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Application Of Innovative Technologies And Digital Approaches In Tax Legislation

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Abstract: This article examines current trends in the digitalization of tax legislation and the implementation of innovative technologies in tax administration. Particular attention is paid to the analysis of digital platforms, electronic document management, electronic invoicing systems, and the use of big data to improve the efficiency of tax control. International practices, including examples from Latin American and European countries, are discussed, and the prospects for adapting these approaches to national systems are assessed. Special attention is given to the legal aspects of the digital transformation of the tax sector, including challenges related to legal certainty, personal data protection, and cybersecurity. The article aims to identify key areas for the development of the tax system in the context of the digital economy.

Keywords: Tax legislation, digitalization, electronic administration, innovative technologies, electronic invoices, big data, tax automation.

Introduction: The pace of change in the digital age requires tax authorities to be efficient and innovative in tax matters, and to quickly and intelligently combat tax fraud and ensure tax compliance.

The Tax Administration has always prioritized innovation, the active implementation of electronic services, and the creation of user-friendly applications, which contributes to increased tax compliance. This is achieved both by improving tax administration and by simplifying interactions between taxpayers and tax authorities.

LITERATURE REVIEW

An analysis of the scientific literature indicates that digitalization of tax legislation represents an important step towards increasing the efficiency of tax systems, reducing corruption, and improving service to taxpayers. Among domestic researchers O. Yusupov [1] In his research, he examines key aspects of the digitalization of the tax system in Uzbekistan. He pays particular attention to the implementation of online cash registers and electronic reporting, the operation of the e-Tax system, and reducing corruption through digitalization. He has conducted a comparative analysis with Kazakhstan and Russia.

In turn, foreign researchers are also paying attention to this issue. Angelos Alexopoulos , Petros Dellaportas [2] and other co-authors considered a network and machine approach to detecting value-added tax fraud. This research paper presents adaptive machine learning algorithms designed to identify suspicious transactions by analyzing the complex and high-dimensional network of interactions characteristic of the VAT system. The fraud detection approach is based on the integration of a specially constructed Laplace matrix with classification algorithms using scalable machine learning methods. The developed method was tested on a VAT dataset in Bulgaria and demonstrated the ability to detect approximately 50% of fraud cases, significantly outperforming existing methods that do not consider the structure of the tax transaction network. It should be emphasized that the proposed solutions are fully automated and can be implemented immediately after filing tax returns.

In the study of O.I. Lyutova [3] The concepts and types of guarantees for the implementation of the mechanism for fulfilling tax obligations in the context of digitalization are substantiated.

METHODOLOGY

This study utilized a comprehensive methodological approach, combining elements of theoretical analysis, comparative legal research, and applied analysis of digital solutions in tax regulation. The methodology aimed to identify key innovative and digital mechanisms used in the tax legislation of various countries, as well as assess their effectiveness, applicability, and potential for implementation in national tax systems.

RESULTS

At the European Commission, data processing and automation [4] are empowering advanced analytics.

The Transactional Network Analysis (TNA) tool is a system based on social network analysis methods that enables Member States to exchange information and process VAT data[5]. TNA improves the effectiveness of fraud detection through the use of advanced analytical technologies. Furthermore, the system automates the collection of targeted information and risk analysis, visualizing suspicious networks without the need for manual intervention. The figure below shows an example of such visualization.

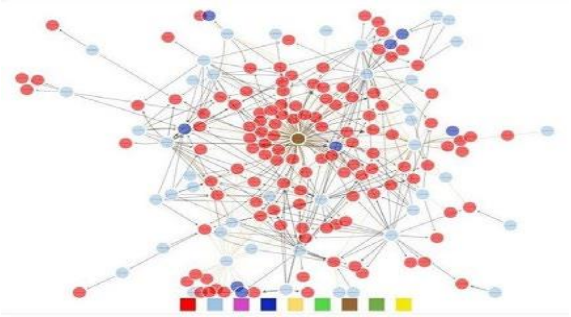

Figure 1. Transactional network analysis

TNA has three main modules:

1. Collection of data from multiple information sources such as Eurofisc data or the VAT Information Exchange System (VIES);

2. Data processing for indicator calculation and application business rules for evaluating traders and trading networks;

3. Data visualization that allows experts to get a current picture of the situation and give them the opportunity to provide feedback.

CESOP (Central Electronic System of Payment Payment Information System (PIS) is a centralized electronic payment information system (CIS) created within the European Union [6]. It is a single European database into which payment organizations (e.g., banks or payment systems) transmit information on cross-border payments. The system is designed to assist tax authorities in EU countries in detecting VAT fraud, particularly in e-commerce.

Banks or payment systems are required to report quarterly data on payment recipients who received more than 25 cross-border payments per quarter.

The CESOP came into effect on January 1, 2024. In CESOP, specific tasks can be performed manually, under human supervision, or completely autonomously. Technological advancements and the support of powerful tools such as numerical artificial intelligence or machine learning can provide new self-learning indicators, predictive analysis, and forecasting of future fraud trends.

