receive billions of payments per quarter and will process this information meaningfully. In CESOP, specific tasks may be performed manually, with some human supervision or in a fully autonomous fashion. The technological enhancement and support from such powerful tools as "numeric AI" or "machine learning" may provide new self-learned indicators, predictive analysis and future fraud trend forecasting.

4. CHALLENGES: WORKING WITH DATA IS NOT EASY

Firstly, no data set is perfect: cleaning data and aggregating it can be complex and laborious. There is also the challenge of the visual presentation of data or translating it into business insights. Is there a 100% secure solution for the data? Are we exposed to security or compliance threats? The security of data is vital in sectors such as government and banking where the stakes of losing critical data are very high.

Secondly, the technology "hype" needs pragmatism: some technology solutions are more academic or only appear simple / feasible until they face a reality-check or IT-sovereignty red lines. Some tech solutions may need huge legislative change to work, or even an overhaul of an entire system.

Thirdly, automatic advanced analytics pose ethical and legal questions. What if innocent businesses are wrongly qualified as fraudulent or individual persons not involved in e-commerce fraud are wrongly reported?

Fourthly, the technology transformation of any organisation suffers from shortages of skilled people, appropriate tools and data. Public acceptance of any technology possibly perceived as intrusive is also an issue. People may give access to their data more easily to a private company (e.g. for a fidelity cards/coupons) than to tax authorities.

Finally, in data sharing, the system as a whole is as strong as its weakest link.

5. THE POWER OF WORKING TOGETHER

Maybe some tax authorities dispose of data sources at national level, but the real value comes from pooling all information to be able to see what otherwise is invisible. There is a huge potential to fight fraud of several types by bringing together data and expertise from different places: the European Commission, national authorities, and industry. The Commission plays an essential role in this by bringing the actors together, pushing for standardisation and coordinating the individual efforts for a higher collective achievement.

Entering the Era of the Digital Tax Agency

By applying technology in a human-centred and collaborative way, tax agencies can drive compliance through citizen engagement

Gabriel Bellenger

Global Consulting Lead for the Revenue Industry, Accenture

These are challenging times for tax agencies, as they face intensifying pressure to adapt their systems, people and processes to new realities. If they're to succeed in doing this, technology must be part of the solution.

Only by transforming into a digital tax agency can they support compliance while also responding to fast-evolving citizen and employee needs and new service requirements. To realise the full potential benefits, this transformation must also involve viewing every interaction with a taxpayer as an opportunity to help them cope with changing circumstances in their personal and tax lives, often – sadly – including job losses and reduced incomes.

However, trying to use technology to help people in this way raises a host of questions. Consider, for example, that by the end of 2020, half of all digital searches will be voice-based. What's more, Alexa or Siri are already writing our shopping lists for us. But how can we be sure that these machines are really acting in our best interests? How can we be certain that they're acting in harmony with our human needs and desires?

BARRIERS TO TRANSFORMATION

To answer such questions in a way that builds confidence and trust among taxpayers, the tax system – and the agencies that manage it – have no choice but to transform using digital technologies. The good news is that this process is already underway, as old systems and processes are updated for new times. But progress is gradual rather than rapid, and there are still many barriers in the way.

One is a shortage of vital skills. Research by the OECD has found that 59% of recruitment agencies have trouble finding people with the right skills for tax agencies. And with 26% of central government employees within the EU (43% of them senior managers) likely to retire in the coming decade,[1] this skills gap can only worsen.

Meanwhile, the 2019 Accenture Taxpayer Survey found that significant numbers of citizens still struggle to understand and follow tax rules. Some 15% of US and 10% of UK respondents who work in the digital economy told us they're unsure of their tax obligations. Respondents from other countries are even less aware: in South Africa, for instance, as many as 26% were confused, compared to 24% in both Norway and Denmark.[2]

If tax agencies could more closely align their data, people and processes in ways that best suit how we think, behave and want to consume information, they would create a fairer tax system that engages citizens more successfully. To make this happen, three steps are key:

1. LEVERAGE AI AND AUTOMATION

With their ability to read and interpret large amounts of data, machine learning and other AI technologies are enabling process, workforce and organisational transformation on a massive scale. One European insurance company has completely restructured its workforce as a result of AI deployment, moving 30,000 roles from compliance claims into an enlarged customer service function that can handle disputes faster and deliver swifter and more effective customer services.

What works for insurance can also work for tax agencies. Identity Resolution technology, for example – which uses data to define and create a unique customer identity – reduces fraud by enabling faster, more accurate identification, while also making processing more accurate. A case in point is the Belgian government, which is using AI-powered analysis to identify transactions at risk of Value Added Tax (VAT) carousel fraud, and has saved nearly one billion euros a year as a result.[3]

2. INTEGRATE SERVICE AND COMPLIANCE

Every interaction with a taxpayer, from identification to payment, is an opportunity to help and engage with

taxpayers in ways that positively influence compliance behaviour. With this goal in mind, forward-looking tax agencies are using AI to help taxpayers file their returns in a timely, efficient and right-first-time way.

This service covers simple processes from getting a customer's postal code right to carrying out highly complex tasks such as calculating net versus gross profit, spotting filing anomalies and checking tax submissions against those filed for previous years. The focus is on preventing non-compliance from happening in the first place, not on correcting mistakes after they have been made.

By way of example, take the Australian Tax Office, which has built a Customer Analytics Record that provides a single source of information for calculating a taxpayer's non-compliance risk and predicts their propensity to pay a debt. This innovation has not only improved the agency's operations, reduced complaints, improved compliance rates and delivered financial gains. It has also boosted confidence among taxpayers that the tax system is fair and equitable.[4]

## 3. BUILD A COLLABORATIVE ORGANISATION WITH PEOPLE AT ITS HEART

Putting humans at the core of compliance management benefits both the tax agency and the citizen. Tax agencies that engage with customers and provide tailor-made tools to solve service issues and spot errors can help to educate customers about processes, while also preventing both costly mistakes and nerve-racking uncertainties for the taxpayer.

The following capabilities are essential:

- **Agility at all organisational levels:** Combining human and machine capabilities in an agile organisation is essential to maximising tax filings, ensuring tax compliance and ultimately full value for the public purse. Agencies should jettison siloed, hierarchical structures and instead drive agility in IT, thinking and working holistically right across the organisation.

- **Relentless customer focus:** Already accustomed to a high degree of consumerisation in the private sector, taxpayers now expect similar levels of customer service from the public sector. If they are placed at the center of the tax-filing process, technology can help and enable them to be tax compliant. When a tax-filing error is detected, for example, the tax agency should immediately raise alerts or halt a transaction that could hinder the taxpayer's compliance. The taxpayer should then be offered tools to help them correct any mistakes. If despite all available assistance an error does occur, the tax agency should investigate by reviewing the data entered against the customer's case history. This will enable the agency to determine the best way to resolve the problem and maximise the citizen's compliance, now and in the future.

- **Expanded ecosystem:** Culture and innovation act as mutually enriching values in a collaborative organisation. Government agencies, including tax agencies, must embrace a new role as curators of ecosystems. By fully enabling data sharing through IT infrastructures, agencies will achieve new levels of efficiency and innovation. The outcomes for the organisation and the citizens they serve will be worth the effort.

Service & Compliance Integration
Every interaction with a taxpayer from identification to payment is an opportunity to positively influence compliance behaviour
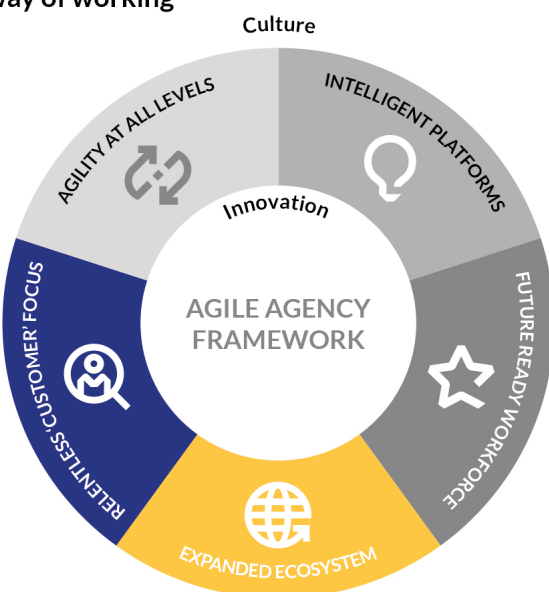
WWW.IOTA-TAX.ORG
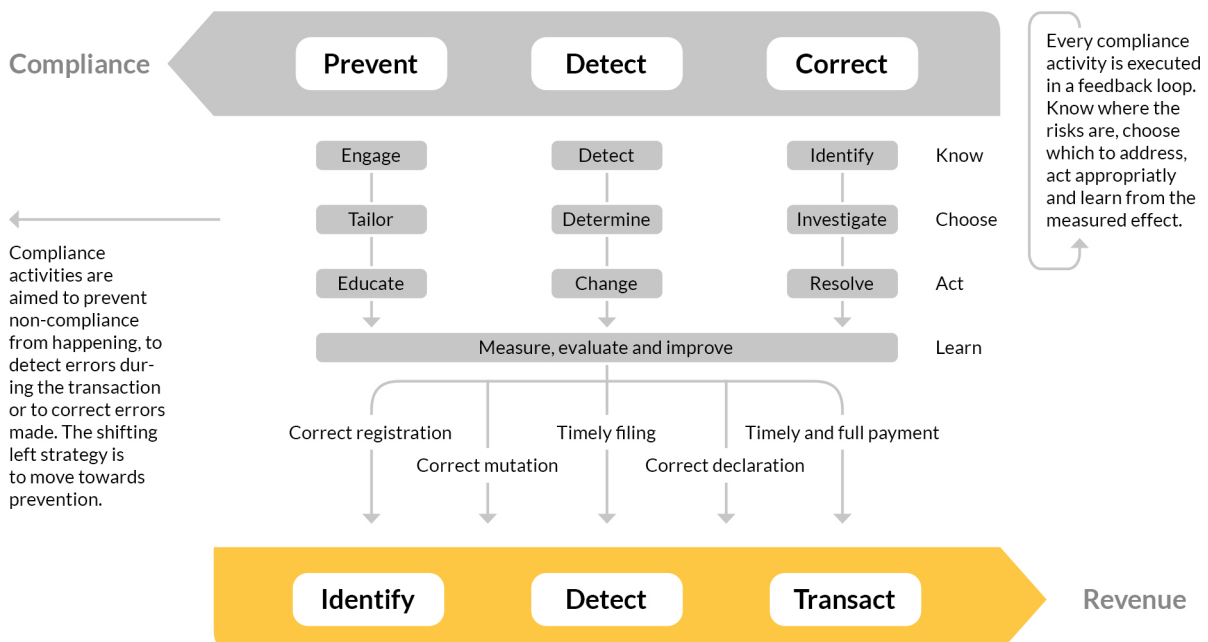
- **Future-ready workforce:** An aging workforce needs support to navigate constant change. Life-long training, reskilling and upskilling of employees to help them embrace new technologies and disruptive ways of working are crucial. With remote working becoming increasingly common – and indeed necessary – new collaboration tools will be needed to support communication, consistency and information-sharing across a more distributed workforce.

- **Intelligent platforms:** Given the mass of data now at hand and governments' growing expectations of how best to use it, traditional approaches need business agility to respond to ever-changing policy demands. Automation and AI will help drive efficiencies and deliver speed and greater accuracy in revenue collection. With assistance from a human or AI-enabled chatbot, for instance, every compliance activity can be executed in a feedback loop that enables a mutually-beneficial virtuous circle: tax agencies will know where the risks are – and be able to address them appropriately while learning from the process, thus increasing their ability to help and support taxpayers.

There are 5 key capabilities to change a tax and customs organisation to a collaborative way of working

A STRATEGY FOR TOMORROW

Tax agencies can meet the needs of both government and taxpayers more effectively, provided they embrace new technologies and navigate the strategic operational shifts required in the digital age. By investing in new technologies that increase process automation and enhance customer service, they can engage citizens and influence their behaviours in ways that promote and reinforce compliance.

Strategic changes made today will yield significant benefits tomorrow, especially around the reliability and efficiency of tax collection and assessment. The digital tax agency is in our grasp. Now is the time to make it reality.

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[1] OECD Government at a Glance 2017

[2] Accenture Taxpayer Survey 2019

[3] https://www.vatglobal.com/vat-news/new-super-weapon-against-vat-fraud-in-europe

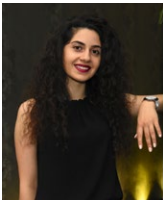[4] https://www.accenture.com/au-en/success-australian-taxation-office

ELECTRONIC TRANSACTIONS
AND REAL-TIME REPORTING SYSTEMS

Big Data Analysis Towards the Future

Meri Sakanyan

IT Service Responsible,
State Revenue Committee of the Republic
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INTRODUCTION

Since the introduction of the E-invoicing system, and the new generation cash register machines the volume of data in databases has increased to terabytes. As a result, data analysis and extraction became harder and time consuming.

In parallel with technological development a need emerged for users (tax authorities) to have the ability to follow statistics of tax authority processes in real-time. To achieve these results, in 2018-2019 SRC of Armenia introduced a Big Data analytics and reporting system. It was implemented to take preventive measures.

BIG DATA ENABLES NEW ABILITIES

The Introduction of a Big Data analytics system enabled the analysis and output of constantly growing data volumes in seconds. By using Big Data search technologies we are able to group product names, which allows searching products based on a single word in all related documents. It should be noted that the database is updated every night.

All this helps our statisticians and analytics professionals to work faster and more efficiently.

