

Status and Development Objectives of Tax Administration in Accordance with Advances in Big Data and AI

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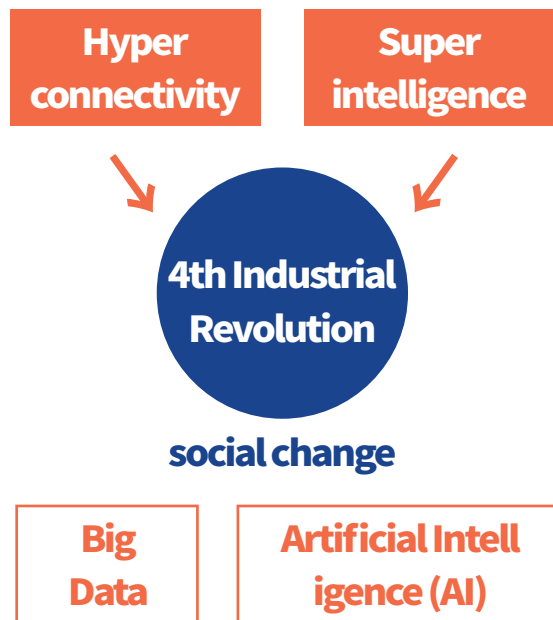
**Big Data and AI
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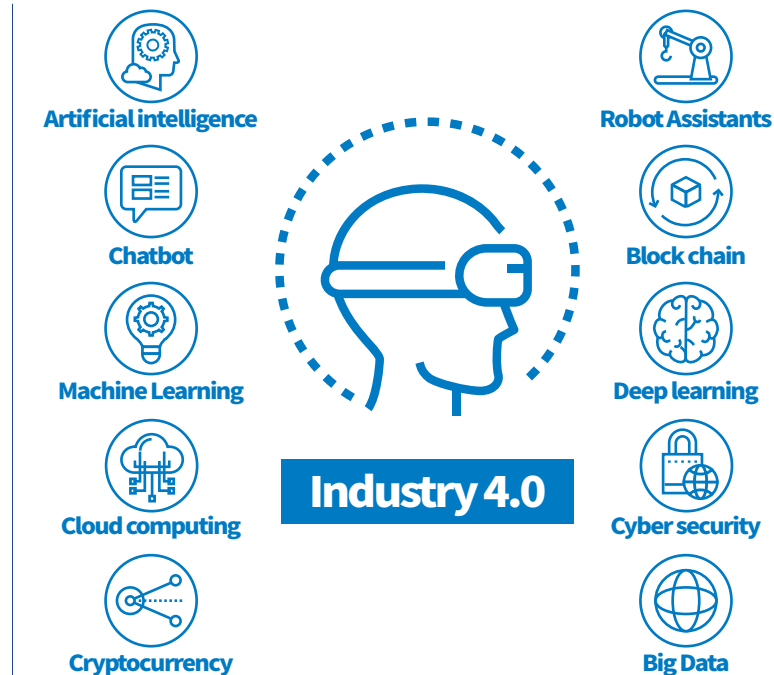
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1 Introduction

The 4th industrial revolution and social change



FUTURISTIC



The Korea NTS and the US IRS's responses

Korea NTS

Big Data Center [2019]

US IRS

Office of Compliance Analytics (OCA) [2011]

2 The Use of Big Data and AI by the Korea NTS

Establishment of the Big Data Center in Korea NTS



Big Data Center

Common analysis team, individual analysis team, corporate analysis team, asset analysis team, in-depth analysis team, information analysis team, and technical support team

