OECD Forum on Tax Administration

E-services and Digital Delivery Project

Third Workshop Summary

Prepared by the FTS of Russia

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Introduction

At the March 2015 Forum on Tax Administration (FTA) Bureau meeting, Commissioners endorsed a proposal by the Federal Tax Service of Russia (FTS) for it to lead a project to explore the latest developments in information technology that could enhance service delivery within revenue bodies, particularly focusing on developments in E-Services and Digital Delivery (ESDD).

The goal of the project is to identify emergent information technologies, especially in the area of digital delivery and e-services that can enhance service delivery in revenue bodies, and describe how these can help addressing service expectations of taxpayers.

The first phase of the Project included two workshops which were hosted by the FTS in Moscow in 2015. The first workshop identified and prioritized critical components to be included in the scope of its work including taxpayer expectations of digital services, common features for tax administrations vision for e-services and digital delivery and challenges that tax administrations face in achieving this vision. The second workshop focused on exploring two essential technological features of e-services and digital delivery including Big Data technology, as well as and portal solutions and natural systems.

To assist the FTS with delivery of the Project, an Advisory Group was formed with representatives of revenue bodies from Australia, Denmark, New Zealand and Singapore. The Advisory Group stepped up with the initiative to develop the Tax Administration Digital Maturity Assessment Model that Tax Commissioners can use as a tool to assist in making self-assessment of their organisations' digital maturity level.

The first phase of Project resulted in the OECD-published report *Technologies for Better Tax Administration: a practical guide for revenue bodies*. The report was prepared by the FTS with support from the OECD Secretariat and the Advisory Group and was presented by the FTS Commissioner at the FTA Plenary in Beijing in May 2016.

The Report explores the opportunities that leveraging Big Data, Smart Portal Solutions and Natural Systems presents for revenue bodies, and in so doing it identifies and highlights the new capabilities they will require to become more data-driven and deliver contemporary services to taxpayers. The Report also included the Tax Administration Digital Maturity Assessment Model.

Following the presentation of the Report, the FTA Bureau tasked the FTS to further develop and test the Tax Administration Digital Maturity Model as well as to proceed with exploring latest developments in digital technologies with special focus on artificial intelligence, machine learning and mobile solutions. All these issues were addressed by the Third ESDD Project workshop that was organized by the FTS and kindly hosted by the Inland Revenue Authority of Singapore (IRAS) on April 24-26, 2017. This document summarizes presentations, discussions and findings that were observed in the course of the workshop.

Key Findings from the Workshop

Overview

The Third ESDD Workshop took place over the course of two and a half days. It was attended by representatives of the OECD Secretariat as well as delegates from tax administrations representing 26 FTA and non-FTA member jurisdictions including:

FTA Members

Austria	Republic of Korea
Australia	Malaysia
Canada	Netherlands
Chile	New Zealand
People's Republic of China	Norway
Denmark	Russia
Finland	Singapore
Hungary	Slovak Republic
Italy	Spain
Japan	United Kingdom
United States	

Non-FTA Members

Armenia	Philippines
Cambodia	Chinese Taipei
Thailand	

The Workshop featured keynote speeches and presentations delivered by representatives of leading consulting and technology companies including Accenture, EY, Fast Enterprises, IBM, Microsoft, NCS and Teradata.

The Third ESDD Workshop focused on two principal areas:

- Use of mobile apps in tax administration; and
- Use of artificial intelligence, machine learning and digital workforce management in tax administration.

Each of them received a full day of attention from the Workshop attendees. The agenda allowed for keynote speeches and presentations representing views, research and experiences from representatives of both the private sector and tax administrations, as well as discussions in break-out groups and panel sessions.

A separate half day session was devoted to presenting the revised and tested model of Tax Administration Digital Maturity Model and the anonymous survey of 26 tax administrations carried out on the basis of the Model. The detailed analysis of the survey results and conclusions are summarized in a separate paper and will not be covered in this document.