NEW REPORTING SYSTEM

During data analysis a need occurred to introduce a new reporting system that would enable our colleagues to use the systems more efficiently. This year SRC of Armenia introduced a Reporting Service that flexibly delivers the right information to users. Our analytical system is based on modern analytical technologies and has the following three subdivisions:

Mobile reports: One of the primary goals of SRC is to provide users with statistics and analysis of all tax transactions as accessibly as possible. For this reason, we have created mobile reports that show the statistics of data for each period of the last two years, using graphs. One of the advantages of this format is that mobile reports are available on any type of device.

Graphs have already been created of Corporate Income Tax for 2018-2019 Summary data, Turnover Tax Summary data 2018 versus 2019, Combined Tax Return form for VAT and Excise Tax, Income Tax Summary data, Wages by Gross Income

Ranges, Customs Summary data, Dynamics of Single Treasury Accounts, Real Payments to the State Budget, Payments to the State Budget by tax types and the most
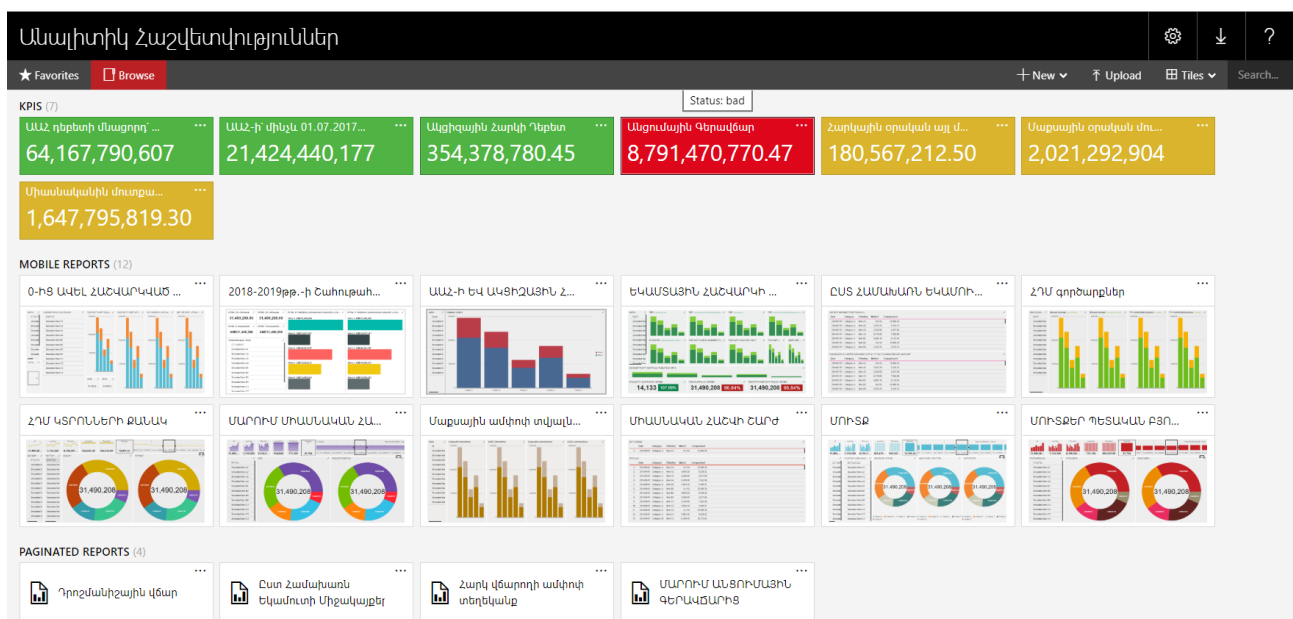
consumed goods in Armenia, itemised according to regions and periods.

The main advantage of this system is that any user can compare different data of periods or regions with each other and come to the right conclusion.

KPIs: This section of the system allows users to view tax payments in real-time. Due to this feature, the work of SRC is presented more visually and transparently.

Paginated reports: In this type of reporting form we placed reports which can help users to obtain the most requested information. For example, users can upload the taxpayer's summary information report or the report of all e-invoices in A4 format. These reports allow the user to search from a database for any data, for any period of time, and get the desired results in seconds. The results of the Big Data analysis are most evident in this type of reporting.

In these kinds of reports, it is possible to enter one word of a good's name as a parameter and the system will find similar words and all possible products from the entire product listings, by using the principles of Big Data analysis. In the next step, after receiving the TIN of a company as the second parameter, the system finds the procurements and sales of the goods specified by the organisation to receive a general picture on the supply chain from import to end use or export. For now, the system only identifies products with full names.

This process enables analytics professionals to analyse growing volumes of structured transactional data and see the whole circulation with product traceability.

One of the system's most important features is that it can provide users with analytic report results in any form (Excel, pdf, etc.)

Currently, works are in progress to develop data processing so that products are identified as accurately as possible, including the same products written in different languages, and searching several words at the same time. All this will allow linking the tax and customs systems, and receiving a general picture on the supply chain from import to end use or export. This will allow applying a more targeted approach to tax inspections.

CONCLUSION

Due to new generation cash register machines and the E-invoicing system, in Armenia the entire supply chain is electronic and we have 100% accurate statistical data, which allows making proper public policy in security and vitally important sectors.

The modern system of risk rating and notification

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INTRODUCTION

How can we improve tax compliance and administration, while reducing tax evasion and disciplinary costs? Business processes were developed and reform directions were defined by cooperation between the SRC and the best international experts. The applicable program was initiated by the Tax Administration Modernization Project (TAMP) for the following purposes:

- Reducing the labour and financial costs of tax compliance in the private sector through the expansion of e-governance systems;

- Improving risk management and tax discipline;

- Improving the performance of RA SRC, by the reorganization and automation of business processes.

- As a result of this, in April 2017, a Monitoring Division was set up within the SRCSR Department of the RA SRC. The purpose of the division was to create a new taxpayer culture by collecting, analysing and monitoring information on taxpayers available from the SRC and other public administration bodies, to introduce automated risk-based inspection processes and to provide taxpayers with new high quality services. As a result, we now have a program that has reached all of our targets. Gathering information is not the goal in itself. As a result of combining the gathered information, we should ultimately understand which taxpayer is risky and which is not risky, and extend our control activities to risky taxpayers only.

MONITORING CENTRE

Taxpayer behaviour is monitored online from the Monitoring Centre. An automated system decides if a taxpayer is risky or not, according to developed standards. It is important to note that the subjectivity factor is completely ruled out. Thus, if our staff decides to send a notification to a taxpayer determined by one or more of the subjective factors, the system rejects it because the taxpayer's identification number is not on the originally created list. The electronic platform analyses daily transactions with cash registers, settlement documents,

as well as the risks associated with income tax filing and employee registration, taking into account a number of sectoral features (seasonality, sector, type, etc.).

Note one of the criteria of risk assessment: the taxpayer did not operate the cash register until 4 PM for 3 days, or revenue was generated for only 1 hour per day. At the same time, the field of this taxpayer is the sale of consumer goods (bread, butter, eggs). Notifications are sent electronically to the taxpayer's personal online office created through an online file system. Through these notifications taxpayers are informed about the risks of their activities, after which they can provide an electronic or other explanation for the risks (for example by Email). However, if the explanation provided is not substantiated and the taxpayer continues to exhibit such behaviour for other days of a month, then the monitoring centre marks the taxpayer on an inspection list.
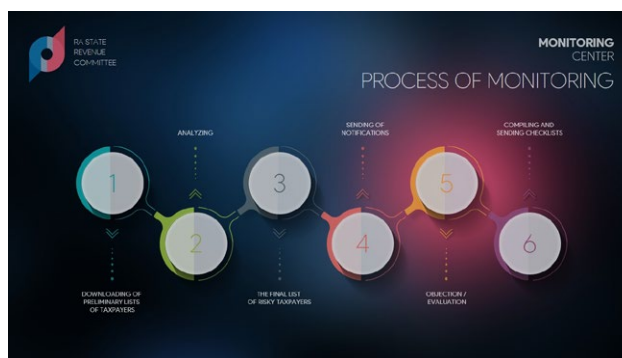
"Image 1 / The process of Monitoring"

By the way, there is also a high level of taxpayer awareness, as the information about notification, in addition to the reporting system, immediately appears in the window of the cash register operated by the taxpayer.

So the taxpayer can only print the receipt on the cash register after pressing the "Accept" button .

CONCLUSION

It is safe to say that the dialogue with businesses has shown results. In the past from the first sign of the risky behaviour, the taxpayers were immediately supervised and obliged to a commitment, now, they are given the opportunity to improve their behaviour independently and present a corrected report in the case of less tax paid to the state budget. As a result, public funds spent on control measures have been substantially reduced, and taxpayers' perception of the tax administration has improved, increasing public confidence in the state and the SRC.

Electronic Invoicing in Latin-America

Raul Zambrano

Technical Assistance Director
Inter-American Center of Tax Administrations

CURRENT DEVELOPMENTS AND LESSONS LEARNED

The implementation of national systems of electronic invoicing in Latin-America is a well-known trend. Leading countries in the use of the technology, such as Chile, Brazil, Mexico and Argentina, with adoption levels close to a hundred percent of all registered invoice issuers, are followed closely by Ecuador, Uruguay and Peru that have significantly expanded the number of issuers and documents, with only small taxpayers still using paper based invoices.

In the last couple of years other countries have joined the club: Colombia put in place a new operational model implementing a pre-clearance model supported by a cloud based application hosted by the tax administration that reached mandatory level for all large taxpayers by the end of 2019. Costa Rica went into full production establishing a mandate for all taxpayers to use the system currently handling over a hundred million documents per month. Guatemala implemented a new operational model that replaced the old GFASE based model with one that would match the tendency elsewhere in Latin-America, where all documents are transmitted to the

Figure 1 Year of introduction of e-invoice

tax administration. The Dominican Republic, Panama and Paraguay started their own systems with all three

countries conducting and successfully concluding their pilot projects and preparing for general production in the voluntary phase. Bolivia, El Salvador and Honduras have ongoing projects for the development and adoption of their own national systems, while Cuba is planning to start its own project in 2020.

Tax administrations, particularly those with solid and stable systems are using the data in different ways, either to improve control or to provide services. A few examples of use:

- Implementation of electronic audits in Mexico, where tens of thousands of audit processes have been conducted. The processes include the generation of audit working papers for the audit until the preparation of reassessment notices when needed.

- Implementation of on-line monitoring of the transit of goods in Brazil, where the state tax administrations could track transports carrying sensible goods across state borders based on a combination of technologies (OCR readers, RFID antennas and dynamic weights) with electronic documents (invoices and transport guides) to detect possible fraudulent operations that would try to unfairly take advantage of inter-state commerce rules.

- Mobile applications that ease the issuance of invoices for taxpayers under a simplified regime in Argentina that saves time and money while meeting their obligations to both the tax administration and their customers.

- A large-scale project by the Chilean tax administration for factoring electronic invoices that have opened access to fresh resources regarding a lot of taxpayers. Although the number of exchanged documents is not very high, the traded values are impressive, reaching a couple of percentage points of GDP.

- In Chile, the tax administration is preparing input and output registries for all VAT taxpayers, lifting their requirement to keep corresponding books. Moreover, SII is pre-filling VAT returns with an acceptance rate above 90 percent among all VAT registered taxpayers. Following the trend, Ecuador started to pre-fill some fields of VAT returns in early 2019 and various countries
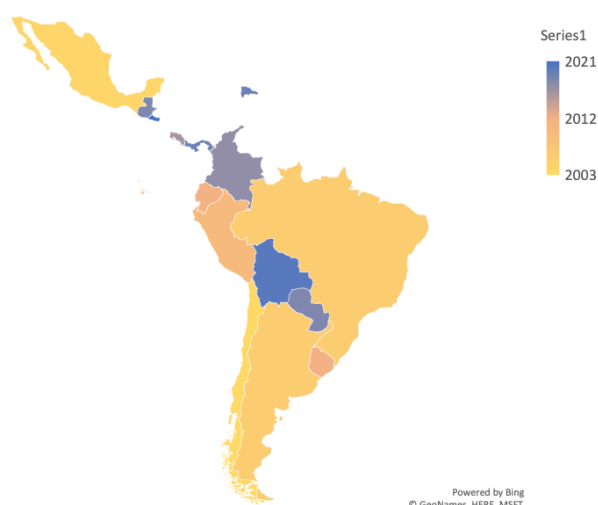
are currently working to join these two countries in such an adventure.

- In some Brazilian States, there are currently mobile applications available for the general population to query the best prices of goods (based on the barcodes they had), not according to advertisements but the actual prices of these goods at businesses located a few kilometres from where the user is querying the app. Also, some states have adopted a best-price approach for government purchases of some goods, particularly consumables, getting important economic gains compared with previous years.

- Mexico adopted a standard catalogue to assign codes for goods and services to be used by taxpayers in the country, a process that can be followed in the near future by Costa Rica and Uruguay, while Brazil adopted GS1 for certain goods (the tax system gives consumption taxing rights on the majority of services to municipalities). On the other hand, Chile conducted a Proof of Concept exercise to use the details of the items in the electronic invoice with a machine learning process in order to assign codes to goods and services and identify the potential misuse of credit in purchases not related to the main purpose of a business.

Figure 1 The benefits of e-invoice systems

The rest of the presentation focused on lessons learned. It was presented with the help of quotes and images of moving pictures, summarised here:

- Different solutions for different countries (*Using a "One-size does not fit all, based on Laurel and Hardy distinctive hats" reference*)

Tax administrations in the region currently have over 100 billion electronic documents, all of them prepared in XML under the national standard for the operation, and digitally signed with a private key under some kind of PKI infrastructure. A low-cost (or no cost) solution for small and mid-size taxpayers is available.

There are many differences among the working models, and there have to be. Some come from the fact that the tax systems are different, but others are consequences of local realities, budgeting or infrastructure limitations, legal and regulatory constraints as well as culture.