7 Teams — **48 Members** — **28 Tasks**

[2019] 27 Tasks **[2020]** 28 Tasks
[2021] 28 Tasks

Source : Big Data Center specifics as of 2021.11.05 - NTS

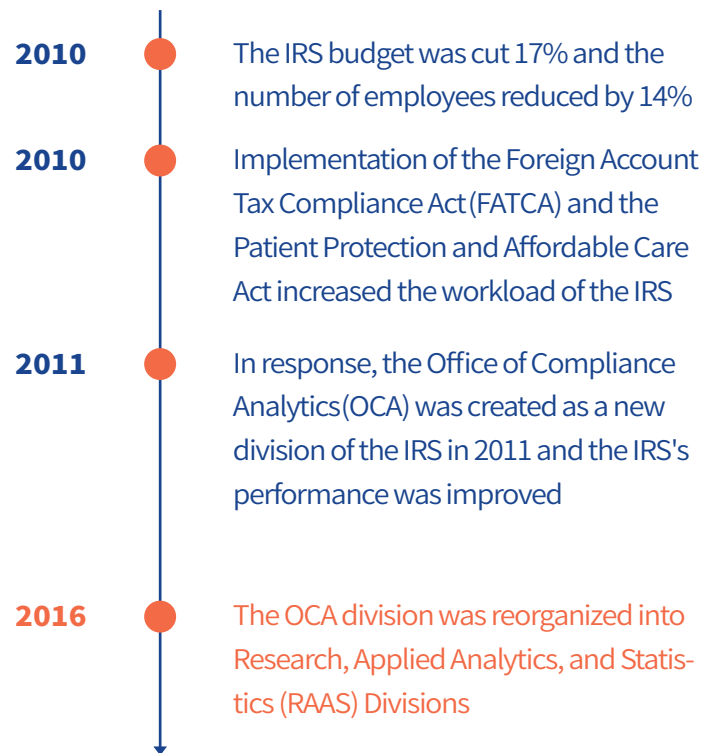
2-2 Examples of Big Data Use Cases by the Korean NTS

Big Data was utilized in...

- Assisting small business owners by providing information in advance, on expenses necessary when filing income tax by analyzing transaction big data (350k small business owners informed)
- Providing real-time chat-bot consulting service for taxpayers
- Determining financial difficulties of taxpayers who applied for national tax payment deadline extensions by analyzing transaction data such as credit cards/ tax bills/ cash receipts and etc.
- Finding business owners evading cash income using borrowed-name accounts
- Distinguishing whether a business registration application needs to be issued immediately or issued after on-site confirmation
- Identifying highly delinquent taxpayers in need of follow-up investigation

3 The Impact of AI and Big Data on the US IRS

Why the IRS adopted big data analytics



Data collection by the US IRS

Data collected

- Facebook, Twitter, LinkedIn, Google Maps, credit reports, credit card processor data, marketing data, FATCA, Swiss Bank Program, country by country report, Paradise Papers, Panama Papers, Offshore Leaks, more than 250 million tax returns a year, Emails
- The IRS has even used “Spiders” (automated computer programs) to review social media sites, and “Stingray” (a cell-site simulator) to identify and track phones

Source : Houser and Sanders (2017). Houser and Sanders (2017);Freeman (2019); Toscher and Kellerman (2019)

3-2 The Impact of AI and Big Data on the US IRS

Data mining applications used by the US IRS

- Investigative Data Examination Application (IDEA) and Lead and Case Analytics (LCA) help identify patterns of illegal activity by analyzing large sets of data through a single access point.
- Financial Crimes Enforcement Network (FinCEN) Query is an online database search engine that helps data analysts search the records of the Financial Crimes Investigation Network.
- Return Review Program (RRP) uses machine learning algorithms to “score” returns on their likelihood to be fraudulent by uncovering patterns in data associated with fraud.
- Compliance Data Warehouse (CDW) helps identify tax evasion through analysis of interactions and relationships between businesses.

AI Techniques used by the US IRS

- Machine Learning and Deep Learning: decision trees, random forests, discriminant analysis, naïve Bayes, survival analysis, clustering, principal components analysis, convolutional neural networks
- Evolutionary Systems and Simulation: Agent-Based Models, genetic algorithm (Butler 2020)
- Natural Language Processing: Named-Entity Extraction, Topic Modeling, Fuzzy matching, Word embedding
- Recommender Systems ● Graph Mining
- In 2018, IRS signed a new contract with Palantir, a data mining company, to pay \$100 million over the next 7 years to help with data exploration and mining techniques.

3-3 The IRS's Performance Using Big Data

Year	Collection Cost /\$100
2010	\$0.53
2011	\$0.51
2012	\$0.48
2013	\$0.41
2014	\$0.38
2015	\$0.35
2016	\$0.35
2017	\$0.34
2018	\$0.34
2019	\$0.33

Tax collection cost per \$100 has decreased annually from \$0.53 in 2010 to \$0.33 in 2019

IRS found \$10 billion in criminal tax deficiencies in its fiscal year 2018, which is four times the \$2.5 billion identified in 2017, thanks in part to the exploitation of big data

4 Big Data and AI Development and Future Tasks

International tax enforcement

US IRS

- The IRS collects lots of information on international transactions where large-scale tax evasion occurs, and uses big data and AI techniques to analyze the explosively increasing information on international transactions
- The IRS collects a large amount of international transaction information through the Offshore Voluntary Disclosure Program (OVDP), Swiss Bank Program, Paradise Papers, Panama Papers, and Offshore Leaks
- The IRS receives a lot of information from foreign tax authorities under the Foreign Account Tax Compliance Act (FATCA), the Country-by-Country report under the OECD's BEPS program, and the Joint Chiefs of Global Tax Enforcement (J5)

