

# Kluwer International Tax Blog

## Big Data in Tax Administrations

Alfredo Collosa (CIAT, IMF) · Friday, July 16th, 2021

The present article explores some concrete application cases of Big Data in Tax Administrations (TAs). It then formulates some ideas for its possible expansion in the near future, considering both advantages and disadvantages.

### 1. Big Data

The concepts of [Big Data](#), data analytics and artificial intelligence are not new. Still, some technological advances have made their intensive use in business and public administration possible over the past few years. The main advances concern: the enormous expansion of processing and storage capacity on computers associated with the reduction of their costs; the growing availability of communications networks and broadband Internet; the development of effective models to capture, store, and process massive data and advanced cognitive algorithms; the emergence of new sources of data (e.g., sensors, GPS, social networks, etc.), including electronic invoices, and the exchange of fiscal information between countries.

The handling of data begins with Big Data, which is based on the concept of the five ‘V’ as follows: Volume: related to the large amount of data generated; Variety: the sources of the data are highly varied, which increases the complexity of the analyses; Velocity: due to the large volume and variety of data, all the processing needs to be agile to generate the required information; Veracity: directly related to the reliability of the data; Value: this refers to the ‘useful information’ that can be obtained from the data.

Most Big Data solutions include some of the following components: data sources, data warehousing, lot processing, data consumption in real time, stream processing, analytical data warehousing, reports and orchestrator.

It is difficult to define the exact border between Big Data and data analytics or between data analytics and artificial intelligence.

[Big Data and analytics can help](#) TAs provide a method to find anomalies, possibly leading to predicting where these anomalies may happen again.

Purchases online, electronic and card transactions, billed offline purchases, as well as reactions to tax notices, are all data points in an individual’s tax journey that can be used for a taxpayer’s

behavioral analytics. Big Data and analytics, coupled with Artificial Intelligence, can work even better to help regulators significantly increase tax compliance.

For example, historical data about the reaction of taxpayers on receiving tax notices can be used to predict their next move. Predictive analytics can also develop sophisticated risk profiles, analyze trends, flag potential audit issues and identify higher-risk cases for deeper investigation, potentially cutting off avenues for fraud even before they take place.

## 2. Experiences of Using Big Data in Tax Administrations

**In the United States, preventing tax fraud** is also possible with the implementation of Big Data. One of the biggest problems for state organizations is differentiating well-meaning taxpayers and those who try to cheat the system to either lower their tax payments or get more significant rebates. A couple of years ago, the Internal Revenue Service admitted using Big Data to stop tax cheats. One of the employed strategies, social media data mining, was used to prove that people live a more affluent lifestyle than their tax records. This successfully saves USD 300 billion tax lost every year. Big Data solve this problem by utilizing data classification and trail-based pattern recognition separate fraudsters and genuine taxpayer.

**In United Kingdom, the HMRC** is one of the pioneer tax administrations in Big Data analytics to improve tax management. The ‘HMRC Connect’ system won the ‘UK Big Data Project 2014’ award and continues to be perfected. The system has internal data sources from the public service and established agreements with banks, sharing economy platforms (such as Airbnb, eBay), insurance companies, data exchange with British Overseas Territories and OECD countries. In addition, it uses social networks (Facebook, Twitter) to detect ‘lifestyle’ evidence.

ADEPT (Analytics for Debtor Profiling and Targeting) is a Big Data analytics system of 13.5 terabytes (size in 2017), with a debt management system and a decision engine. It automatically combines data from 20 internal and external systems and controls many changes, affecting up to one million debts each day. Information on the debt, such as payments made and due, the records of the field auditors’ notes and the letters returned as ‘impossible to deliver’ are put together with sociodemographic and other data. ADEPT transforms data and creates a unique source of intelligence for debt management.

ADEPT is also used to boost operations; it is the basis for continuous learning and improvement in debt processes. You can evaluate customer response to HMRC interventions and recalculate each taxpayer’s behavior models and risk profiles. ADEPT assigns customized sequences of collection interventions to each debt. Then, the debt management system assigns each case to the corresponding channel.

**In Spain, the AEAT uses Big Data** to track wealthy individuals who pretend to reside abroad for tax purposes. The Tax Agency crosses about 70 sources of information to detect false non-residents with relevant assets.