One key difference is the handling of B2B vs. B2C transactions. In some countries B2C transactions are

documented with other documents instead of invoices. Some countries treat the two kinds of operations exactly the same. The implications are broad and include a larger base of taxpayers that need to issue invoices: small taxpayers that deal only with individuals, or a larger number of documents to be issued, transmitted and processed as well as differences in the expectations the buyer would have in different situations. To illustrate the last point, just consider the difference in expectations of invoice delivery time between customers waiting in line at a supermarket and those ordering construction materials over the phone.

Another important difference is the standard for the document itself. Each country has its own national standard (that could be further specialised per type of operation or economic sector), with the exception of Colombia and Peru that adopted OASIS's UBL standard, but still with some country specifics. Although the majority of taxpayers in each jurisdiction operate at the national level and benefit from a tailored-made standard that matches local language, common practices and culture, it has to be said that companies that operate in more than one jurisdiction have to deal with different standards and operational models forcing them to either develop different solutions for each country or to build a more adaptable solution that can be used in different jurisdictions.

- The operational models vary a lot, some use the clearance model (operated by the national tax administration in Colombia, by two or more tax administrations at the state or national level in Brazil, or with the help of private companies that act as proxies in Mexico), others concurrently receive the documents without the need of approval before issuing the invoice, as is the case in Chile or Ecuador. The Panamanian approach uses a clearance model for B2B operations and a post-clearance one for B2C.

The implementation of a clearance model is complex and demanding in terms of resources. If adopted, the tax administration should use on-line monitoring focused on identifying and stopping fraudulent operations.

- Systems will be widely adopted only when mandatory (*Paraphrasing Hamlet's "To be or not to be"*).

Full scale adoption of electronic systems has only happened after required by law for a large part (or all) of taxpayers, setting an adoption calendar for different taxpayer groups. Countries have adopted different criteria for defining when these groups should join the system. Brazil chose full economic sectors to enter at once, while other countries opted for size in terms of revenue, setting dates for specific thresholds.

In some cases, a number of taxpayers that were already included in a particular regime, for instance a self-printing invoice authorisation, where required to adopt the system early.

- Some fraud operations continue to exist (*Using the poster for the "Usual Suspects" movie*).

The introduction of electronic invoicing discourages many fraudulent practices but not all of them. In particular, those involving false invoices to inflate credit for VAT, or expenses to be deducted from income tax. In the new environment some bad actors continue this practice. The invoices are well formatted and digitally signed, by usually new companies. Sometimes even the flow of money from buyer to seller exists, although the goods or actual services do not exist or do not correspond with the values in the invoice.

Data analysis can help tax administrations identify elements that signal possible fraud, giving visibility to a problem that might have been swept under the carpet. In the old days, tax administration would have found these cases from a tip or during an audit with some luck involved.

Under the new situation, these companies can be identified, and action can be taken within a short period. Some strategies used to cope with the issue include special types of invoices, called "M", that would result in a withholding of tax on the buyer's side of risky operations with new taxpayers in Argentina, along with a system that would publish the names of companies that have inappropriately used the scheme in Mexico, an approach called EDOS and EFOS, or the prosecution of all actors involved in other countries.

- The responsibility of guarding the information (*Using a reference to Peter Parker's "With great power comes great responsibility"*).

The information contained in the invoices, if exposed, could present issues by compromising the privacy of individuals or passing reserved information of companies in terms of customers and prices to other competing businesses. Leaks of information would damage trust in the system and could affect society's perception of the tax administration. A careful approach must be implemented to grant access only to limited information in specific cases and to anonymize data when possible for larger analysis.

# Online Invoicing System – real time data, real time effect

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On 1 July 2018 the Hungarian National Tax and Customs Administration (NTCA) introduced a new online reporting system, the Online Invoicing System.

The objective of the introduction of online data reporting and the establishment of the data management system is to further whiten the economy by discouraging tax fraud. This is complemented by the free online invoicing function, as a service of NTCA. With this development a large volume of invoice turnover become visible and traceable for NTCA, consequently risk management is more effective and VAT revenues can be significantly increased.
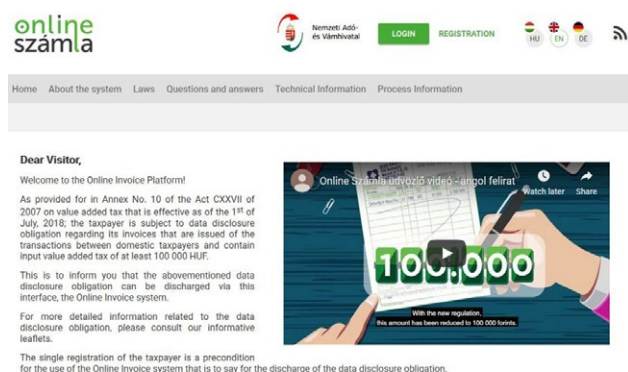
LEGAL BACKGROUND

After the regulation the taxpayer is subject to data disclosure obligation regarding its invoices that are issued of transactions between domestic taxpayers and contain input value added tax of at least 100,000 HUF. This means that current Hungarian legislation requires invoices but not taxpayers to be reported.

The reporting obligation is primarily an expectation to apply invoicing software. Consequently, the regulation does not allow manual intervention on invoices issued by the software. If the invoice is issued from a manual invoice book, the taxpayer still has to comply with the reporting obligation. In this case, the taxpayer must enter the details of the invoice in the tax administration interface within 4 days.

From 1 July 2020 the amount threshold will be abolished, and from 1 January 2021 all invoices will be subject to reporting. Thereby, from 2021 the Hungarian tax administration will get all B2B and B2C invoices in real-time, if the invoice is issued by a Hungarian taxpayer.

TECHNICAL BACKGROUND

One of the principles of the invoice reporting project was to share information and ensure transparency. NTCA set up a separate website for invoice reporting where it published all the information needed for development and reporting. The website is accessible at: https://onlineszamla.nav.gov.hu. All the information on the website is available in Hungarian and in English, and the most important information is also available in German.

WITHIN THE ONLINE INVOICING SYSTEM

- real-time data on issued invoices arrive to NTCA;
- issued invoices can be queried by the recipients as well as the invoice issuers;
- a large amount of the invoice data is rapidly available for the purpose of effective risk analysis and auditing, which assists in the detection of tax fraud;
- with the automation of the data report, administrative burdens are reduced for the users of billing/invoicing software,
- the new system substitutes the consolidated data report of invoice issuers.
- The system provides real-time feedback messages on all invoice reporting. The feedback draws the attention of the taxpayer to possible invoice content misrepresentations as well as deficiencies.

IMPACT ON TAXPAYERS

Invoice reporting has clearly contributed to the digitisation of taxpayers. The Online Invoicing System is essentially

an invoice data standard that companies had to adapt to. The adaptation does not have a deadline, it is more like a process. NTCA can closely monitor this process through the quality of reported data.

For a large part of taxpayers, the reporting obligation initially meant an IT development obligation. According to initial feedback, most companies only wanted to comply with legal requirements, without thinking about what other changes this would mean for them. In many cases, the development involved the rethinking and rationalisation of invoicing processes.

After about a year, several companies realised that the obligation to provide data was also an opportunity in their digitisation process. Currently, NTCA integrates several taxpayers' ideas in the system, which includes increasing the efficiency of business processes and digitising previously manual activities.

In many cases, after an initially difficult implementation, a significant group of companies, tax consultants, accountants and IT developers expect additional services and support from the tax administration. This is also because NTCA was very supportive from the beginning, and was able to solve (or showed solutions for) many issues and problems quickly and efficiently. According to taxpayer feedback, the introduction of the Online Invoicing System and its communication as well as the related tax administration activities, clearly strengthened confidence in NTCA.

At the same time, the taxpayers who were unable to adapt to the challenges should also be considered. If a taxpayer remains with manual invoice issuing, complying with this obligation will entail significant administrative costs. The tax administration expects that the increase in administrative costs will drive these taxpayers towards the invoicing software.

IMPACT ON TAX ADMINISTRATION

NTCA developed a new IT system, which is able to receive and control invoice data in real-time. NTCA uses the data in risk analysis as well as in auditing and enforcement processes. Thanks to the new digital systems of NTCA (Online cash register, EKÁER, Online Invoicing System), the tax gap in Hungary decreased to 9% in 2018.

Reporting represents a significant increase in data for the tax administration, requiring the use of new tools and new solutions. Although NTCA has developed very well over the past year, there are further opportunities in this area. The main goal is to link the invoicing data to more data sources, so NTCA can get a more realistic picture of each taxpayer and the relationships among taxpayers.

The invoice data are not only useful for risk analysis. They also have an impact on the effectiveness of audit activities. It cannot be expected from such a system to

detect previously unknown tax evasion methods. But it clearly provides more effective detection of tax evasion and tax fraud as well as faster reaction time.

Invoice data is also used by the tax enforcement area. For companies with tax debts, enforcing a claim is much more efficient if the executor sees through an automated system when an invoice is issued.

Real-time invoice information is also a treasure trove for criminal investigators. In the case of tax fraud in a criminal organization, analysing invoice data can provide significant support for detection work.

According to the above, it is evident that invoicing information is important for tax administration departments. In the future, invoice data will certainly be increasingly integrated into tax administration processes and thinking.

SERVICES
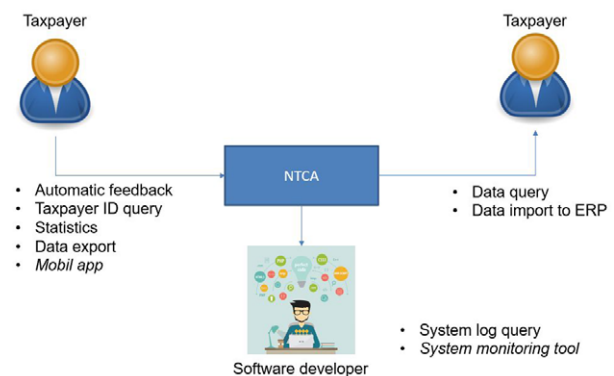
NTCA did not only develop this IT system to fulfil legal obligations, it also considered what kind of services the tax administration can offer to the taxpayers. The following services were developed by NTCA to help the work of Hungarian taxpayers:

- Invoicing software
- Automatic feedback
- Taxpayer ID query
- Statistics
- Data export
- Mobile app

The tax administration provides an invoicing program free of charge to all Hungarian taxpayers. This program is available through the Online Invoicing System. Its main purpose is to provide an alternative for those SMEs which do not have an adequate program. The tax administration's invoicing program also offers valuable services. For example, electronic invoice support is an essential part of the software, and the tax administration also ensures that the electronic invoices are kept and archived according to the rules.

One of the most interesting ways of using the reporting system is digitising incoming invoices. The invoice information is immediately and automatically received from the invoice issuer. It can also query this information via the receiver interface. By automating the interface query and loading the query results into the ERP, automated invoice processing can be implemented. More and more IT developers and companies have launched developments in this direction recently. By abolishing the threshold, this type of solution becomes comprehensively applicable.

The most forward looking development from NTCA is the development of a mobile application. All system functions, including invoicing, will be available in the form of a mobile application (Android as well as iOS). This makes the system easily accessible anywhere and in any environment.
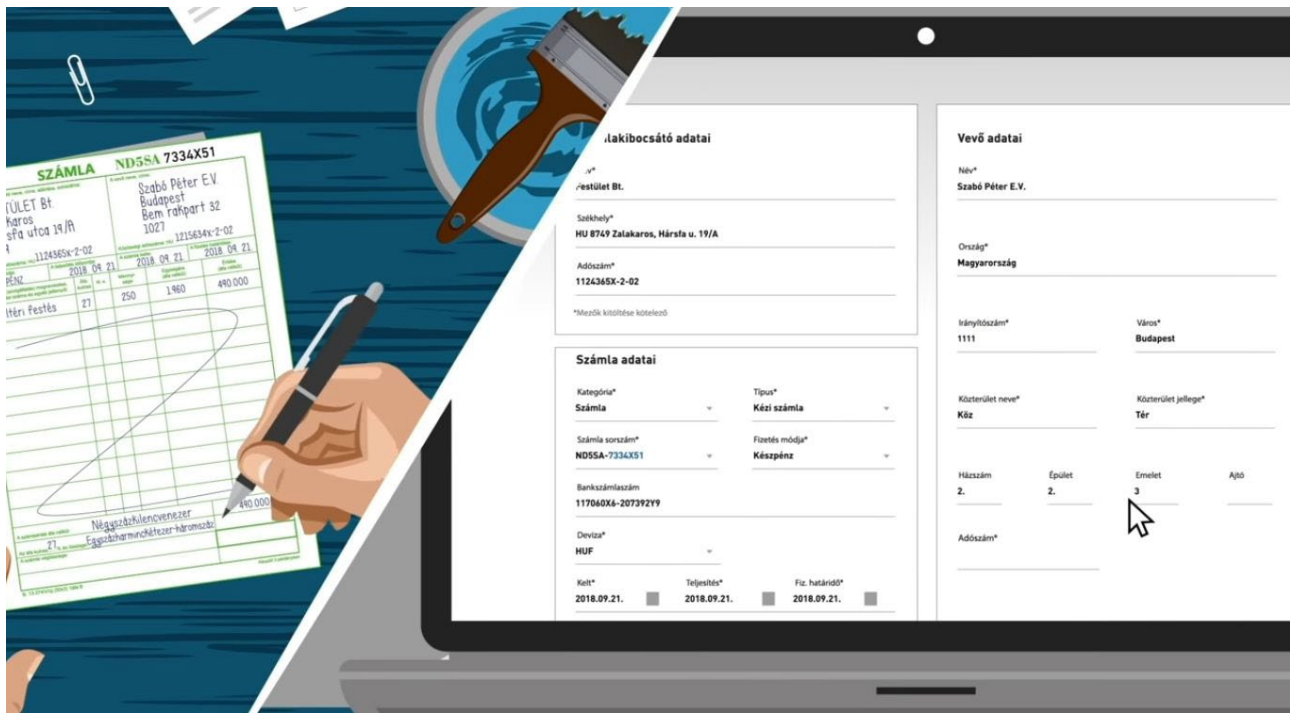
USE OF BLOCKCHAIN TO PREVENT ERROR AND FRAUD

Blockchain for Government

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FREEDOM THROUGH LIMITATION

What is Blockchain? You have heard this question numerous times before. The answers vary: Blockchain is a distributed ledger, Blockchain is an immutable database, Blockchain is an asset management platform, Blockchain is the solution bringing a new dimension to democracy, Blockchain is a value-exchange protocol, etc. And what are the words associated with Blockchain? Transparent, incorruptible, cost-effective, secure, unalterable, decentralised, trusted, etc. Who faces the biggest challenges in terms of transparency, corruption, security and all of the above? GOVERNMENTS. Governments are the ones who manage the assets of countries. Governments are the ones who are expected to fight against corruption. Governments are the ones who need the trust to be re-elected. Governments try to decentralise service delivery, to provide cheap, fast and secure services.