Korea NTS

- In order to detect offshore tax evasion, the NTS is exchanging country-by-country report information with 61 countries under the BEPS program, and is implementing automatic financial information exchange with 96 countries
- Since 2011, the offshore tax evasion office has been operated as a regular organization
- However, it is necessary to invest more in collecting information on global offshore tax evasion cases and on offshore transaction information from foreign countries

Year	# of audit (cases)	tax penalty (billion won)
2012	202	826
2013	211	1,079
2014	266	1,218
2015	223	1,286
2016	228	1,307
2017	233	1,319
2018	273	1,338

Source : Freeman (2019), Korea NTS (2019.11.20)

4-2 Cryptocurrency

US IRS

- The IRS believes that cryptocurrency-related tax compliance is seriously problematic
- In 2018, the IRS received and analyzed the cryptocurrency transactions of thousands of taxpayers from Coinbase, the largest cryptocurrency exchange in the US
- The IRS is receiving help from Chainalysis, which provides blockchain data and analysis services to verify the identity of cryptocurrency traders

Korea NTS

- According to the Specific Financial Information Act amended in 2020, in order to report as a cryptocurrency business operator, it is necessary to obtain ISMS certification and to receive a real-name confirmation deposit account from a bank.
- With this revision, the transparency of transactions using domestic cryptocurrency exchanges will be improved, but there is no clear taxation plan for transactions using overseas exchanges or P2P personal transactions through active OTC platforms.

4-3 Industry and Academic Partnerships

US IRS

- The IRS believes that collaboration with external partners will yield innovative solutions to pressing problems and improvement of tax administration
- The IRS has recently made progress through partnerships with industry and academia to incubate and test a range of new analytical approaches

Korea NTS

- The Korea NTS announced that big data was used to select subjects for follow-up investigation among highly delinquent payers, and it was reported that the AI of LG CNS, a private organization, was used for this work
- In order to utilize the cutting-edge techniques of big data and AI, it is necessary to find ways to actively utilize external specialized agencies, rather than relying solely on the capabilities of the newly-launched Big Data Center of the NTS

4-4 Agency Cross-training and Recruiting

US IRS

- Data analysts at the IRS need to learn the basics of business processes, and business experts at the IRS need to learn analytics
- The IRS is making efforts to educate related techniques by providing opportunities such as temporary assignments, workshops, and short training courses
- The IRS CI division has already deployed data analysts in its field offices and train its special agents on the use of data tools like Palantir

Korea NTS

- The Korea NTS has been providing customized training for employees in connection with specialized educational institutions since 2018
- The NTS is continuously recruiting big data and AI experts to introduce rapidly changing technologies.

4-5 Privacy

US IRS

- The IRS collects data through social media and e-mail and uses it for tax evasion analysis through data mining, but the collection and use of such data may violate the Administrative Procedure Act (APA), Private Act of 1974, Freedom of Information Act (FOIA), and Fair Information Practice (FIPs) (Housers and SOURS 2017)
- Information exchange between countries under FATCA and BEPS programs may cause problems due to differences in the scope of information protection between countries and the possibility of abuse of information

Korea NTS

- The NTS acquired ISO27701 and ISO27001 to safely manage taxpayers' personal information in the process of using big data
- ISO27701 is a certification that stipulates the requirements for a personal information protection management system, and ISO27001 is a certification that stipulates the necessary requirements for the management and operation of security systems

5 Implications for Developing Countries

5_1. Establishment of related infrastructure and systems

- The Korea NTS was able to utilize big data and AI in such a short time thanks to the relevant infrastructure and systems that had already been well established
- In order to effectively utilize big data and AI in tax administration in developing countries, relevant data should be accumulated and relevant infrastructure must be established through activation of credit card use, mandatory issuance and transmission of electronic tax invoices, and activation of electronic filing

5_2. Training tax officials and hiring big data and AI experts

- In order to successfully introduce big data and AI in developing countries, training for tax officials and hiring big data and AI experts are necessary

5_3. Partnership with external specialized agencies

- In order to utilize big data and AI cutting-edge technologies in tax administration, collaboration with external specialized agencies should be considered
- When the level of big data and AI technology of the tax authority is low, it will be possible to quickly achieve results by partnership with external specialized agencies

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