



Automation of tax control mechanism with the use of specialized information and analytical systems within the framework of ensuring security

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ABSTRACT

The relevance of this work is due to the fact that in the conditions of digitalization of the economy, the tax authorities are forced to actively use the achievements of information technology in their work in order to improve the efficiency of employees and reduce their time spent on certain official duties. The article considers the main problems arising in the activities of tax authorities in the direction of tax control. The basic directions of development of the developed mechanism of automation of the tax control with use of information-analytical systems that in turn allows to raise level of economic safety of the state are revealed. The desktop application reducing time expenses of employees of tax authorities in carrying out of the pre-check analysis in 12 times which serves as an initial point in development of the application for an estimation of risks of economic and information safety is developed.

Key words : security, economic security, information security, counterparty, administration, tax control, information-analytical systems, pre-check analysis.

1. INTRODUCTION

With the development of information technologies in the era of digitalization of the economy, the question of developing new approaches within the framework of ensuring economic security of the state is becoming more and more frequent. Economic security of Russia represents a multifactor complex of financial and credit and budgetary and tax security systems which are the guarantor of stable development of economy of Russia. The vital component of economic security is the system of tax security, as financial resources of the country

and monetary filling of its budgets predetermine the level of tax security. Economic security is directly related to the security of the tax system, which is its most important component and failure to comply with it leads to economic and social threats: first of all, it is the export of capital, the presence of "shadow" and "grey" economy, non-payment of taxes, the so-called tax arrears. The urgency of the given theme is caused by dependence of filling of the state budget on tax receipts and charges, during carrying out of tax administration measures. Tax control plays a key role in ensuring economic security of the state, which in turn must provide control over the formation of state revenues, as well as improve coordination and interaction of control bodies in the Russian Federation.

It should be noted that by the end of 2018, the Federal Tax Service has already recorded high growth rates of budget revenues. Thus, the consolidated budget of the Russian Federation has received 21.3 trillion, which is almost 4 trillion, or 23%, more than in 2017 (20% growth in 2017). This is the maximum increase in revenues since 2013. The federal budget received Br11.9 trillion, which is 30.2% more than in 2017. According to the estimates of the Federal Tax Service, 20%, or more than 400 billion rubles, the growth of revenues to the consolidated budget was due to the tax administration factor [1]. Tax revenues are growing due to the involvement of new subjects of economic activity and business operations in the legal turnover.

In order to maintain a high level of efficiency in the activities of tax control it is necessary to carefully consider various pre-check measures related to the selection of taxpayers for field tax audits (FTA), as FTA is required to ensure the legitimate interests of the state and to prevent possible violations [2].

Description of this problem of risk assessment by taxpayers (contractors), in their studies considered such scientists, Sahajwala R., and van den Bergh P. considered the mechanism of early warning of such risks [3], Radziszewska-Zielina, E., considered the methodology of assessment of contractors in the construction industry [4], Gashenko I.V., considered the mechanism of optimization of tax administration system with the help of new information and communication technologies [5], Saeed Rouhani developed business assessment model, using fuzzy TOPSIS [6], Khristolyubova A. A. , and Nikiforov D. S., considered the process of modeling such risks from information security threats[7-8], Na, O. developed a rating model of corporate information for economic security activities[9], Reggie C., showed the idea of analytical processing of data from different types of information[10], Tipton, H.F., described the impact of risks coming from counterparties in a guide to information security management[11]. A detailed review of the tools and techniques for the analysis of large data was presented by scientists such as Amita Dhankhar and Kamna Solanki[12].

The key principle in the work of employees of the tax service engaged in control activities is the inadmissibility of harm in the course of tax control activities, as they are responsible for losses caused to taxpayers of taxes and fees due to their illegal actions (decisions) or omissions. In this regard, according to the Head of the Federal Tax Service of the Russian Federation, start an audit only when schemes of tax evasion at the stage of pre-check analysis are revealed.

Analysis of the practice of tax authorities shows that their activities in the field of tax control, namely in the field of pre-check analysis of counterparties is insufficiently regulated, both from the regulatory and methodological points of view, "The regulatory framework, which is currently in force does not regulate the requirements for the procedure of pre-check analysis, but does not provide a clear and concise definition of the concept. The overwhelming majority of methods developed and proposed by the FTS are poorly formalizable, not algorithmized and do not allow to establish a clear relationship and sequence of their application" [13].

It is known that the pre-check analysis of counterparties is a study of information about the taxpayer (counterparty), through which to determine the feasibility of the field tax audit. For this purpose it is necessary to process and analyze large volumes of information, which are collected from both external and internal sources, including specialized information and analytical systems.

First, based on the expert survey, the collection, processing and analysis of information about the taxpayer (counterparty) is a fairly long process. Depending on the scale of activities, the pre-check analysis of one counterparty may take from a few hours (small business) to three days (large enterprise). Secondly, the tax authority collects and summarizes information from various sources, after which the obtained

information is compared, which is quite a time-consuming process.