What is decentralisation in terms of Blockchain? Decentralised communication – which allows peers to communicate without being controlled[1]; Decentralised legislation – where smart contracts are introduced, which means parties can draw up the agreement which is self-enforcing, self-executing, irreversible and eliminates the engagement of third parties[2]; Decentralised industry – the best example could be the energy industry, where we all see how aging power systems are failing to respond to demand; another example could be 3D printers, we already observe their development and they will completely change the housing industry, and healthcare in terms of organ implanting, etc.[3]; and finally, decentralised finances – corporate, private money, which creates a competitive environment with systems managed by central banks. The development in general brings new challenges for governments. First of all in terms of cyber-security – illegal use of personal data, cyber-attacks, disinformation, etc. and in addition to cyber-security, in some cases governments face problems related to bureaucracy, corruption, backdoor manipulations, etc. Governments have no other choice, but to become more flexible and smarter, especially when they see that the traditional, centralised mechanisms of problem solving and trust enhancing do not work effectively any more.

Here comes the Blockchain - one of the solutions which bring a new era in democracy, it is a transparent and incorruptible digital ledger, a distributed database, where no centralised version of the stored information exists for a hacker to attack, which is not controlled by a single entity and "a mechanism to bring everyone to the highest degree of accountability"[4] together with being cost and time effective considering the automation of processes and the elimination of intermediaries.

Governments on every continent are exploring the possibilities of Blockchain and are experimenting in many different fields. The most prominent examples[5] are:

- Estonia – trying to improve its E-Estonia program which connects government services in a single digital platform and integrates the most sensitive data from healthcare, the judiciary, the legislature, security and registries. This way the information is protected from corruption and misuse;

- Switzerland – The Swiss city of Zug has digitised ID registrations built on the Blockchain and has completed an e-voting test;

- USA – started exploring the possible applications first for the Food and Drug Administration with the purpose of securely sharing patient data and improving the level of transparency and security in health data processing and later for the Department of Homeland Security to test the Blockchain's capability to protect data collected by Border Patrol cameras and sensors;

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[1] Russia vs Telegram - https://cointelegraph.com/news/telegram-digital-resistance-the-open-network-and-russias-ban
[2] General information: Buterin, V. (2014) "A Next-Generation Smart Contract and Decentralized Application Platform". https://github.com/ethereum/wiki/wiki/White-Paper.
[3] Park, H.S. (2017) 'Technology convergence, open innovation, and dynamic economy', "Journal of Open Innovation: Technology, Market, and Complexity"
[4] Ian Khan – TedX Speaker, Author, Technology Futurist
[5] https://www.computerworlduk.com/galleries/applications/how-governments-are-using-blockchain-3680393/ (last seen on 30.09.2018)

- Sweden – wanting to digitise everything in order to enhance citizens' trust. The pilot project of bringing the land register onto the Blockchain is successfully completed;

- Dubai (UAE) – declaring the desire of becoming the first government in the world to conduct all of its transactions using Blockchain, etc.

It might be very surprising, but before all these well-developed countries, Georgia was the first to start using Blockchain technology in public services[6]. It was the first government in the world to introduce a Blockchain-based property transaction verification protocol.
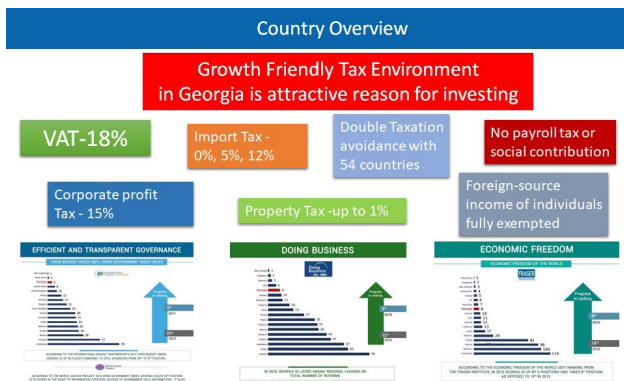
Georgia is a young democracy with a history of state corruption and the absence of private property. By 2019 Georgia had managed to radically reduce red tape and corruption, largely liberalised its economy and improved the business environment. In 2012, the World Bank recognised Georgia as one of the world's fastest reforming economies and as a leader in fighting corruption. Georgia later ranked 2nd in the 2019 World Bank's Ease of Starting Business (EDB) index, and is in the top-ten countries according to the Economic Freedom Index as well as in terms of efficient and transparent governance. According to Transparency International, Georgia had the lowest corruption rate in the region. Works on exploring Blockchain technology started in 2016. The project was implemented by the National Agency of Public Registry, which always puts the main emphasis on using the potential of new technologies. The primary reason for choosing Blockchain Technology in Georgia was to provide a higher level of security and to protect ownership rights[7].

Having completed the pilot project successfully, NAPR kept exploring the possibilities of the system and launched phase 2 of its Blockchain direction, which aims to introduce trust contracts into the property transfer process so that parties will be able to perform two actions (property registration and money transfer) in one transaction. The introduction of classic smart contracts still remains the main goal of NAPR to provide citizens with the option of completing the transaction of sale and purchase agreements in a trusted environment by clicking one button on their smartphone.

Governments should not create problems to solve them with Blockchain later, but the technology has grown to the point that it can now be applied to any need of a trusted and accurate record. Attempts from governments to make systems work better, to become more transparent and accountable should be supported and appreciated. What are the possibilities for governments? The applications are wide-ranging, as the potential of Blockchain continues to be discovered. Blockchain technology is impacting and often redesigning traditional business methods. The technology can be used in numerous fields: Notary services, verification of Apostilles and legalised documents, Legal enforcement, Taxation, Bills and payments, Legislation records, Security and Safety, Border Control, Cyber protection, Education (student enrolment, grading, diplomas), Healthcare, Land registration, Welfare distribution, Agriculture, Environmental protection (protection of endangered species), Waste management, Digitised IDs for natural persons and legal entities, E-voting, etc.

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[6] www.napr.gov.ge
[7] Harvard Business School, Georgian case study "Blockchain for Government" – Mitchell Weiss, Elena Corsi, January 12, 2018

Using blockchain to combat VAT fraud

Lucas Mul

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INTRODUCTION

A big part of the European Union's (EU) value-added tax (VAT) system is functioning well. In 2018 17.7% of all revenue generated by Member States originated from VAT (Eurostat 2019). However, specific deficiencies have led to an annual VAT gap of 137.5 billion euros (CASE 2019). Several proposals to change the current VAT system, which was introduced in 1993, are deemed inadequate by experts (BusinessEurope, 2018). To overcome this problem, summitto developed a decentralised invoice registration system based on blockchain technology. By leveraging blockchain technology our system is able to significantly tackle VAT fraud without infringing on the taxpayers' confidentiality rights.

VAT GAP IN 2017 (EUR million)

Belgium	3,996	Greece	7,339	Lithuania	1,119	Portugal	1,929
Bulgaria	625	Spain	1,806	Luxembourg	23	Romania	6,413
Czech Republic	2,082	France	12,030	Hungary	1,893	Slovenia	128
Denmark	2,235	Croatia	459	Malta	13	Slovakia	1,791
Germany	25,016	Italy	33,629	Netherlands	2,744	Finland	1,622
Estonia	122	Cyprus	11	Austria	2,444	Sweden	654
Ireland	1,938	Latvia	385	Poland	5,764	UK	19,199

Total EU-28	137,470

Figure 1 (Source: European Commission)

VAT AND VAT FRAUD

As of 2018, 168 of the world's approximately 193 countries employ a VAT system (OECD, 2018). Despite their widespread use, VAT systems have their flaws. For example, an estimated 50 billion euros of EU government revenue is lost each year due to VAT fraud (EC, 2017). VAT fraud is conducted in many ways. In general fraudsters report VAT amounts to the tax authority that differ from the amounts on their invoices. Criminals are able to report their VAT fraudulently and because of inefficient, often manually executed audits, fraud is only detected very late.

CENTRALISED INVOICE REGISTRATION SYSTEMS

Several countries throughout the world have implemented mandatory invoice registration systems to enhance the efficiency of their tax authorities. In these countries every invoice (in some cases above a certain threshold) is uploaded to a central database. By collecting every invoice, tax authorities have a 100% insight into the data of these invoices. This allows tax authorities to check if the amount of VAT reported by the taxpayer corresponds to the amount that is actually written on the invoice. This process can also be automated.

However, there is an enormous downside to these systems. As mentioned above, all invoice data is stored in a central database. Protecting all of this data is a difficult and costly task. The recent surge in cyberattacks shows the severe impact which data breaches and data abuses have on society. A clear example is the data breach of the Ecuadorian government in September 2019. Personal data of 20 million people was leaked, while Ecuador has a population of only 16 million! This was reportedly made possible by the fact that not only data of living but also of deceased people was leaked (Karasz and Kurmanaev, 2019).

In November 2019 an even bigger data leak reached the news. 1.2 billion records were leaked through one single server. In other words, data of almost one sixth of the global population was made public! The data that was found exposed included i.e. 50 million unique phone numbers and 622 million unique email addresses (Newman, 2019).

The scenario which threatens governments with central invoice registration systems is even more problematic: the leakage of invoice data can have dramatic economic consequences for a nation state and their companies.

WHY BLOCKCHAIN?

The risk of losing invoice data can be eliminated if invoice data is simply not even registered. In order to fight VAT fraud, actually only a unique ID of an invoice needs to be uploaded. This ID can be encrypted and published in a decentralised blockchain database. Just the owners of the invoice (the seller and the buyer) can decrypt this data. A unique source of truth is generated, but access to the underlying data is granted to the tax authority on a per-invoice or per-company basis. The amount of VAT due can be calculated without infringing on the taxpayers' confidentiality.

By storing encrypted data in a decentralised blockchain database, anyone can verify and audit registration data, while ensuring that there is no "single point of failure".

Invoice registration systems need to be online 24/7 to ensure that companies can always report VAT and that the economy runs smoothly.
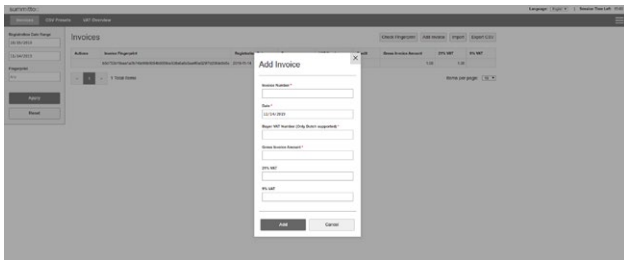

Figure 2 (Source: summitto)

TX++: A TRIPLE ENTRY ACCOUNTING SYSTEM

In order to actually implement this system, summitto developed TX++, its own blockchain based invoice registration system. TX++ can be coupled with any existing accounting software package. Alternatively, businesses can register invoices through a web portal (Figure 2). After the user registers an invoice, a unique ID is generated, the data is time-stamped and encrypted.

The VAT returns of the seller and buyer are linked and no longer can there be a difference between input and output VAT. Therefore, the system creates a single source of truth of invoice data.

This way of reporting VAT creates a triple entry accounting system (Figure 3). While double entry bookkeeping prevents companies from making mistakes internally, registrations in a publicly available ledger prevent discrepancies between companies. By open-sourcing our system, taxpayers will even be able to verify how tax authorities are executing VAT legislation. Therefore, summitto is transparent on execution, but private on data.
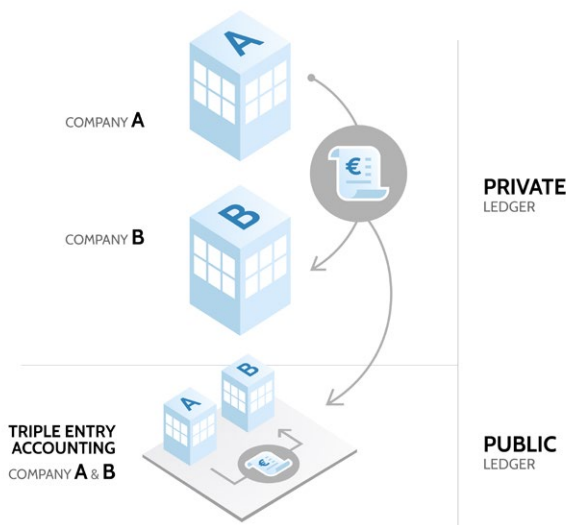

Figure 3 (Source: summitto)

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MONITORING THE MOVEMENT
OF GOODS OF HIGH FISCAL RISK

The SENT system – an effective tool in combating crime

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The monitoring system for the road and rail carriage of goods and heating fuels trading called SENT has been activated in Poland since April 2017. This system has an direct impact on improving the effectiveness of controls which are focused on so-called "sensitive" goods for the state budget revenues, in particular motor and heating fuels, liquid gas LPG, lubricants oils, vegetable oils, fully and partially denatured ethyl alcohol, including those in products not intended for human consumption, dried tobacco, goods used in the manufacture of cigarettes and medicines threatened by lack of availability in Poland. The system consists of four key elements: notifications, geolocation data, controls and penal sanctions.