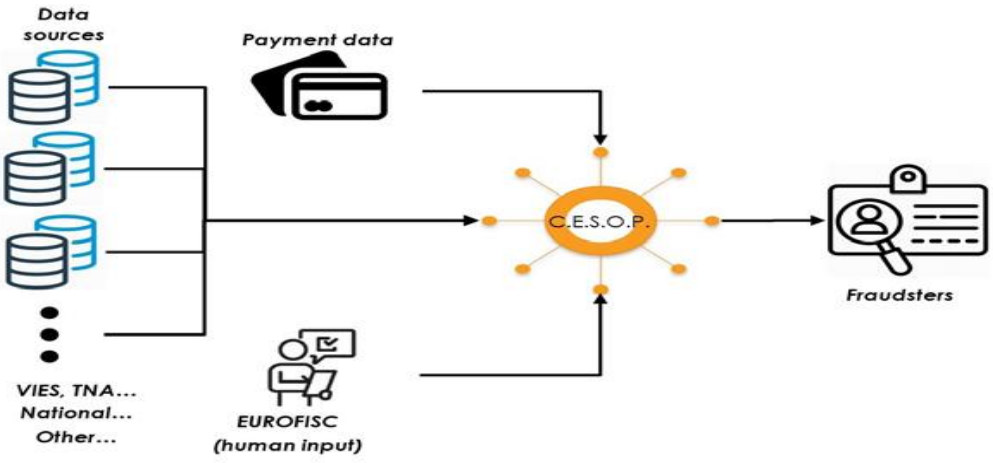

Figure 2 – Information about the Central European Payment System (CESOP)

Problems: Working with data is not easy .

First, no dataset is perfect: cleaning and aggregating data can be complex and time-consuming. There's also the challenge of visually representing data or translating it into business insights. Is there a 100% secure data solution? Are we exposed to security threats or regulatory requirements? Data security is vital in sectors like government and banking, where the risk of losing critical data is very high.

Secondly, technological hype demands pragmatism: some technological solutions are more academic or seem simple/feasible only until they run into the red line of reality checks or IT sovereignty. Some technological solutions may require massive legislative changes or even major overhaul of the entire system.

Third, automated advanced analytics raises ethical and legal questions. What if innocent businesses are mistakenly classified as fraudsters, or individuals not involved in e-commerce fraud are mistakenly registered?

Fourth, the technological transformation of any organization suffers from a lack of qualified personnel, appropriate tools, and data. Public acceptance of any technology that may be perceived as intrusive is also a problem. It's easier for people to provide access to your data by a private company (e.g. for loyalty cards/coupons) than by tax authorities.

Modern tax authorities use artificial intelligence technologies to ensure that taxpayers complete their tax returns timely, efficiently, and accurately the first time.

This service covers simple processes, from obtaining rights to a client's postal code to performing highly complex tasks such as calculating net and gross profit, identifying reporting anomalies, and verifying tax returns against those filed in previous years. The focus is primarily on preventing non-compliance rather than correcting errors after they occur.

An example is the Australian Taxation Office [7], which developed a customer analytics report, providing a single source of information for assessing taxpayer compliance risks and predicting their ability to pay taxes on time. The implementation of this tool not only increased the agency's efficiency, reduced the number of complaints, and improved tax compliance , but also delivered significant financial benefits. Furthermore, it contributed to strengthening taxpayer trust in the tax system, enhancing its fairness and equity.

On 1 July 2018, the Hungarian National Tax and Customs Administration (NTCA) introduced a new online reporting system – the Online Invoicing System [8].

The goal of implementing online data reporting and creating a data management system is to further improve economic transparency by preventing tax fraud. This process is complemented by the provision of a free online invoice service by the NTCA. This innovation makes a significant volume of invoice turnover available for monitoring and analysis by the NTCA, improving risk management and contributing to a significant increase in VAT revenue.

After this resolution comes into force, the taxpayer is obliged to disclose information on invoices issued for transactions between domestic taxpayers.

The regulation does not permit manual intervention in invoices issued using software. If an invoice is manually issued from the invoice book, the taxpayer must still comply with the reporting obligation. In this case, the taxpayer must Enter the invoice data into the tax administration interface within 4 days.

One of the principles of the account reporting project was information sharing and transparency. NTCA created a dedicated account reporting website, where all information necessary for development and reporting was published. The website is accessible at: https://onlineszamla.nav.gov.hu.

In the online invoicing system:

- ✓ Data on issued invoices is received in real time by NTCA;
- ✓ issued invoices can be requested by both recipients and issuers of these invoices;
- ✓ Large volumes of account data are quickly available for effective risk analysis and auditing, helping to identify tax fraud;
- ✓ Automating data reporting reduces the administrative burden for invoicing software users;
- ✓ The new system replaces the consolidated statement of account preparers' data.
- ✓ The system provides real-time feedback on all invoice reports. Feedback alerts taxpayers to potential invoice content distortions and deficiencies.

In recent years, the implementation of electronic invoices at the national level has become a noticeable trend in Latin American countries.

By the end of 2019, Colombia implemented a new operating model based on the concept of data pre-cleaning, implemented through a cloud-based application hosted within the tax administration's infrastructure. This system became mandatory for all large taxpayers.

Costa Rica has moved to full-scale implementation of its electronic invoicing system, making it mandatory for all taxpayers. The system currently processes over 100

million documents monthly.

A new model has been implemented in Guatemala, replacing the previous intermediary-based system with a system that aligns with regional trends. The new model involves the direct transfer of documents to government agencies, and its implementation is being followed by the successful completion of pilot projects and the transition to a deliberate, full-scale implementation phase.

Bolivia, El Salvador, and Honduras continue to implement their own projects to develop and implement national electronic document management systems.

CONCLUSIONS

Tax authorities can more effectively meet the needs of both the government and taxpayers by embracing new technologies and navigating the strategic operational changes required in the digital age. By investing in new technologies that increase process automation and improve customer service, they can engage citizens and influence their behavior in ways that promote and enhance compliance.

Strategic changes made today will yield significant benefits tomorrow, particularly in terms of the reliability and efficiency of tax collection and assessment. A digital tax agency is within our grasp. Now is the time to make it a reality.

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