Mobile Applications in Tax Administration

The global reach of mobile

The issue of using mobile technologies for the benefit of enhancing service delivery strikes a note with the majority of tax administrations. The relevance of this topic can be confirmed by statistical data. According to Teradata, one third of worldwide internet traffic is being served on mobile devices.[1] In some countries mobile internet traffic takes a leading position over traditional access channels: Canada saw mobile traffic exceed desktop traffic for the first time in October 2016[2], while China reported that 95% of the country's internet users surf the web on their handheld devices.[3] With smart phones and tablets becoming ever more available, there is an almost unlimited growth potential to the number of mobile users.

Mobile is a vibrant market with a global reach. With over 5 million applications available on two most popular mobile platforms[4], it is clear that mobile devices are firmly fixed within the natural environment of taxpayers all over the world. Tax administrations are noting the arrival of the "mobile generation" and recognize that efficient mobile solutions will not only enhance taxpayers' experience but also make compliance easier by moving tax closer to the point of transaction. This involves embedding tax into taxpayers' natural environment elements, such as employee payroll or purchase of goods and services.

Customers expect best practices

With so many mobile solutions offered to users by the world's leading businesses, tax authorities will have to compete with the market's best products in terms of intuitive design, usability and functionality. Customers expect any mobile solution to conform to a certain standard: it should be intuitive through easy navigation and feature clear instructions, 24/7 access, cross-platform adaptability to the user's device and security of sensitive personal information. This makes tax administrations' development efforts even more challenging, requiring them to analyse taxpayer behaviour in the mobile world.

The mobile market is far more agile and fluid than any tax administration can ever be. To take advantage of new and emerging technologies and agility of the market, tax administrations will need shift their focus to the provision of wholesale services. This challenge can be addressed by engaging third-party providers and release of Application Programming Interfaces (APIs) by tax administrations.

APIs as an enhancement tool

API solutions are a powerful technology tool to enhance the efficiency of tax administrations' capabilities in many areas, and mobile is no exception. By allowing third party developers to build upon existing services and data, tax administrations could drastically increase take-up and, more importantly, bring tax services closer to the natural environment of the taxpayers.

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[1] Teradata. Improving Citizen Engagement in Tax Administration: Managing the customer journey. Presentation at the Third ESDD Workshop. Singapore, 2017.

[2] Canada Revenue Agency. Canada's strategic outlook for mobile apps. Presentation at the Third ESDD Workshop. Singapore, 2017.

[3] State Administration of Taxation. Use of Mobile Applications in China's Tax Administration. Presentation at the Third ESDD Workshop. Singapore, 2017.

[4] CRA. Singapore, 2017.

In Singapore, the IRAS launched an API Marketplace in February 2017 to collaborate and co-create with the community. In the 2 months since its launch, more than 50 developers have registered an account on the Marketplace[5]. Other organisations such as banks have also expressed interest in IRAS' APIs. Besides providing an overview of the available API offerings, the Marketplace also contains an API sandbox environment and a forum for the developer community to share ideas and suggestions with IRAS. With an initial offering of 7 APIs, the IRAS plans to introduce more APIs with the overarching objective of collaborating with third parties to create innovative solutions and embed tax into taxpayers' natural systems thereby improving their experience.

In Great Britain, HMRC has developed a third-party tax software and API strategy in September 2015. The main strategic principle is "API first", which involves close collaboration with software developers. The core of the strategy lies within the API platform, which consists of the developer hub and a sandbox. This structure not only stimulates competition among software developers, but also leads to enhanced customer experience and improved compliance.

In Russia, the FTS portal provides sources of open data which can be accessed by third-party developers and fed into their applications. Most FTS service solutions for businesses are seamlessly accessible via companies' ERP systems offered by accounting software developers.

The issue of engaging with third-party providers is extensively covered in FTA report *Rethinking Tax Services: The Changing Role of Tax Service Providers in SME Tax Compliance.*

Strategic approach to mobile

Taking into account how multifaceted the mobile technology is, the process of its implementation requires revenue bodies to use a strategic approach. This entails having a holistic enterprise-wide view of the customers' needs and checking if solutions that are to be developed align with the organization's strategic priorities. Some tax administrations have already broken the ground with this approach.