Each transport of the above-mentioned goods related to taxable activities, in particular domestic and intra-EU supply of goods, intra-EU acquisition of goods and carriage through the territory of Poland, requires notification to the system of the National Revenue Administration. The economic operators are obliged to submit notifications to the system before the start of the carriage of goods or before the entry to Poland and the driver must possess a reference number of the notification during the whole carriage of goods.

The system also collects the geolocation data transmitted by GPS trackers that provide access to the current information about the actual geolocation position of vehicles carrying goods covered by the monitoring system. Geolocation data have been obtained from two sources – data from any external localisation systems installed in vehicles as well as mobile applications run on any Android 5+ or iOS 12+ mobile devices, which are provided free of charge by the National Revenue Administration. Then geolocation data and the results of risk analysis are presented for control teams and coordination units on digital maps available through laptops.

Control services, i.e. Customs and Tax Control Officers, Police Officers, Border Guard Officers and inspectors of Road Transport Inspections have online access to the system data, carrying out roadside controls, and thus can direct control teams towards suspicious or unreported carriage. During roadside controls, officers can also enter control data into the system without the need to return to the office, so the data is collected directly in the control place and the work of control teams is more efficient. Major reason of implementing the SENT system was prevention. Accordingly it was decided to increase the number of carried out controls by control teams of the Customs and Tax Control Service and introduce very high penalties for each group of obliged operators. The amount and inevitability of these penalties is not intended to increase state budget revenues but to prevent the avoidance of carriage notification.

Customs and Tax Control Service data	2017*	2018	2019	TOTAL
submitted notifications	2 303 481	3 303 468	3 312 058	8 919 007
performed controls	262 080	470 594	516 973	1 249 647
revealed irregularities	2 758	5 229	1 754	9 741
completed convoys	1 323	893	347	2 563
taken samples	659	953	924	2 536
applied authority seals	1 880	2 993	1 747	6 620

Table with Customs and Tax Control Service statistics
*18th April – 31st December 2017

The implementation of the SENT system increased revenues from value added tax and excise duty, contributing to reducing the loophole in the tax system. Through the collection of data on selected "sensitive" goods carriages, the system disciplines taxpayers to recognise taxable transactions, inter alia, value added tax taxable transactions and in the case of excise goods, also the excise duty taxable transactions, which increases tax revenues. In this way regulations regarding the SENT system reduce the shadow economy, particularly in the scope of depletion in the value added tax. It also provides the revenue administration with access to current information on performed taxable activities in the scope of these goods.

The main effects of the introduced legal changes and controls activities related to the SENT system:

- increase in legal consumption in 2017 – diesel 15% and gasoline 6%; in 2018 increase by another 3% in diesel and 5% in gasoline, in three quarters of 2019 increase by another 4% in diesel and 6% in gasoline - according to Polish Oil Industry and Trade Organization data;

- 8% increase in production of fuels in 2018, 2 mln m3 supply of fuels from production;

- full use of processing capacity of domestic refineries in 2018;

- limiting the possibility of introducing illegal fuel;

- reduction of lubricating oil production over 50%;

- reduction of rape seed oil export (intra-Community delivery of goods/export) over 70%.

The Electronic Public Road Trade Control System

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The Electronic Public Road Trade Control System (EKAER), introduced in Hungary 5 years ago on 1 January 2015, is used to complexly control the movement and origin of goods, including Community supplies and sales as well as domestic trade goods movements for first taxable goods. The aim is to strengthen the position of compliant economic operators, to make the circulation of goods more transparent, to eliminate fraud related to food products often endangering human health and to eliminate tax evasion.

COOPERATION

Collaboration is the key to the system's operation. On the one hand, the cooperation is based on IT, whereby the National Tax and Customs Administration receives electronic data regarding the visual appearance and weight of vehicles on the road from a separate organ responsible for managing toll payments, which can be automatically linked to EKAER notification data. In this way, you can see the actors involved in the transactions, the characteristics of the goods, the means of transport and the route of single interfaces. In the case of sensitive products under the responsibility of the National Food Chain Safety Office, the identification number required for the movement of goods is issued in a controlled manner with the identification of the Office.

A complex system interface has also been established between the IT systems of the National Tax and Customs Administration and registration systems. Registration, risk analysis and control together provide the IT background necessary for the National Tax and Customs

Administration's existing organizational cooperation in this field. If the goods are under customs procedure or in the case of intra-Community movement of excise tax exempt products, there is no obligation to declare because multiple entries in the data assets of the National Tax and Customs Administration must be avoided.

In addition to IT cooperation, close organizational cooperation has been established as well for the purposes mentioned in the introduction. Taxation and auditing, customs and law enforcement, as well as risk analysis and the anti-crime activities of the National Tax and Customs Administration are conducted in a coordinated manner.

COMPLEXITY

In order to achieve the above objectives and to develop such cooperation, the data of EKAER notifications are not only for law enforcement purposes. EKAER data integrated into the strategic system are used as basic information. This also predetermines the type of action to be taken in the event of a particular risk.

TARGETED SELECTION

In order to utilize the system-based data in an organization-wide manner, risk analysis combines control data known to taxpayers, such as company personnel, company filing, tax reporting and returns, control, and customs. Real-time automated risk analysis is carried out on EKAER notification data. So, on the one hand, the National Tax and Customs Administration can take real-time action, thus it can intervene with law enforcement during the movement

of goods. On the other hand, if EKAER notification data is not available, visual appearance and weight data can identify anomalies related to the movement of goods (sudden weight loss, unreasonable route).

EKAER data can also be used for tax audits. There is an automated comparison of VAT returns and intra-community supplies or purchases of goods reported by EKAER, which allows taxpayers submitting tax returns to be selected for tax audits based on pre-tax risk analysis. The sudden surge in turnover of sleeping businesses can be immediately detected, and actual deliveries to another Member State following import duty clearance with VAT suspension, destined for another Member State can be verified by analysis as well. In conclusion, all data is interrelated and interconnected. The more we deepen the scope of data utilization, the more it generates new analytical considerations.
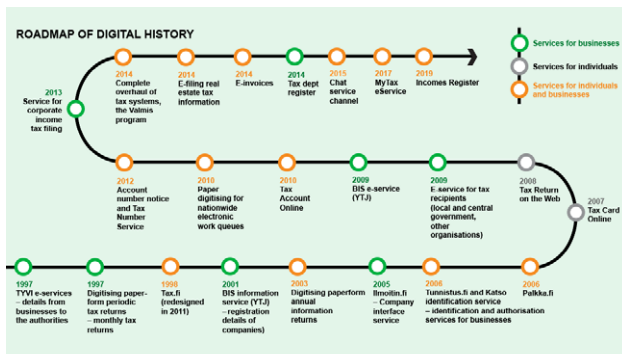
E-SERVICES FOR COMPLIANCE SIMPLIFICATION

# COTS system solution for high usability of e-services

Sanna Kuuri

MyTax Service Owner,
Finnish Tax Administration

ROADMAP OF DIGITAL HISTORY

The Finnish Tax Administration has offered eServices for customers for 20 years. As the result of a major IT and business renewal project, the Finnish Tax Administration introduced a new Commercial off-the-shelf (COTS) eService for all customers, most recently for individuals a year ago. Now all customers use MyTax to file and pay taxes as well as to communicate with the tax administration.

In the beginning of this decade, it was clear that something had to be done. The old base technologies needed renewal due to technology continuity risks. Furthermore, IT costs were growing too high. The decision to purchase a COTS taxation system was made and shortly after the Finnish Tax Administration decided to renew its eServices. The Tax administration introduced MyTax in 2016, which is now fully in use.
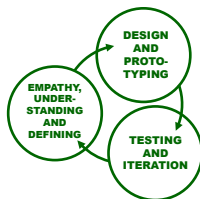

The old eServices were made for only a single purpose each. They were quite easy to use but the users could not get a full view of their taxation situation. The e-filing rate for individuals had been around 60% for several years (while e-filing is not mandatory for individuals, corporations have to file their tax returns electronically). Tax Administration services were renewed in 2016-2019. The old eServices were replaced by MyTax. The purpose of the renewal is to give customers an overall view of

their tax situation and increase available services.

INVOLVING CUSTOMERS

From the users' point of view, the complexity of navigation in the service was identified as challenging in advance. Therefore, the Finnish Tax Administration decided to invest in usability. Involving users at all stages of the development process was paramount in developing MyTax. Prior to the actual development work, several customer surveys were conducted. Through the surveys, we tried to understand the customers' current potential challenges, to make a prototype of the future transaction situation and test it together with users.
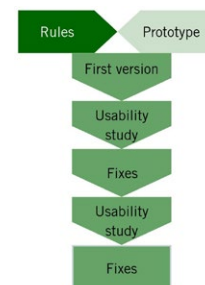
In the actual implementation work, we conducted approximately twenty usability studies. In a usability study, the developed service is tested by individuals who are members of the actual user group. Testers are given a task that they have to complete. A Usability Expert monitors the test situation and also asks the user for more specific questions if needed. A report of the usability study is made and functions are improved based on its findings.

STATISTICS
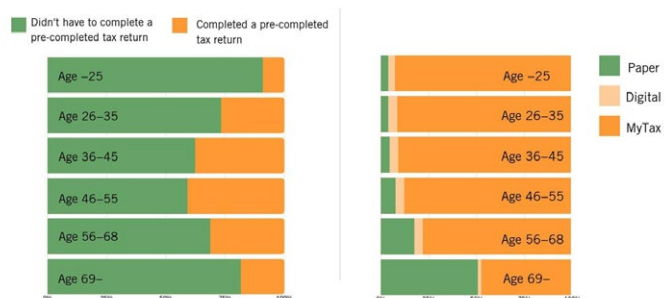
Usability improvements are taken almost as seriously as legislative changes, which are necessary during service development. The findings of usability studies overrule our other requirements. We have two full-time Usability Experts and at least two Finnish Language Experts involved in developing MyTax. The Usability Experts give the software provider's developers User Experience Design Guidelines and they make a User Experience Evaluation Plan for each roll-out.

Using COTS offers good usability. There are some usage limitations due to the overall format of the program, but in a majority of cases we have been able to provide satisfactory solutions. We worked in close collaboration with our software provider and both parties understood the importance of usability improvements.

Usability investments in the service are significant, but the reasons are clear. When the service's user number is high, user problems are immediately encountered in customer services. In addition, the quality of information received through the service may be poor if users have problems with submitting tax returns through it. We also have to keep in mind that taxation is difficult and making it understandable in eServices is not easy. The EU Accessibility Directive imposes requirements for development work. But as a rule, the fixes made for accessibility reasons benefit all service users as usability continues to improve.

In addition to prototypes and usability evaluations, customer feedback is continuously monitored. Service development efforts are never based solely on feedback. They are always explored more closely with users. Most of the feedback received is not directly related to the eService, but rather to taxation or taxation processes more broadly.

BENEFITS OF THE COTS ESERVICE

Users are unaware that the new eServices are developed with COTS and are not tailor-made like the old eServices. For users, the biggest change is that they can now see all their tax matters in one eService and this, of course, is an improvement. On the other hand, users have to navigate to the function they need in their specific situation because everything is now offered in one eService. Individuals are generally pleased that MyTax shows all tax types.

For the tax administration COTS represents significant savings in eServices. It seems that MyTax is going to pay itself back by 2022. Customer services benefit from the fact that everything is now in one taxation system, and for the customer in one eService. Service quality requires constant reactions, thus the need for customer communications has increased. We have to clarify processes and responsibilities for any consultation situation that requires customer communications. Furthermore, almost all of our development is going to have an effect on MyTax in the future.

MyTax is one of the most used eServices in Finland. In the first half of 2019, there were more than 11 million logins to MyTax. Almost all tax related services for businesses, organizations and private customers are now included in MyTax. Customers can submit tax returns, pay and ask for advice through MyTax. Users can also see their current balance and payment status in MyTax. MyTax is available in Finnish, Swedish and English.

Investments in usability have been profitable. About 80% of the users say that their experience with MyTax was good.

Individuals' e-filing rate rose from 60% to almost 80% in the spring of 2019. The main reason was that the Finnish Tax Administration no longer sent forms and self-addressed envelopes automatically to individuals, which gave taxpayers an incentive to go to MyTax.

The biggest change for individuals was not the new eService but the simultaneously renewed taxation processes. This meant significant customer communication efforts before the release of the new eService.
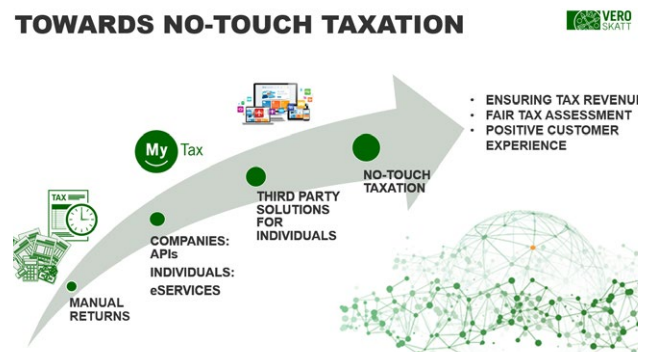
There is still a lot to be done and MyTax is probably never going to be completely ready. Changes in society cause changes to taxation. When it comes to usability there is always room for improvement. New technologies enable us to reduce the administrative burden for customers and we need to seek ways to make it happen.

Trends of e-services in Georgia

Lili Tsverava

Head of Taxpayers Education and Service Methodology Division

In line with existing needs and requirements towards tax administrations, enhancing the quality of services delivered to taxpayers has gained crucial importance. In this regard, Georgia Revenue Service has approved a Service Development Strategy for 2019-2020. In the Document, GRS states that the new goals are the introduction of remote services and the development of face-to-face services to support the promotion of voluntary compliance, where necessary.