Thirdly, as a result of the pre-check analysis, the received output data are presented in fragmented form, which should be systematized. Often, the process of registration of the audit results and their presentation in the final report is also time-consuming and creates additional difficulties for the employees of tax authorities. The above problems arising in the work of tax authorities necessitate the creation of an automated system to identify organizations in respect of which an on-site tax audit may be conducted, based on data from various information resources.

The first attempts to implement tax control mechanisms were made by T.A. Efremova, who outlined all the functional capabilities of the potential mechanism [14]. Also, Russian tax authorities have developed a model for assessing the digital maturity of tax administrations, which is in demand by foreign services. Russia shares with other countries experience in introduction of the automated control system for VAT refund (HSC VAT-2 and HSC VAT-3) [15,16]. The automated information system AIS "Tax-3" which transferred processing of the incoming documentation to tax authorities [17-19] was developed. The tax inspector had to copy each cell manually or transfer the information to paper beforehand and only then to start the analysis process. Also, since November 2018, the Federal Tax Service accepts reports only in its new AIS "Tax-3" system (AIS - automated information system), but its creation did not involve the developers of EDI (system of electronic data processing, which stores and processes all tax reports), so many of the known shortcomings of EDI were not corrected. The main difference of AIS "Tax-3" from EDI is that the new system works at the federal level, and EDI had regional databases. In this regard, tax inspectors have already noted a decrease in the overall speed of processing and obtaining the necessary information. Also AIS-3 "Tax" has not solved the problem of inconvenience of analysis of accounting reports - it presents documents in exactly the same form.

2. DEVELOPMENT OF SPECIAL SOFTWARE FOR TAX CONTROL MECHANISM

As a result of the need to automate the receipt of basic information about the taxpayer (counterparty) during the pre-check analysis was born the idea to implement a program that will independently perform the analysis, based on the received input data on the results of financial and economic activities of the taxpayer (counterparty) and to issue a predetermined assessment of the risks emanating from this counterparty. The name for this program was chosen as "Taxpector", which is abbreviation of the English words "taxes" and "inspector".

Initially, the development of the program was made in the form of a web application, as to work with this program there would be no need to install it on each computer. It was planned to use Python programming language with aiohttp library as server technology to organize client-server relationship in the form of HTTP requests. As a client part it was planned to use Vue library with the help of which it is possible to develop flexible interfaces with fast response.

To run the program, you would only need to open the desired site in your browser, regardless of the operating system that is installed on your computer.

The specialized counterparty verification information and analysis system "Sparq Interfax" was chosen as the system for obtaining data. This choice is due to the fact that this system aggregates most of the data needed to collect information about the taxpayer in the pre-check analysis, as well as access to this system was provided by the university.

During the initial stages of development, it became clear that when working with the Sparck system, it is impossible to use their servers to retrieve data from the web application. This is due to Cross-origin resource sharing (CORS), a browser technology that allows access from one domain to another. The Sparck system has a restriction: only the client located in the domain <http://spark-interfax.ru/> can access the servers of the system. It was impossible to bypass this restriction by means of a web application, so we had to choose the desktop application.

It was decided to use Electron as a basis for a desktop application - a library that allows you to build desktop applications based on modern web technologies. This package allows developing modern interfaces and cross-platform applications using JavaScript, CSS and HTML technologies.

The choice is conditioned by the fact that this package allows developing an application simultaneously for operating systems (OS): Mac OS, Windows and Linux: there is no need to rewrite the program code separately for each OS. Also, this tool allows you to build interfaces with modern requirements to them and also create them cross-platform, that is, the same for each operating system.

As a result, as a result of the system operation, tables should be displayed with the necessary information in the interface and a report should be generated in Word format (docx extension). This library allows you to build tables of different complexity in a format understandable to Microsoft Word. For a clear description of the functioning of the system under development there was built a context diagram of data flows in the notation Yordon-De Marco[20], presented in Figure 1.

In this work a subsystem for collecting basic information about the taxpayer was implemented, as well as described the classes and methods for the formation of the report in the form

of tables in the interface, which in turn should help the employee of the tax authorities to reduce time spent on pre-check analysis of the taxpayer. In the course of development the time spent on search, processing and execution of information in the form of a structured report has been measured. Thus, the analysis of a group of interrelated persons and other information about the taxpayer by a tax inspector in the "manual" mode (without using the developed software) took about 1 hour and 30 minutes, which is about 12 times more than the result obtained by conducting a similar analysis in the "automated" mode (using the developed software) - 7 minutes.

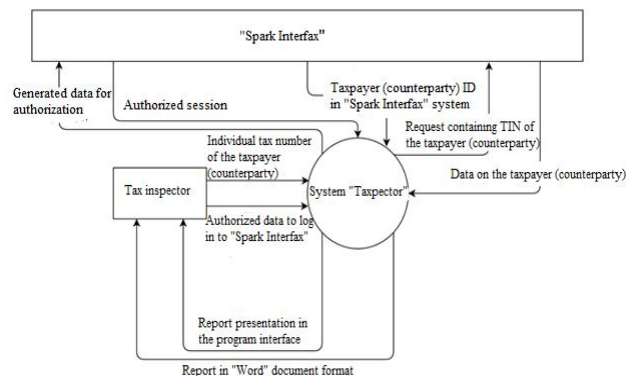


Figure 1: Data flow diagram - context diagram (system model) in Jordan-De Marco notation

The structure of work of the module on report formation on the basis of received data from information-analytical system "SPARK Interfax" is planned. The main functionality of the system is the serialization, which is necessary for interaction in the system, beyond the transmission of data in this script. This is necessary in order not to manually create their own protocols and methods to transfer the data into a form suitable for further transmission.