In Australia, the ATO App is an integral part of the overall ATO Digital Strategy. It is very popular with the taxpayers, with over 1 million downloads in 4 years (the country's population is 24.5 million.[6]) The ATO App uses voice biometric authentication to enable a taxpayer to get access to the ATO's full suite of online services through a mobile device. What started in 2013 as a simple information-based service, which allowed taxpayers to check the status of return processing and calculate tax rates, has now turned into a holistic two-way interaction tool convenient both for the taxpayer and the authorities. One of its newest features is the ability to upload deductions recorded on the mobile device into the tax return.[7]

Universal app vs. targeted apps

While having a dedicated strategy is something all tax administrations could agree on, there are a number of issues that countries approach differently. This includes the debate of whether tax authorities should offer a universal mobile solution for all taxpayers and services, or instead develop a variety of narrow functionality apps directed at certain user groups or dedicated to

[5] Inland Revenue Authority of Singapore. Use of Innovative Technologies in IRAS. Presentation at the Third ESDD Workshop. Singapore, 2017.
[6] "Population clock". Australian Bureau of Statistics website.
[7] Australian Taxation Office. ATO App. Presentation at the Third ESDD Workshop. Singapore, 2017.

certain life events. On the one hand, a one-stop shop approach is clearly beneficial in terms of technical support and maintenance. It also allows the user to receive all the relevant information in one place without having to switch back and forth between apps. On the other hand, separate applications have the advantage of greater customization and individual tailoring of tax services. This way tax administrations can use a more targeted approach to desires and requirements of different target groups, even in terms of design and user interface. A third option implies that tax services are incorporated in a single whole-of-government public services app or solution, if applicable.

For instance, while Australia concentrated all their service functionality in one app, Canada took an opposite stance. The CRA developed three separate apps for three different target audiences and is currently developing their fourth. While there still is a multi-purpose app for providing services to individuals, the administration decided that small business owners and benefit receivers require special attention in form of targeted standalone apps. The decision was based on a detailed analysis of taxpayers' enquiries. According to CRA, this mode of operation allows the administration to better align service delivery with the needs of specific users.[8]

Choosing the right platform

Another debated issue is choosing the right platform for implementing mobile solutions. It was agreed that tax administrations should take into account their demands and needs while selecting and implementing their mobile platform. For instance, usage frequency and the need to leverage app functionalities should be given proper consideration. It should be noted that there is no universal one-size-fits-all platform, as every option entails a number of pros and cons.

Development of standalone native apps for mobile devices seems to be the default option. Among its advantages is higher take-up and the ability to use device functionality, for instance, fingerprint scanners could be engaged in biometric authentication.

However, high development and maintenance costs and update issues caused some tax administrations to try a different approach. Progressive web apps are browser-based services which have most of the native apps functionality, but are platform-independent and can seamlessly deliver the same user experience and design on any mobile device. However, the technology of progressive web apps is still in its infancy. In Canada, two out of three apps currently offered by CRA are browser-based.[9]

In Russia, the FTS web portal and all its services are mobile-friendly. The next step of this process will be including mobile adaptability features into end-to-end *Personal Account* services. The FTS also engages in app development. In 2017, the *Personal Account for Individual Entrepreneurs* was released as a standalone mobile app. The FTS has also released several narrow-functionality apps allowing taxpayers to enforce public control over retail sales by checking cash receipts or to verify the legitimacy of fur goods which are subject to mandatory RFID-tagging.

[8] CRA. Singapore, 2017.
[9] ibid.

Another less expensive alternative to apps is developing a mobile-friendly website. This might be the ideal option for administrations tied with budgetary constraints. Although today the functionality of the website is limited as compared to native or browser-based apps, further progress in performance of devices and browsers will diminish this gap. It is worth noting that tax administrations that have built a fully service-oriented system architecture will have less difficulties adapting their services to different user interfaces.

Using input from the public

Cooperating with customers in terms of service design is yet another concept which might be extremely relevant for developing mobile. Taking into account that tailoring services to customer's needs is a common element in many administrations' service strategies, it is only logical that they turn to the public for design ideas and user testing. Some countries, like Australia, have already had extensive successful experience with taxpayer collaboration laboratories, bringing in members of the target audience to co-design and to test some of their products and services.