As a unifying agency the Tax and Customs Administration of Georgia, is also responsible for SPS border and partial passport control. The mission of Georgia Revenue Service is to collect budget revenues through fair and transparent tax and customs administration and high quality services as well as to participate in economic, public safety and environmental protection activities. GRS started the development of e-services during the last decade, being aware of the benefits of electronic services, such as reducing the compliance burden of taxpayers and administration costs for the tax authority, supporting risk management measures and direct linking to raise voluntary compliance.

To be more specific, Georgia Revenue Service provides around 180 different types of electronic applications. The vast majority of them are made in-house by GRS.

Special emphasis will be devoted to the Taxpayer's personal web-portal (hereinafter: web-portal), where taxpayers can perform any operation without a particular need to interact with the tax authority in person.

In order to access the web-portal the customer has to get a user name and password. When a customer is registered as a taxpayer, he will automatically receive a text message (SMS) and email indicating how to access his personal web-portal, and a temporary password. Besides, if a newly registered taxpayer cannot access his web-portal or a natural person decides to open his page, they can use a video authorisation handled by the GRS call centre.

Any customer, who owns a web-portal, can assign different levels of access for the users of his portal, as the portal has a user management function. If a company director needs an accountant or an import manager to access the company's page, he can create sub-users giving access to different functions, e.g. authorising the accountant to fill-in, submit and review tax returns, VAT invoices and waybills, or authorising the import manager to fill-in, submit and review customs declarations.

For improved security of web-portal users and for more precise data for GRS, a 2-step verification became mandatory in August 2019. While entering the web-portal, after inserting the password, the user or sub-user gets a 4-digit code on the mobile number indicated in the system.

The content of the web-portal is wide. The content differs according to the types of taxpayers, whether the taxpayer is a natural person or a legal entity. Major modules are: private space, tax declarations, accounting, customs, payments, documents and even several e-services of other government agencies.
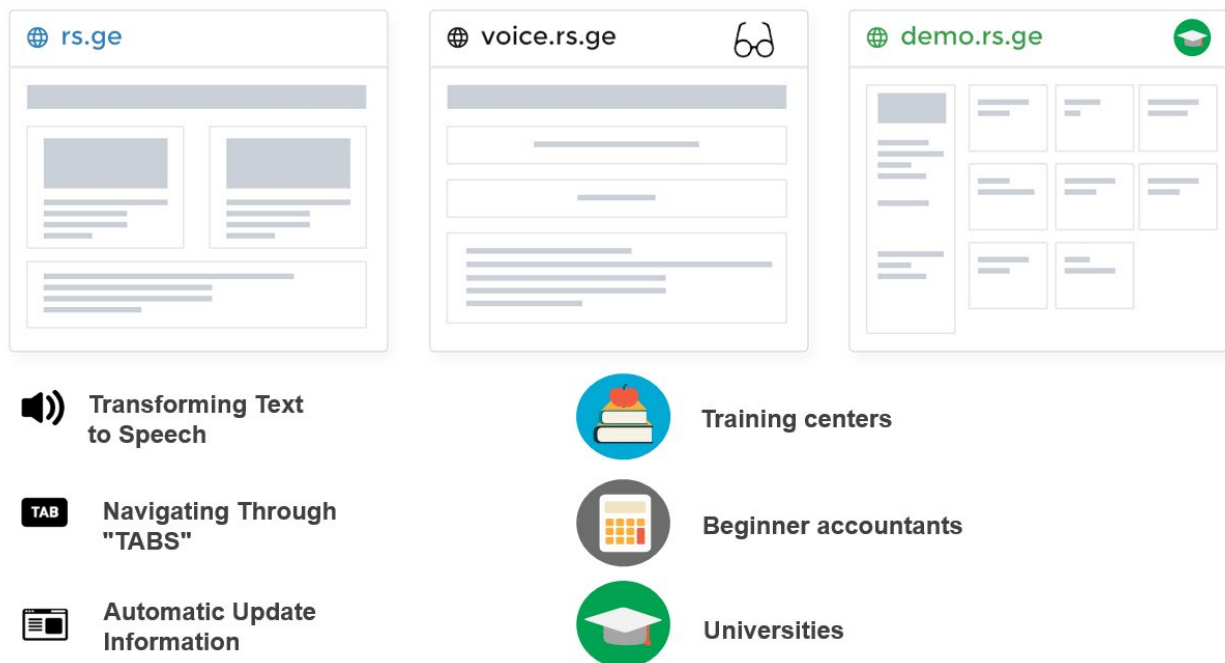
By using these major modules, the taxpayer and GRS are able to interact remotely during the whole process. The number of electronically unavailable services has been minimised.

Furthermore, with the introduction of e-customs declarations, e-VAT invoices, e-waybills as well as GRS cash registers, GRS has almost completely digitised a significant part of the supply chain for tax purposes, thus providing GRS with great assistance in effective tax administration.

However, despite tangible benefits and success, any system, any solution needs further upgrades and modifications. Currently, GRS is finalising the project concerning the unification of VAT invoices and e-waybills in order to minimise the compliance burden of taxpayers who are often obliged to upload both documents for each transaction.

Besides, GRS has created a special targeted web-page for persons with disabilities, transforming text into speech, as well as "demo.rs.ge" – a unique platform for students, accountants, learning institutions to use a simulated real case-scenario and to become more skilled in using e-services. All the above mentioned tools ensure inclusiveness for different stakeholders in the tax administration process.

However, the modernisation of e-services is a never-ending process. There is always room for improvement, and adjustments to new requirements and environments. The further enhancement, in parallel with the modernisation of existing solutions, will also include the introduction of new ways to communicate with taxpayers. We plan to use face recognition while registering taxpayers on the web-portal. To improve remote services, upcoming events are the empowerment of the existing call centre and the introduction of live chat.

Transforming Text to Speech

Navigating Through "TABS"

Automatic Update Information

Training centers

Beginner accountants

Universities

Using feedback to improve compliance – Tax Compliance rating

Maksim Baranov

Leading specialist ,
Estonian Tax and Customs Board

The developments in the field of tax administration in Estonia during the current decade are best described as follows: from having a few big problems we have gone to having many little ones.

Just a few years back, Estonia struggled with a VAT gap and undeclared labour. Hundreds of millions of euros were uncollected and went into the pockets of tax cheats. Major changes were necessary to tackle these problems. We implemented the employment register to address the problem of unregistered workforce. For the VAT problem we started collecting granular invoice data allowing us to see beyond the aggregate values in the VAT return. Both measures were successful.

However, as big problems receded, smaller ones became more visible. We started paying more attention to general tax compliance, reporting and paying taxes on time. The issue of undeclared labour was replaced by not reporting the full amount of wages. The growth of the so-called gig-economy creates new challenges as we have to deal with more taxpayers that know less about taxes. Businesses in Estonia are predominantly small. Following tax rules, which are at times complicated, is burdensome and definitely not a priority number one for most entrepreneurs. Often, the tax damage caused by those businesses is not severe, but in combination results in significant sums.

In such cases, using orthodox measures such as audits and other enforcement procedures is not a reasonable approach. Audits are costly for a tax administration, often unpleasant for taxpayers and are not a good long-term solution to improve tax compliance.

Our ambition is to become the country with the highest voluntary tax compliance rate in Europe. We want to move away from costly controls and dealing with the consequences of non-compliance. We would rather nudge taxpayers to make the right choices and, by that, prevent non-compliance. In our view the only way forward is to create seamless services for reporting and paying taxes. An example of such a service is "Tax compliance rating", which mirrors to taxpayers how the tax administration sees them. The tax compliance rating pursues two goals.

The main goal is to provide taxpayers with immediate feedback if their tax matters are in order. The second goal is to simplify background checks so that companies can minimise potential tax risks arising from their trading partners.

PROVIDING FEEDBACK

Despite the name of the service, its purpose is not to rate taxpayers but to give them feedback if their tax matters are in order. When talking to our clients we often see the desire to be compliant but at the same time they lack the knowledge to be compliant. Small businesses often do not have the resources to follow tax legislation changes and for proper accounting. Often, when we guide them and pinpoint issues in their data we hear the phrase "thank you, but I would have appreciated this feedback earlier". With tax compliance rating we give taxpayers immediate feedback regarding their tax matters. To access the service the taxpayer must log in to the online environment of the Tax and Customs board and, voila! – on the first page the user sees a short introduction of the service and a link to its complete profile. The profile comprises data we have on a taxpayer. It consists of data that is already public today and the rating we have compiled based on data protected by tax secrecy.
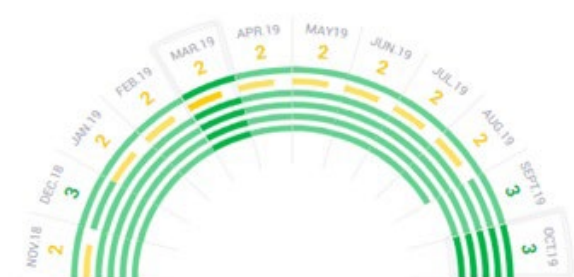
Tax compliance rating
October 2019

Thank you for being tax compliant.

We compute the rating only for legal persons and self-employed individuals. However, natural persons can use the service as well to check the background of a company they are interested in.

We give feedback in the form of a rating that is broken down into three levels, highlighted in corresponding colours. The rating value of:

- 3 (green) means that everything is in order;
- 2 (yellow) means that there are minor discrepancies in the taxpayer's data;
- 1 (red) means that something is wrong and the client should correct tax data.

If the rating value is either 1 or 2, meaning that there are shortcomings in tax discipline, the user gets a clear instruction as to what is wrong and what must be done in order to eliminate the shortcomings.

Declarations ⓘ
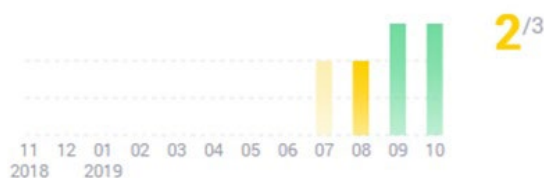
You have submitted declarations late and /or have entered incorrect data.

- The amount declared in field 6.1 (intra-Community acquisitions of goods) of form KMD shall not be larger than the total amount in field 6 (intra-Community acquisitions of goods and services received from a taxable person of another Member State,total). Please ensure that the data submitted is correct.

The purpose of giving feedback in the form of a rating value and corresponding colour is to send an easily comprehensible signal if everything is fine or not. Our experience shows that taxpayers do not want to read complex texts. Their expectation is a simple message if everything is OK or not.

We update the rating daily. Once the taxpayer has corrected tax returns, the changes are almost immediately reflected in the rating. As a result, taxpayers who want to be compliant can do a self-check whenever they want reassurance regarding their taxes.

When giving this feedback, we try to create a complete picture of the taxpayer's behaviour. We have compiled a list of 101 possible checks that we use to create this picture. We look at reporting and payment discipline, results of previous tax audits and the background of related persons. We cross-check data from multiple sources to provide an adequate picture if we believe the taxpayer is

underreporting wages. We also look at VAT returns and listings and provide feedback on whether VAT has been declared correctly and whether there are mismatches between the taxpayer's data and those reported by their business partners. We also highlight obvious and not so obvious mistakes that taxpayers make when filing taxes. The initial list of 101 checks is a starting point. We will update it as we go, based on new developments in the tax field and the feedback from users.

The rating is predominantly based on data reported by the taxpayer. However, we also use data from other registries – company register, land register, vehicle register, criminal records database – to make our feedback as relevant as possible.

SIMPLIFYING BACKGROUND CHECKS

Tax risks may also arise from trading partners. Our clients often point out that it is burdensome to check and monitor the background of their suppliers and customers. Often honest businesses unknowingly become involved in VAT fraud and have to prove that they traded in good faith and made reasonable efforts to verify their trading partners' background.

Prior to the implementation of the tax compliance rating we ran a pilot that was a simplified version of the soon-to-be launched service. We got good feedback from taxpayers and a suggestion that this data should be shared. And why not? Each business gets a profile that summarises its tax data into one window. This information is of use not only to the business itself but also to its trading partners. Why not enable businesses to share this information and, by doing so, communicate to each other that they are tax compliant and there is no tax risk when doing business with them?

Data declared to the Tax and Customs Board:

Choose quarter: 2019/2 2019/1 2018/4 2018/3
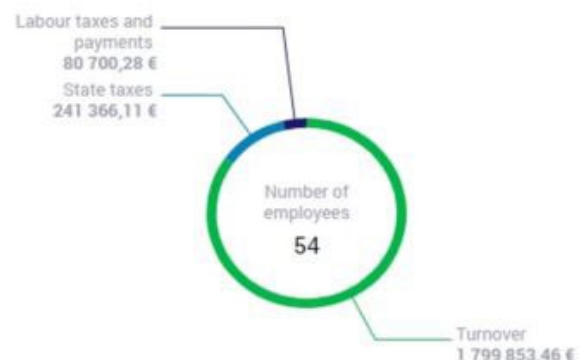
As a result, we developed a function allowing a business to share its data. There are two possible options to do so. The first one is to make data public. This means that whoever looks at the company's profile can see its tax

compliance rating. The second one is to share data with a particular business or person. This means that only the relevant business or person can see the rating.

The tax compliance rating is computed based on data protected by tax secrecy. The only one who can make the decision on whether to share data is a member of the board or a person authorised by a member of the board. Tax and Customs Board cannot share data on behalf of companies. The members of the board are in full control of their company's data and can share it or cancel sharing whenever they wish.

On top of that, we provide a function to monitor changes in the tax compliance of relevant trading partners. The user can compile a list of companies of interest and order notifications for that list. If the rating of the business partner changes, the user is notified. The user is notified only if the company has shared its data with the user.