To obtain the necessary data from SPARK, the developed software sends a number of requests to SPARK system API. The data received in the response from the API are converted by means of serialization functions into instances of corresponding classes for data storage and stored in the system in this form. For example, to obtain data on interdependent organizations, the system sends a query to the SPARK GET API: `http://www.spark-interfax.ru/sapi/trusted/{companyId}`, where `companyId` is the unique identifier of the organization in the SPARK system and receives data on the officials of the audited organization - name, position, INN, identifier in the SPARK system.

Figure 2 shows a block diagram of the algorithm for obtaining information about related organizations.

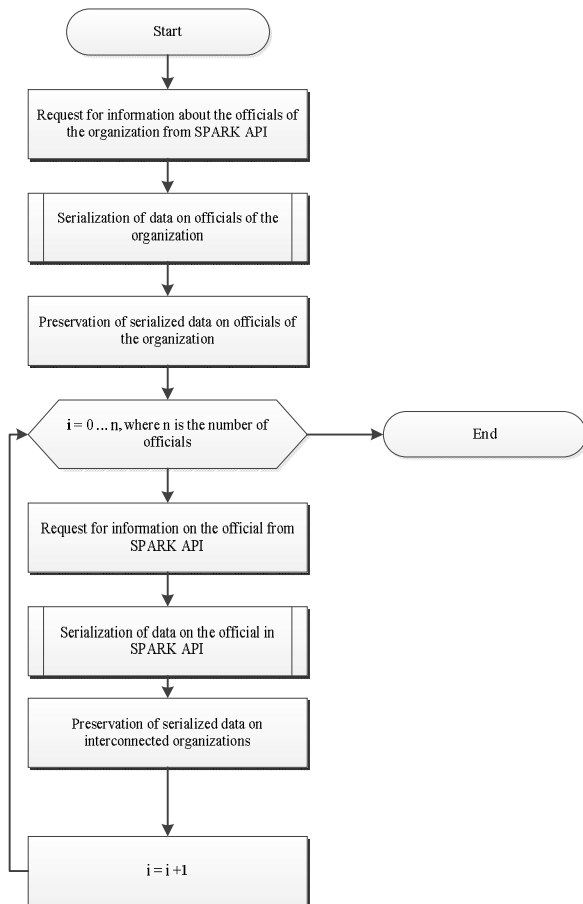


Figure 2: Block diagram. Getting information about interconnected organizations

As a result of the data we have the necessary information for the following tables:

- 1) credentials;
- 2) types of economic activities;
- 3) officials of the organization;
- 4) founders (individuals);
- 5) founders (legal entities);
- 6) information about the existence of bankruptcy proceedings;
- 7) information on established organizations, separate units;
- 8) certificate information;
- 9) license information;
- 10) settlement account information.
- 11) credentials;
- 12) types of economic activities;
- 13) officials of the organization;
- 14) founders (individuals);
- 15) founders (legal entities);
- 16) information about the existence of bankruptcy proceedings;
- 17) information on established organizations, separate units;
- 18) certificate information;
- 19) license information;
- 20) settlement account information.

3. CONCLUSION

The work revealed the relevance of developing a system for pre-check analysis of the taxpayer based on data from the SPARK system, namely, a subsystem for the collection and processing of information on the performance of financial and economic activities of the taxpayer.

To improve the efficiency of the work process of tax authorities' employees, a form of conclusion was automated, which consists of three parts:

- 1) basic information about the taxpayer;
- 2) forming a group of interrelated persons, analysis of other information about the taxpayer;
- 3) analysis of the taxpayer's financial and economic performance.

Implemented application "Taxpector" is successfully integrated into the activities of the tax authorities and allows to accelerate the financial analysis of the company by 12 times, reducing the time from 3 hours to 15 minutes, as the employee of the tax authorities can get the necessary information in a convenient format with the ability to export data to a tabular editor Excel. This system influences management of risk of information safety at "outsourcing" in which obliges the subordinated organizations to manage and control risks of violation of information safety, including at outsourcing of software development.

It will allow to define the basic vector of actions of malefactors on which basis motivation of potential violators will be considered. For example, introduction of the undocumented possibilities for the purpose of theft of the information, on the other hand - introduction in system of possibility of remote access from outside the developer for the purpose of restoration of working capacity of system in case of failures is possible. Within the limits of this system, it is possible to reveal the potential violators representing threat to information safety not only the enterprises but also the state. Also, the developed application will allow you to take into account as a priori information about a potential counterparty, for example, the developer of the software application, - participation in litigation, financial stability, experience in the industry and the like.

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