Arranging hackathons is another way to approach this concept. Encouraging third-party IT specialists and software designers to brainstorm innovative ideas and solutions has already proven effective in several instances. For example, in Singapore, the IRAS held their inaugural Hackathon in late 2016 bringing together individuals from within and outside the organisation to brainstorm solutions to shared challenges. There was also strong buy-in from partners from the tax and technology industry who supported the event as speakers, mentors and judges. The 3-day event attracted 66 participants and resulted in 19 innovative ideas and working prototypes. As a follow-up to the Hackathon, three teams were also shortlisted and awarded a grant for further development into full-fledged solutions. The teams were also supported by IRAS' subject matter experts during the development period. Through these community outreach efforts, IRAS tapped on the industry's innovative ideas to co-create better digital services for its taxpaying community.[10]

Measuring performance and learning

Tax administrations are concerned with finding an effective way to measure the performance of mobile in terms of take-up and customer satisfaction. They particularly pointed out the difficulty in identifying to what extent positive results of tax administrations' service efforts can be accounted for by a certain mobile solution. Solutions to this might include web path analysis – monitoring and processing customer journeys to identify major stumbling points. An example of this approach is FTS of Russia's pilot project of applying path analysis to their web portal. The ATO is also a heavy user of web path analytics.

A connected idea concerned the concept of iterative design found in many agile methodologies, which implies constantly updating the solution by expanding features and elements that proved to be successful and abolishing failed ones. This entails continuously gathering and analysing customer feedback, as well as dynamically changing the metrics themselves.

The role of mobile in the service mix

One of the most important outcomes of the workshop is finding common ground on the place of mobile solutions in the overall tax service mix. Participants argued that mobile solutions

[10] IRAS. Singapore, 2017.

could not be viewed as an isolated service channel or as an alternative to websites. Different interaction channels could be effective for different kinds of taxpayer requests, and there can be no one-size-fits-all approach. For instance, Canada analysed taxpayer enquiries categorizing them in terms of complexity and frequency and came to a conclusion that only simple high-frequency tasks could be efficiently dealt with by mobile solutions, while other enquiry categories required other interaction tactics, including traditional channels like phone calls and face-to-face visits.[11]

This means that mobile solutions must be incorporated into the tax administration's wider proactive service strategy and become part of an omni-channel service offering that would allow seamless switching between platforms. As a consequence, mobile solutions need to be developed to be complementary to all other service products and provide pathways to them.

This idea can be best summed up as the concept of a service ecosystem – an integrated approach to digital service delivery with mobile as a critical element. To evolve from legacy paradigms to the service ecosystem, tax administrations are required to monitor and record customer behaviour and then use advanced analytics to integrate and process data from multiple sources to have a complete map of user interactions. This will enable tax administrations to understand taxpayer behaviour patterns and pathways and guide them to the most efficient service channel in real time, drastically improving their interaction experience.

AI, machine learning and robotization in tax administration

AI – a potent market

Artificial intelligence solutions and cognitive systems are not something entirely new, yet public bodies, including tax administrations, have only just started to explore their potential. Most IT and technology experts agree: the market for AI is extremely robust and will keep on growing in the near future. According to data provided by EY, worldwide revenues for cognitive systems and artificial intelligence will grow from $8bn in 2016 to over $47bn by 2020.[12] With AI solutions becoming cheaper and more available, more and more businesses are becoming avid users of this technology. Workshop participants agree that tax administrations should follow that example.

Changing approaches to handling and processing data

One of the key features of AI systems is providing organizations with new approaches to data. Tax administrations by nature operate in a data-rich environment, being on the receiving end of numerous returns, invoices, purchase and sale documents, customer inquiries and many other datasets. The ability to accumulate, store, process and analyse this data is crucial for administrations' efforts to raise the efficiency and effectiveness of their operations.

The main difficulty is that most incoming data is unstructured, and this is where cognitive systems may be most useful. AI has an enormous potential in working with messy unstructured

[11] CRA. Singapore, 2017.