FINAL REMARKS

The challenges we face today and will face in the future in the area of tax compliance require new approaches. We can no longer rely only on orthodox methods in tax collection. And we do not have to. Technology provides us with new ways to approach taxpayers. We can automate the way we communicate with taxpayers and provide them with tools to make the right decision. This is what we aim to achieve with the tax compliance rating. Relevant and up-to-date feedback will allow companies to do a self-check, correct their data and prevent possible audits. In addition, using a new way to communicate with taxpayers allows us to reach more companies, possibly every business in Estonia. This feat is unachievable by using conventional measures such as audits and face-to-face meetings.

The tax compliance rating is available for use free of charge to everyone. It is also a service in a sense that the taxpayer can decide whether to use it or not. There is no legal consequence arising from the use or non-use of the new service.

We expect the new service to launch during 2020. Instead of a "big-bang" approach, we have chosen to be more cautious and enable taxpayers to become accustomed to having such data at their disposal. That is why in the first stage taxpayers will be able to look at their own rating. The data sharing function will be launched in the subsequent year.

A simple registration process is a good foundation for successful businesses

Alakbar Mammadov

Head of State Registration Main Department
State Tax Service under the Ministry of Economy of the
Republic of Azerbaijan

The vast majority of registered LLCs enjoy e-registration services, as a rule. The analysis shows, that one of the reasons for this is the simplification of the e-registration of LLCs with local investments by 2019. Users of this service are growing rapidly, as a result of the opportunity for e-registration without an e-signature. For instance, in the first 9 months of 2019, the rate of e-registration of LLCs with local investments was 88 % in comparison with only 80.7 % in 2018.

According to the amendments of the Law on State Registration and State Register of Legal Entities, since the beginning of this year, the state registration of LLCs, VAT registration and opening a bank account have been completed via a single procedure. All previous procedures regarding registrations have been abolished, including the necessity of validating e-applications with an electronic signature. Those who wish to benefit from the new service must log in to the "Internet Tax Office" without an e-signature, and register online with the PIN code (Individual Identification Number) of their ID card. Data from registration applications are entered in the system online and the process of Taxpayer Identification Number submission concludes with documents being validated by a single procedure. Moreover, through this procedure employment contract statement notification data is automatically sent to the information systems of the Ministry of Labour and Social Protection of Population (MLSPP). The above procedure also entails the taxpayers' registration for VAT purposes and the certificate issuance for bank account opening. In other words, with the completion of one procedure, four other processes are accomplished.

THE USE OF E-SERVICES

A step-by-step description of the process is a strong proof, that state registration of LLCs has never been easier in Azerbaijan.

Step 1. Users without an "ASAN Signature" can enter their mobile telephone number and PIN code and press the "enter" button to access the "Online Chancellery" division at the Internet Tax Office.

Step 2. The mobile operator is asked to verify the compliance of the entered mobile telephone number with the PIN code. In the case of noncompliance, access to the system is restricted. In the case of conformity, a six-digit verification code is sent to the mobile telephone number.

Step 3. The user adds the verification code to access the "Online Chancellery" division, which consists of an Inbox, Sent items, Signed and E-registration of a legal entity (without an e-signature).

Step 4. "E-registration of a legal entity (without an e-signature)" is chosen as the application type and the following information is added:

- Name of the LLC;
- Information on the Founders;
- Information on the Executive Body;
- Amount and shares of statutory capital;
- Legal address;
- Information on members of the Supervisory Board;
- Activity of the legal entity;
- Tax liability and VAT registration;
- Information on the certificate's copy for opening a bank account;
- Information to receive an "ASAN Signature";
- Information on the labour contract.

Step 5. After entering all data, the user (director) presses the "forward" button and can see the automated Application and Charter. When the user clicks on the "Confirm" button, the registration Application and Charter of the LLC are displayed in the "Issues for confirmation" folder of the Founder(s) and Representative(s).

Step 6. After sending the registration application, the "Notification on Submission of Electronic Application for state registration of a Limited Liability Company with Local Investments" is displayed. The notification reflects the VAT number, confirming the state registration of the

LLC and the Chancellery number when the application was registered via the "One-stop shop" system of the State Tax Service. Accordingly, the Certificate, the Charter and the Extract from the State Register of legal entities are sent to the e-office of the LLC.

- The LLC is ready for VAT registration;
- The certificate's copy is sent to the relevant bank offices;
- The request to receive an "ASAN Signature" is transferred to the relevant certificate service centre.

Data on labour contracts are sent to the information systems of the Ministry of Labour and Social Protection of Population.

E-REGISTRATION OF LLCS: ADVANTAGES

According to the new system, paper-based registration documents are no longer required since they are sent online to the taxpayer's electronic account only. In this respect, the e-registration documents with a unique encrypted barcode enable official verification by all state authorities, banks, notaries and other entities.

New significant reforms in this sphere are part of concerted efforts to improve the domestic business climate. They are also the continuation of recent changes to tax legislation for supporting entrepreneurship, and international recognition.

Thus, as a result of these achievements, the number of procedures for the registration of LLCs has decreased from 3 to 1. The duration of the procedure was reduced to 20 minutes, while even the requirement for financial resources and various documents has been eliminated.

"Successful business takes roots from the easier registration process"
A. Mammadov

| Easier registration procedure | All information is centralized | Registration data are sent to the MLSPP, Bank Office, notaries, ASAN Service Centre and other authorities | Costs and paper for doing business are reduced to "0" | LLC being e-registered within 0,5 day |

AI ENABLED VIRTUAL TAXPAYER ASSISTANCE

Skatti – Our digital co-worker: Experiences from developing a chatbot using AI

Helene de Faire

Head of unit, Eastern Tax Information unit
Dept. of Customer Relations
Swedish Tax Agency

ASSISTING CITIZENS AND BUSINESSES

About 3.5 million telephone calls and 500,000 emails are answered annually by the Tax Information Office at the Swedish Tax Agency. It is clear that many of the country's 10 million people and just over 1.1 million companies need information and support on issues related to the Agency's areas of responsibility.

Providing citizens and businesses with assistance and information in an easy and accessible way is an important factor in "making it easy to do the right thing", and thereby increasing the level of tax compliance. The Swedish Tax Agency (STA) has for a number of years focused on building public trust by developing both accessibility and taxpayers' treatment. The official website is constantly being developed to increase usability. Tax Information Office agents receive extensive training in customer service and the Agency as a whole works by applying a customer perspective in all parts of the organization. To never rest and rely on old achievements without constantly trying to find new ways to help customers is especially important in today's increasingly digitized society. This is where "Skatti" (skatt = Swedish for tax) comes into the picture. Skatti is the name of a chatbot that just over a year ago moved into the STA's website. This first chatbot, or "digital co-worker" of the STA, answers questions regarding population registration and personal taxation around the clock, year round. As of October 2019 Skatti has had over 320,000 conversations, including about 800,000 questions.

Figure 1. Meet Skatti

THE BIRTH OF SKATTI

The process of creating Skatti began in early 2018, inspired by our Norwegian colleagues at Skattetaten, who had started a project aimed to create a chatbot for customer use. Amongst other things we were curious what our customers would think about talking to a chatbot, as well as how the introduction of a digital co-worker would affect the use of other channels (see Fig. 2). Three experienced agents from our contact centre were trained to become certified AI trainers and started building the AI behind the graphical interface of the chatbot, using James from the Norwegian company, Boost.ai.

Figure 2. Why a digital co-worker

The choice of using agents from the contact centre as AI trainers was easy: They are experienced in explaining complicated questions in a simple way, they know what questions the customers usually ask, they have a broad competence and are good at expressing themselves in both speech and writing. We found it important to explain to the contact centre agents that the aim of the virtual assistant is not to take their jobs, instead to make them more diverse and complex.

Initially, the chatbot was trained to answer questions regarding population registration. This subject area was selected as it is not too extensive, which made it possible to publish a first version on the Agency's intranet fairly quickly. STA employees were invited to test the chatbot and submit comments on the design, the accuracy of the responses and how they felt about asking questions from a chatbot. The response was predominantly positive,

which meant that we dared to put Skatti on the official website after a brief launch on our developer site.

SKATTI GOES LIVE

Via a survey tool Skatti received positive feedback from the customers who used it, which led the AI trainers to expand the subject area to include the most common personal taxation issues. The chatbot is now also able to understand questions within other areas of expertise and link to the corresponding page on the site. Prior to filing tax returns in the spring of 2019, Skatti was equipped to deal with the vast majority of questions private individuals ask about their tax return. The questions posed to Skatti and its ability to answer them is evaluated continuously.

We can conclude that

- The resolution rate in conversations with Skatti has varied between 78-83 %;

- Approximately 40 % of the conversations with Skatti have taken place outside the opening hours of the tax information office, which improves customer service; and

- Customers often try to chitchat with Skatti. You can ask Skatti about lots of things and get witty answers. Common questions are if Skatti is single, how old Skatti is and what favourite foods Skatti has.

WHAT'S NEXT?

Further tests will take place to be able to answer all the questions posed when we started working on the chatbot: To use more advanced functions within the tool that is being used, to pass questions Skatti is unable to answer to a real agent, to expand Skatti's expertise to common business related questions, etc. A network with tax agencies in other Nordic countries also developing a chatbot has been established and we are looking forward to further cooperation in the area. Do not hesitate to get in touch if you are interested!

Figure 3. From baby to fulltime employee

Her Majesty's Revenue and Customs (HMRC) - Digital Prompts Programme (DPP)

Michael Charles

Dept. of Customer Relations
UK Her Majesty's Revenue and Customs

Her Majesty's Revenue and Customs (HMRC) are the United Kingdom's (UK) tax administration.

The administration collects the money that pays for the UK's public services and helps families and individuals with targeted financial support. HMRC does this by being impartial and increasingly efficient in its administration. In 2018-19 HMRC collected £627.9 Bn for the UK government. Additional revenue from compliance activity was £34.1 Bn for the year. The tax gap for 2017-18 was 5.6% of tax liabilities.

HMRC believes that increasing digitisation of the tax system will help close the tax gap further, by reducing the possibility of carelessness and error. Our work on the Digital Prompts Programme aims to use customer insight, data and compliance risk expertise to develop real-time digital prompts to help people report and file their tax affairs correctly. These kinds of prompts represent a low-cost one-off solution to improve customer interaction with HMRC, reducing costly post-filing compliance work.

The Digital Prompts Programme (DPP) is currently developing and deploying two types of Digital Prompts into a number of on-line tax returns.

The first type is error correction prompts. Customers are presented with an on screen message if they input data that is inconsistent with what is expected, or a message to check guidance for complex areas of tax compliance. A significant number of these prompts have been introduced to HMRC returns over the last two years, in the areas of Income Tax Self-Assessment and employer payroll completion. Results have been extremely positive with uplifts in tax receipts observed in the tens of millions of GBP. Accompanying qualitative research with customers has also shown that the customers' journey has been improved by simplifying the wording of questions and adding 'help' text where appropriate.

The second type of prompt, trialled by HMRC, is a personal commitment prompt called the Upfront Honesty Declaration (UHD). This prompt is a request at the beginning of a Tax Return asking customers to give a commitment to provide honest and accurate information. The prompt is deployed in addition to the legal declaration at the end of the form and seeks to remind customers of their responsibilities before completing the content. The UHD was trialled initially in VAT and Income Tax Returns and has produced an increase in receipts of VAT in the hundreds of millions of GBP in the first year of deployment.

The cost of deploying Digital Prompts is relatively low in comparison to traditional paper mailshots. Digital Prompts have on average cost £8-10,000 GBP per prompt to introduce, and yet they afford extensive population coverage as a result. An example would be a prompt placed in HMRC Online Tax Self-Assessment return, which is completed by 4 million customers annually, costing £8,000 GBP.

All the Digital Prompts introduced by HMRC have been critically evaluated using both qualitative and quantitative approaches. They are being implemented using Randomised Control Trials (RCT), which are seen as a gold-standard approach to evaluating the impact of a treatment and is commonly used in clinical drug trials and social sciences.
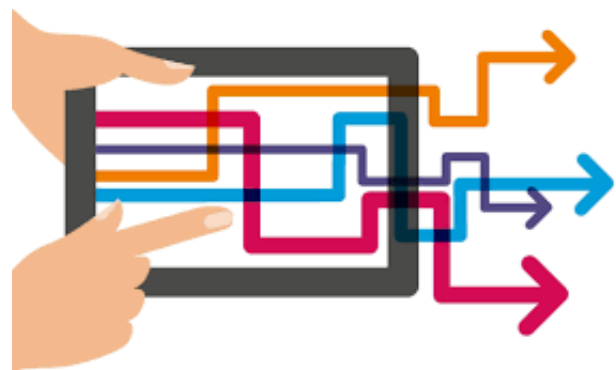
Each prompt is exposed to fifty percent of the target population randomly, say those customers completing a Tax Return, these are known as the treatment group. The remaining fifty percent are not shown the prompt and they are known as the control group. The randomisation mitigates the risk of selection bias that the treatment group is not representative of the general population, which may have an effect on the end result.

The randomly assigned control group acted as a benchmark, in order to confidently estimate what would've happened in the absence of the treatment. The effects of any external factors such as changes in policy or the economy were assumed to affect the treatment and control groups evenly, so any statistically significant impacts can be attributed to the prompts.

Further qualitative research is conducted using various techniques including semi-structured in-depth interviews, focus groups and ethnographic research. These methods are used to gain insight and understanding into a range of customer perspectives and experiences regarding the prompts. This evaluation investigated how participants felt about seeing the prompts, whether they understood what the guidance meant, the action they took as a result and how the messages could be improved. Results of the qualitative research were positive with no negative feedback from customers relating to the Digital Prompts. Ethnographic research was also carried out and gave insight into the holistic setting of taxpayers as they completed tax returns. This included the environment customers were in when completing Tax Returns and the tools/IT available to them.