**In Australia, the Australian Taxation Office (ATO)** is building a network analytics solution called ‘ANGIE’ to help its tax avoidance taskforce discern complex, multi-layered relationships between clients. Underpinned by a graph database, the solution is being developed as part of the task force’s data and analytics program. The task force was set up in 2016 to crack down on tax avoidance by multinationals, large public and private businesses and associated individuals.

ANGIE – or the ‘Automated Network & Grouping Identification Engine’ – will automatically identify and group clients to understand their relationship to one another. It will allow the task force to detect ‘patterns of interest’ and visualize new links between clients. The graph database is also expected to be used by the global tax enforcement group J5 to ‘discover enablers of tax time’. The group comprises revenue authorities from the US, UK, Australia, the Netherlands and Canada.

**In India, a Business Standard report** says the data gleaned from Insight will be segregated. This will have the taxpayer’s master profile, including address, signature, and I-T return profile. There is also a segment named business intelligence that will ferret out non-compliant folks.

A geographic information system will help tax the taxman zero in on a specific area for more focused action. It will also classify taxpayers based on parameters like income, profit and capital gains, the report says.

As per this report, the Insight project will feature an integrated information management system, which will harness machine learning to help take the right step and the right time. It will entail collecting relevant web pages and documents that could be probed, it says.

**In Canada, the CRA** looks at analyzing Big Data to combat offshore tax evasion. The CRA continues to prioritize obtaining better data, improving its use of data to target its compliance actions, and achieving results in its fight against offshore tax evasion and aggressive tax avoidance.

**To stop tax evasion using borrowed-name accounts, South Korean tax officials** have developed an artificial intelligence-based Big Data analytic system that can analyze various data, including tax invoices, cash receipts and data of relatives and friends.

The National Tax Service (NTS) put the new system into demonstration this month. ‘We believe that when the financial transaction analytic system kicks into full gear in August, we would be able to react more quickly to tax evasion using borrowed-name accounts’, the Agency said in a statement.

The new system is NTS’ AI’s brainchild and Big Data research center established in July last year. For good reasons, it will be used to provide help for taxpayers by analyzing credit card payments and tax invoices and improve their financial position, such as ways to avoid a cash crunch. The current NTS transaction analytic system monitors offshore tax evasion by analyzing foreign exchange receipts using similar keywords to pick suspicious offshore account-related activities.

### **3. Final Ideas**

The efficiency of TAs, today more than ever, is strongly associated with the proper use of ICTs and the quality of IT services. It is essential to manage them properly since the activities of the TAs are increasingly dependent on the processing of data and information. Therefore, data governance becomes strategic.

TAs worldwide are advancing their use of Big Data on tax, focusing heavily on tax compliance and analyzing the vast amounts of data available on corporate and individuals to improve the tax collection system.

Big Data allows TAs to have a higher degree of automation, reduce manual data operations and avoid costly reconciliation, thus reducing audit costs. This also enables them to focus on strategic planning for a better taxation system.

It will be necessary to analyze in each particular case considering the context of each TA the possible application and its benefits and costs.

It is essential to analyze the context and incorporate technology only if necessary, i.e. not technology as a fashion, as many experiences have not been positive.

It is also advisable to analyze the field's best practices and then see what problem we need to solve to identify which manual work can be eliminated or increased through AI and what additional information can be generated from the machine.

As with any ICT project, to increase the chances of success, the highest authorities of the TA must be involved from the very beginning and carefully follow its implementation.

I believe it is vital both to promote technology for its efficiency and be attentive to its governance. I am explicitly referring to avoiding possible biases with its use, always respecting the rights and guarantees of taxpayers in all areas, starting with protecting their personal data.

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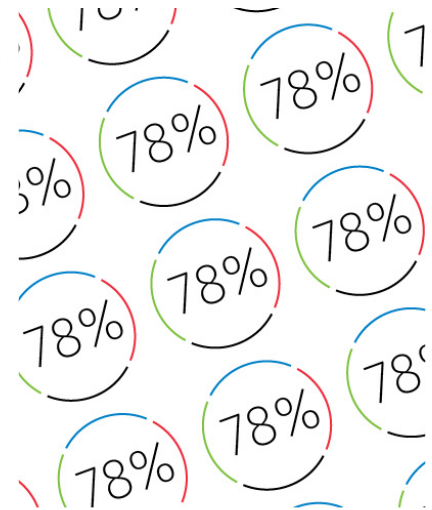
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