[12] EY. Designing, deploying and sustaining an AI strategy. Presentation at the Third ESDD Workshop. Singapore, 2017.

data, including geospatial, link and timeline information, behavioural and sentimental data. Cognitive systems can not only process unstructured data but also understand in a comparable way to humans. They can reason, grasp underlying concepts, form hypotheses, infer and extract ideas. They develop and sharpen expertise and continue to learn.

With this functionality in mind, AI-based systems can provide invaluable advice and assistance to decision-makers by uncovering hidden connections from unstructured documents, supporting tax audits and investigations and making real time resource inquiries. Linking data from multiple sources allows tax administrations to increase the accuracy of compliance activities and detect fraud. There is also potential for AI-powered research of regulations and policies, simulating effects of their implementation.

In Singapore, the IRAS uses Social Network Analysis (SNA) to detect and prevent GST fraud that could typically go undetected by the conventional approaches.[13] SNA is able to identify network risks through the linkages and relationships between entities, and present a complete and holistic view of risky cases. It has helped to identify and prioritise risky groups of taxpayers for further audit or investigation, and presents complex relationship information into easily visualized networks for auditors. The use of SNA has enhanced the IRAS' compliance capabilities and improved audit effectiveness.

In New Zealand, the Inland Revenue initiated a pilot project for an AI-based automatic GST risk screening. The platform uses a combination of statistical, machine learning, semantic and rules-based applications, and human intelligence to reason over a holistic view of the events, entities, their associates and the communities in which they operate. The pilot proved successful, with processing becoming faster, decisions more robust and fair. The system also released valuable resources for more complicated cases and reduced overall compliance costs both for the administration and for customers. The IR now plans to infuse the system with deep learning capabilities.[14]

The concept of Augmented Intelligence

Although very powerful, AI systems cannot yet deal effectively with complex tax administration tasks on their own. Cognitive computing is most effective when it complements and scales human expertise, productivity and intuition. This idea led many experts to come with another meaning of the abbreviation AI – augmented intelligence. This concept entails providing humans with supplemental insights to improve their subjective decision-making.

Natural interaction with taxpayers

As far as taxpayer relations are concerned, there is no functionality more relevant than recognition of natural language entries. This topic was brought up repeatedly over the course of the workshop. With many administrations switching to omni-channel service offerings, the number of incoming customer inquiries continues to increase. Thanks to AI-based technologies, which are indeed available 24/7/365, tax administrations have received a powerful tool to optimize processing of taxpayer requests as soon as they need it.

[13] IRAS. Singapore, 2017.

[14] New Zealand Inland Revenue. Using Artificial Intelligence to support an Intelligence-Led approach at IR. Presentation at the Third ESDD Workshop. Singapore, 2017.

Taxpayers' enquiries come in language which is natural for humans, but extremely difficult to comprehend for machines. Cognitive systems deal with this challenge by easily recognizing natural language sentences and decomposing them into key words and concepts. This process can work in a one-way arrangement (e.g., by helping call centre specialists quickly identify the nature of the call), or as a two-way interaction system (by maintaining a natural conversation with clients). Basic natural recognition systems, or virtual agents, rely on broad Q&A databases, while more sophisticated systems might include self-learning capabilities.

In China, the SAT is operating a smart chatbot powered by AI technologies. The bot uses geolocation data, as well as user's historic preferences to enhance information received from the enquiry wording. The system automatically identifies voice messages, including deciphering difficult dialects and translates speech into text. The bot then gains access to an internal knowledge pool by using intelligent search and provides an individually tailored response to the taxpayer.[15]

In Norway, the tax administration has introduced Robert, a virtual customer agent. Robert is an AI-powered virtual assistant who is able to communicate with taxpayers in natural Norwegian language and has intelligent search capabilities within the knowledge base. If Robert cannot find an answer in the base, the system initiates a supervised machine learning session, where a tax officer deals with the taxpayer's request while Robert "listens" to the solution and updates his knowledge base accordingly.[16]

At the same time, according to some research almost half of people tend to be unhappy with communicating with a non-human assistant. While overcoming this phenomenon might need a major cultural change it might seem reasonable to reserve an ability to switch to a more traditional "flesh and blood" assistant.