The next steps for the DPP will be to capitalise on the organisational knowledge that has been gained so far. The programme will continue to learn from the existing trials and bring more prompts into business as usual. The programme will also be developing ideas for intelligent prompts, where data from different areas/regimes in HMRC will be matched. Error correction prompts will be presented to customers if they complete returns inconsistently from one tax regime to another.

The use of third party software is being promoted by HMRC as part of its Making Tax Digital (MTD) Programme, and it is the intention to work in collaboration with software developers to replicate Digital Prompts currently deployed in HMRC software.

TECHNOLOGICAL EVOLUTION IN TAX COMPLIANCE – CHALLANGES AND OPPORTUNITIES

Compliance by design – easy, secure and safe business systems

Eric Thorén

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Business taxpayers are very important partners for tax administrations. They provide data to the tax administration regarding their own taxes (VAT, corporate income tax, etc.). In this regard, they are first-party data providers. They also provide data about private individuals (as employers or customers) to the tax administration. In this regard, they are third-party data providers. Tax administrations generally perceive third-party data to be more reliable than first-party data. There can be different incentives for a business taxpayer to provide inaccurate data as first-party provider compared to as a third-party provider, but it is important to acknowledge that they are the same source. Instead of focusing on the reliability of the data provided, one could focus on the reliability of the source, or its capabilities to provide accurate data.

Currently tax administrations collect as much (raw) data as possible, e.g. on personal or business incomes. The rationale behind this is the fact that the more data are available, the easier it is to find discrepancies. If no discrepancies are found, it is more likely that the data are correct. Quality is defined as the absence of any detected discrepancies. This model puts the tax administration and the tax return in the centre and business taxpayers are the data providing agents. This model is about bringing the data to the rules and about searching for non-quality on a case-by-case basis.

This new business model is all about focusing on the quality of the sources (business taxpayers) to ensure that they have systems in place which can accurately handle all tax affairs, including reporting information to the tax administration. It is about integrating quality within existing processes and infrastructures. It is about bringing the rules to the data and putting business taxpayers in the centre. The tax administration's core task is to provide rules, algorithms, calculation modules and other services to support business taxpayers and business processes to accurately calculate and establish tax to be paid. Business taxpayers have the best knowledge about circumstances and related data, whereas tax administrations have the best knowledge about the rules. By bringing these together, new information (i.e. correctly calculated tax) can be 'co-created' in a timely manner.

THE NEW BUSINESS MODEL AND NEW STRATEGIES

The more decentralised business model of tax administration rests on two strategies.

- Secure and reliable business systems
- Tax administrations focus on what is outside of the secure systems

The first one is to support and make sure that tax payers' business systems are secure and reliable and therefore are able to apply the right rules to the right data. This strategy includes tax administrations providing and publishing tax rules, regulations, policy interpretations and case law. This strategy focusses on empowering businesses and ensuring overall tax system quality. In addition, tax administrations have to stay focused on detecting fraud and evasion 'outside the secured system'. This is more about engaging with individual taxpayers on a transaction level. This is necessary in order to prevent 'gaming the system' and to support and foster stakeholders' confidence and trust in the system's operational quality. This is not a new strategy, but the work will change because it will no longer be organised around assessing tax returns.

These two strategies will probably be implemented in different manners for different taxpayer segments and for different tax types. Small taxpayers e.g. will use on-line accounting and tax applications. Tax administrations will work closely together with these cloud-based service providers. Large businesses will probably still apply their own digitised accounting and tax systems. Tax administrations will establish direct relations with these taxpayers, probably as part of cooperative compliance arrangements.

The better the first strategy works and the more it can be based on technology (e.g. machine learning and blockchains), the more cost-effective this systems approach will be. By reducing operating and compliance burdens, tax administration will be able to devote more resources to the execution of the second part of the strategy.

Therefore, the business model of the tax administration should be organised around the different sources of information and tax payments. The main focus for tax administrations will not be on the content of the information from the different sources, but rather on how reliable and trustworthy these sources are.

Tax administrations are thus moving away from a tax return processing factory to a protector and enabler of a system that handles the flow of information and money. In terms of total quality management theory (TQM), the tax administration's tasks and responsibilities shift from end-of-pipeline quality inspections towards total quality management, assuring the system's quality. The core elements of this strategy concern: ensuring data quality and its availability at the source, publication and provision of executable tax rules, supporting the (re-)allocation of computing power as close to business transactions as possible and ensuring right and righteous application of the rules within the network.

GENERAL DIRECTION OF THE SWEDISH TAX AGENCY

In the general direction of the Swedish Tax Agency we have decided to focus on:

- Involving customers in our development
- Developing services based on customer needs
- Solving the customer's situation at first contact
- Increasing co-development with others

The reason for this direction is our strong belief in 'Tax compliance by design'. Our understanding of 'Tax compliance by design' is to get it right from the start rather than fixing what has gone wrong. It is about building compliance into existing business processes as well as gaining and handling information rather than handling the tax returns.

In order to achieve this we have to influence the environment through cooperation with taxpayers and other stakeholders. We should act more as an enabler for others to develop services to citizens and businesses. This means that we should get closer to customers by addressing their service providers. Service and software providers are key targets for us since they develop services and software for business administration.

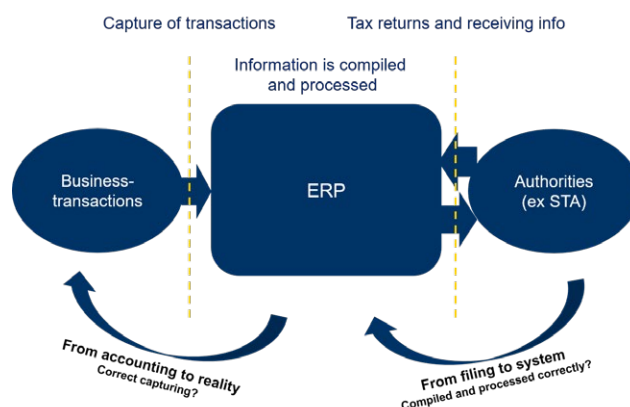A paradigm shift for the Swedish Tax Agency can be illustrated by the following graph.

Figure 1 Focus shift in our business model

The change is about going from processing filed reports (from businesses to the tax administration) in the agency's environment to providing relevant regulation and information into the businesses' environment so that taxes can be processed closer to the business transactions.

STRATEGIES TO TACKLE EMERGING RISKS POSED BY NEW TECHNOLOGY

Emerging risks in massive data analytics – a data scientist's perspective

Antonino Virgillito

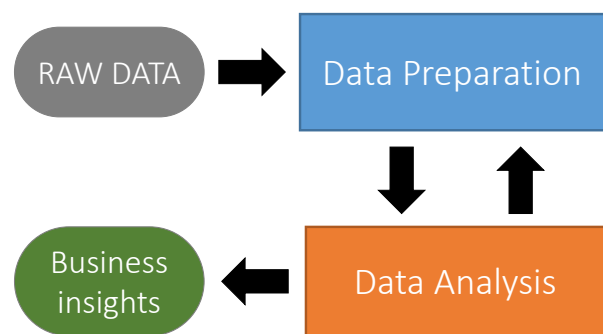*Senior Data Scientist*
Italian Revenue Agency

Tax administrations are currently operating under circumstances where an unprecedented amount of available information about individuals and companies can unlock a wide range of opportunities, in terms of new and more efficient ways to assess fiscal risks and increase tax compliance. The collection of massive, high-frequency data such as electronic invoices, together with the possibility of integrating non-traditional, unstructured sources like data from web and social media, means that tax administrations are potentially able to develop a detailed and always updated picture of taxpayers' profiles.

For this reason, administrations are hiring specialised professional figures, such as data scientists, statistical analysts and big data experts, whose aim is to help exploit the data available in the organisation through the application of advanced data analytics techniques and the use of new technology.

While there is common agreement about the opportunities offered by such a data-driven approach, it is also important to stress that the mere possibility to access large amounts of data is not automatically reflected in perceivable benefits at the business level over the short term. The presence of specialised skills in the organisation is only a prerequisite for carrying out advanced data analysis: the production of any useful outcome generally requires a complex process made up of several steps, involving the coordination of different structures in the organisation. As any elaborate organisational process, advanced data analysis hides many risks indeed. These are often overlooked and overshadowed by the great expected potential of data-driven approaches, and identifying them is an important step from the perspective of reaching a mature level of data asset usage within the organisation.

In this article, based on our experience as data scientists in the Italian Revenue Agency, we first introduce the general context by sketching an overview of the process of data science. Then we focus on what we believe are the main risks faced by a data scientist during such a process, with specific examples related to concrete situations that may occur in tax administrations.

THE DATA SCIENCE PROCESS

The main role of data scientists is to extract business value from the organisation's data assets. In order to achieve this, they follow a process that, at a very general level, can be identified as made up of roughly two phases:

- *Data preparation:* The capability to work with data at the raw level is perhaps what mostly differentiates a data scientist from a "traditional" data analyst. This is the reason why data scientists are required to have IT skills, such as the capability of querying large databases and operate on big data technological platforms. The data preparation phase, present in all data science projects, covers all the operations performed with the aim of tailoring heterogeneous raw source data to fit a specific analytics technique and business question.

- *Data analysis:* Prepared data is then further processed and analysed, with the objective of providing valuable insights to the business. This phase can involve anything, from the simple application of business rules, through the creation of visualisations used to represent hidden relationships in the data, to the application of advanced predictive analytics techniques, such as machine learning or artificial intelligence. The latter is probably the most sought-after application of data science, because it reverts the traditional approach to data analysis, based on the idea of simply applying pre-existing business knowledge on a massive scale, by introducing the notion of extracting such knowledge from the data itself, thus allowing business to enhance the comprehension of underlying phenomena. Predictive

analytics can be implemented though a wide variety of algorithms that "learn" by being trained on the characteristics of past data (e.g. all the features of previously audited taxpayers), in order to provide their prediction on "unseen" data (e.g. assign a profile score to non-audited taxpayers).

RISKS UNDERLYING DATA SCIENCE PROCESSES

Quality

Handling data at the raw level implies an inherent risk of making mistakes, which may lead to the incorrect representation of a taxpayer's position. This risk increases when dealing with heterogeneous data items that have not been coherently modelled in a same database. For example, data obtained from foreign financial institutions in the context of automatic exchange of information has to be matched against taxpayers' registers in order to correctly identify the taxpayers, to which each data item refers.

A crucial element for mitigating the risks related to incorrect data is the presence of a data governance strategy established within the IT sector of the organisation. Starting from a governed situation, where IT engineers have previously performed standardisation and cleaning of heterogeneous sources, facilitates data scientists' job and makes their analysis more straightforward and less prone to errors.

However, not all data quality issues might be evident in the governance phase and also formally correct data can reveal mistakes only after being evaluated by a business-savvy analyst. For this reason it is important that data scientists provide some post-analysis feedback about quality to the IT sector, in order to establish a quality improvement cycle.

Security

Preserving data integrity and avoiding breaches of personal data is an essential aspect under all circumstances, becoming particularly critical when considering massive data treatments. Access security has to be guaranteed at the IT infrastructure level, independently of how data is actually used. However, during their work, data scientists normally are required to "move" great masses of data, for example when transferring the result of data preparation from one data platform to another, or to and from their workstations. This can lead data to flow outside the boundaries of safe IT environments and increase the risk of potential unauthorised access. Data scientists, as well as their stakeholders, should carefully review each step in the data pipeline in order to make sure that data transit occurs only in safe, controlled situations.

Privacy

Data protection issues are not only related to unauthorised access to data. Risk of potential (involuntary) violations of the data protection regulation should always be taken into consideration when dealing with massive amounts of data, including in contexts subject to strict ethical commitments, such as a tax administration.

For example, the treatment of invoicing data can reveal individuals' sensitive information through the analysis of their buying habits. On the other hand, blocking access to a portion of data for the sake of privacy can exclude significant features to be considered in the overall picture, potentially increasing the risk of incorrect predictions and false positives, eventually loosening the protection of individual rights in a different sense.

Although these kinds of issues are clearly subject matters for Data Protection Officers and Privacy Authorities, data scientists with their unique, hands-on view on data, can play an important role in the discussion.

Algorithms

The systematic application of machine learning algorithms to large amounts of data can introduce new risks related to the consequences of automated processing. Powerful algorithms like neural networks, when trained over a large number of examples, are naturally able to detect relationships among data that are difficult or impossible to detect with other methods. However, these are so called "black box" algorithms, meaning that the algorithm does not provide details about the motivations that led to a given outcome. When using machine learning methods in a tax administration, for example for selecting cases for audit, interpretability is a desirable property because auditors always need to have a clear motivation in order to start an audit. Hence, not accompanying the selections made algorithmically with a sound interpretation may render the outcome unusable. On the other hand, interpretable algorithms generally present lower accuracy than black box ones, which may lead auditors not to trust the algorithms' outcomes containing too many false positives.

A lack of interpretation of automated processing is also risky by itself because it can hide potential algorithmic bias, which is a systematically unbalanced outcome towards a certain portion of the population, normally deriving from errors made in the training phase (like incorrect assumptions or insufficient or low-quality data).

The application of advanced machine learning algorithms to such a delicate and complex problem as tax compliance enforcement should then take into consideration the following aspects: 1) collect large enough data sets for

training and make sure they correctly represent the target population; 2) have a solid way to assess and measure the quality of predictions, to be improved through constant tweaking and optimisations; 3) use a mix of different algorithms including interpretable algorithms or general methods to discover the factors that mostly influenced the predictions.

CONCLUSIONS

As data scientists operating in the public sector, our main drive is to constantly improve our analysis and make them more trustworthy and safe. Achieving this goal requires the constant consciousness of the risks hidden behind our actions and the acknowledgement of responsibility for the possible consequences of our analysis. Coping with these risks requires us not only to constantly improve our knowledge of domain and methods, but also to expand our scope of action and enhance our cooperation with both IT sector and business experts.

IOTA

Intra-European Organisation
of Tax Administrations