Robotic process automation and machine learning

Apart from dealing with unstructured Big Data and understanding natural language, AI systems can also help organizations implement automation and robotization projects. Cognitive systems usually take over repetitive routine tasks and by doing this have a significant impact on overall efficiency. The benefits of automation increase with scale. However, experts warn that automation at scale can only be feasible through integration of AI, robotics and analytics. None of those elements can be addressed in isolation of other data-focused technologies.

In Singapore, the IRAS has started a pilot project on the use of robotic process automation which uses software agents to automate routine, repetitive and labour-intensive tasks thereby freeing up resources for staff to focus on more value-added work. This project has already brought about significant cost savings, efficiencies and process improvements.[17]

One of the most important features of contemporary cognitive systems is their ability to learn from their own experience and automatically enrich their functionality, increase their accuracy and productivity. This process, known as machine learning, involves using algorithms that learn from data to make accurate predictions or find patterns.

[15] SAT. Singapore, 2017.
[16] Norwegian Tax Administration. Artificial Intelligence, Machine Learning and Robotic Process Automation in NTA. Presentation at the Third ESDD Workshop. Singapore, 2017.
[17] IRAS. Singapore, 2017.

Implementing a machine learning system starts from training, where the system learns from historical and test data to build complex rules. Then it can be applied to real data. It is important to regularly retrain the system using new historical data. To become really efficient, robots need to be trained, not necessarily by IT specialists, but by any tax administration employee who has the right answers. While being trained AI should be treated rather as a colleague, helping them to optimize their processes and communication capabilities. Tax administrations agree that self-learning cognitive systems could have a significant impact on tax administrations' costs and efficiency.

The road towards AI and automation

Cognitive systems and robotics could be extremely useful for tax administrations in terms of increased compliance, stronger taxpayer engagement and higher cost effectiveness. Nevertheless, the questions on everyone's mind were: what is required to implement those solutions, and what could hinder that process. The consensus was that effective usage of AI technologies is dependent upon three major elements: a consistent operating model, efficient metrics for measuring the results, and internal cultural change.

An operating model should be a basis for developing AI solutions. The tax administration should have a clear understanding of how AI can form an integral part of their enterprise-wide strategy and how it can be aligned with its long-term priorities. Starting with small pilot projects might help acquire experience before implementing major ones. This process requires strong leadership commitment. Some good practices mentioned by participants include forming centres of excellence, creating enterprise-level multifunctional teams, and promoting a sandpit environment for technological experiments.

Measuring the success of AI-powered systems is also a concern. Just as with mobile technologies, there are difficulties in identifying to what extent performance increases can be accounted by a certain solution. However, this is a vital element of success, as it allows tax administrations to effectively modernize and adapt systems to the needs of all stakeholders.

Changing roles and functions

Effective implementation of AI-based systems and robotics is not imaginable without effecting cultural change within the tax administration by promoting new solutions and the way they could assist the workforce in their daily activities. With strong support from the executive level, the organization should build a smart digital workforce with sufficient skills and capabilities. For instance, process automation is a good tool to move human resources away from simple routine tasks and processes. This way the workforce can be easily moved to concentrate on complicated and creative tasks, creating a more fluid workforce marketplace. This will also allow tax administrations to cut internal costs as significantly as by 40%[18] and increase overall productivity.

However, there can also be severe resistance to change, for instance due to distrust towards digital technologies or due to the prospect of layoffs. Trust issues could also arise on the taxpayer side, with customers questioning decisions made by machines rather than humans.

[18] Accenture. Get ready for new wave of emerging technologies. Presentation at the Third ESDD Workshop. Singapore, 2017.

Introducing new technological advancements will require new sets of skills from both executive officers and general staff. There is also going to be a need for new competences concerning crowdsourcing and user-testing processes. In any case, an effective change management strayegy should be in place.

Key summary points

Mobile applications in tax administration

- Mobile devices are becoming more and more available and tax administrations have to develop mobile solutions to be closer to taxpayers' natural environment.
- Taxpayers expect these solutions to conform to best business standards, i.e. to be contemporary and as good as products they use in their everyday life.
- Strategic point of view is useful when approaching development of mobile apps. It is important to avoid developing mobile apps by just following the general trend without realizing the demand for them.
- While business taxpayers use tax services more often it is still an issue whether there is a point in developing mobile solutions for individual taxpayers who tend to use tax services only several times a year. Most of them have 5-10 apps on their mobile devices and there should be a serious reason for them to keep a tax app on.
- Countries' approaches differ in several key points: one-stop shop universal app vs. a variety of narrow functionality apps, native apps vs. browser-based apps or mobile-friendly websites etc.
- APIs are a useful tool allowing closer integration into taxpayer's natural systems.
- When designing mobile solutions, crowdsourcing and conducting user testing are popular methodologies amongst countries.
- Measuring performance of mobile is difficult but necessary for keeping up with customer needs.
- Mobile solutions cannot be an isolated delivery channel, but should instead be embedded into the omni-channel service mix.
- In some countries, there is whole-of-government approach for mobile service delivery but it usually falls behind tax administration's progress.

AI, machine learning and robotization in tax administration

- The market for AI-powered solutions is booming.
- Being data-rich organizations, tax administrations can benefit from AI's ability to handle unstructured data.
- Cognitive systems can act as aids in decision-making by augmenting human intuition and expertise.
- By recognizing and analysing natural human language, AI systems are indispensable in customer interaction.
- Robotic automation of routine tasks cuts costs and frees the workforce to perform more important processes.

- Application of robotics lies not only within taxpayer services but it should start from internal systems of tax administrations, where robots should be taught and trained for further external use.
- Building efficient AI-based solutions requires a stable operating model, cultural change and effective tools to measure success.

Conclusions and suggestions

1. With mobile technologies spreading across the globe at light-speed rates, it is obvious that tax administrations are bound to reserve a significant place for them in their service mix. It is clear though that mobile services alone cannot cover all customer demand and should be complemented by other delivery channels. It is extremely important for tax administrations to exchange experience and practices of implementing mobile, as well as to continue the discussion as to what platforms and tools could be most useful to meet revenue bodies' strategic objectives.
2. One of key concepts in contemporary service strategies is embedding tax services into taxpayers' natural environment. The goal is to achieve seamless service delivery that requires little or no effort from taxpayers. With the help of application programming interfaces (APIs) tax administrations and digital service providers can collaborate and implant tax into natural systems, such as e-banking or accounting software. Tax administrations should keep looking into opportunities and challenges presented by APIs. This will be the key activity of a dedicated working group led by Australia, the creation of which was agreed upon in Singapore.
3. New analytics technologies are influencing the way tax administrations operate by changing what they do when they do it and, in some cases, whether they do it at all. This disruption needs to be studied scrupulously if tax administrations wish to harness the opportunities it represents. Countries agreed to share experience in the form of exchanging practical use cases concerning real-life implementation of emerging analytics methods. Advisory Group countries would complete a template developed by Australia to compile a compendium of unstructured data uses and conditions for success.
4. Data governance and security were named by participants as pressing issues. Tax administrations are by default data-rich organizations dealing with ever increasing volumes of sensitive information. It is paramount to have competencies, skill sets and rules in place to safeguard this information and allow proper handling of data. Many participants supported Finland's proposal to make these topics subjects of collective work subject to their approval and inclusion into FTA Work Programme.
5. Systems based on artificial intelligence can be irreplaceable tools for tax administrations to improve efficiency of their operations. Their functions range from handling unstructured Big Data to understanding natural human languages. To make their operation effective it is vital to apply strategic approach to building them. One of the most important parts of this process is cultural change within the organization.

6. Efficient use of new technologies requires a complete overhaul of strategies, rules, methods of operation, competencies and skills. It involves building a data-drive culture within the organization where automation and collaboration with taxpayers are integral parts of everyday business, and where seamless service and voluntary compliance are the objectives. There are numerous paths towards such higher levels of digital maturity, and tax administrations are encouraged to use the Tax Administration Digital Maturity Model in the course of making strategic decisions.