Development of digital tax services in the transport industry in the Russian Federation

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Abstract. This paper is based on the analysis of the transformation of the tax system of the Russian Federation in the transport industry. We directly analyzed the tax monitoring system, its effectiveness, examined barriers to participation in this system, as well as the prospects for the development of this project in the transport industry. The analysis of the problems of the Russian Federation tax system in the context of digitalization in the transport industry is carried out and the ways of solving these problems undertaken by the state are analyzed. To analyze the solutions to the problem, it is proposed to identify the relationship between the implementation of the tax monitoring system and the number of participants in this program, and the growth of contributions to the federal budget of the country. To identify relationships based on the dynamics of the number of participants and tax deductions, a logistic curve was constructed reflecting the increase in the number of participants in the tax monitoring system in the future, as well as a regression model. A direct relationship between the analyzed factors was obtained, and the effectiveness of the transformation of the state tax system in the context of digitalization in the transport industry was proved. The proposed models can be used to assess the correct implementation of the measures taken to solve the problems of the tax system of the Russian Federation in the transport industry.

1. Introduction

Digitalization as an integral process of the modern world penetrates into all spheres of society, changing it, including in the transport industry. Factors affecting areas such as the Internet, social networks, large data sets, and process automation are transforming familiar patterns of development. Tax systems are not an exception, they are also susceptible to these trends, however, in many countries, including the Russian Federation, the digitalization of tax processes is not fast.

The main task of the state is to stimulate effectively tax revenues to the consolidated budget in order to reduce its deficit, as well as reduce the number of tax evasions. The implementation of digitalization programs including a tax monitoring system helps to solve this problem and can positively affect the development of the country's budget in the transport industry [1].

The implementation of a large-scale project of taxation digitalization gives tangible results, which are expressed in increasing tax collection and taking the business out of the shadows. Demand for Russian developments appeared on the world market. According to the Boston Consulting Group, Russia is 5-8 years behind the leaders of digital transformation, which include South Korea, Denmark, the UK, Sweden, Norway and the Netherlands. However, in the field of digitalization of tax administration, Russia, by contrast, occupies a leading position in the world. The Federal Tax Service of Russia oversees the FTA initiative to study and implement digitalization and transformation of tax
administrations as a whole. Currently, the FTA includes 34 countries: Australia, Austria, Belgium, Great Britain, Hungary, Germany, Greece, Denmark, Israel, Ireland, Iceland, Spain, Italy, Canada, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Republic of Korea, Slovakia, Slovenia, USA, Turkey, Finland, France, Czech Republic, Chile, Switzerland, Sweden, Estonia and Japan [2].

In 2017, the Federal Tax Service of the Russian Federation, as part of the FTA oversight on the digitalization and transformation of tax systems of states, conducted a study in which 26 tax services of countries included in the FTA advisory group were interviewed. By almost all criteria, Russia's indicators are much higher than average.

The need to adjust legislation to the development of technology is recognized only by 16% of the survey respondents. At the same time, the majority of respondents understand the importance of Big Data - they include the tax monitoring system [3, 4].

The use of Big Data in tax accounting and management systems in the responding countries is shown in Figure 1.

![Figure 1. Use of Big Data in tax accounting and management systems in responding countries.](image)

Only 40% of respondents have a strategy for using Big Data, and 56% are just starting to develop an approach to integrating all data, 8% of respondents do not have this system implemented.

Of the 40% who use Big Data, only 31% of the countries surveyed began to rely on Big Data to analyze and manage tax risks, and 8% to work with companies in real time.

Most of the countries surveyed have personal accounts for companies and people, 69% of the bulk of the reporting is done in electronic form, which indicates the trend of digitalization in tax structures in 18 FTA countries surveyed, as well as the relevance and importance of digitalization of the tax system of the state and economy in whole [1, 5].

2. Problems of the tax system of the Russian Federation in the development of information technology in the transport industry

One of the key problems of the tax system of the Russian Federation in the context of the development of information technology is the increased tax risks associated with tax evasion. This problem is actualized in connection with the proliferation of modern business models, doing business without registration and actual presence in the country. The digital economy is characterized by the expansion of Internet business, the creation of information and financial centers.

The problem is that digital business is often not transparent and difficult to control, as well as the volume of business and the speed of transactions require the introduction of new tax administration tools. Therefore, in the modern world, the digitalization of tax activity is necessary to eliminate the shortcomings of tax control.

According to the Federal Tax Service, in 2014 the budget deficit began to increase. This was due to an increase in income, but at the same time, an increase in expenses. This trend was observed in
subsequent years. In this connection, a policy was adopted to optimize the tax system and introduce
digitalization programs. The trend of an increase in the budget deficit was traced to 2016, after the
entry into force of the programs, the situation began to improve, which confirms the importance of
digitalization of the spheres at present, and this situation is reflected in Figure 2.

![Figure 2. Schedule of deficit / surplus of the federal budget of the Russian Federation.](image_url)

Based on an analysis of the dynamics of the budget structure, the relevance of the problem is also
reflected in the adoption by the Russian Government of the Digital Economy in the Russian
Federation Program in 2017. It demonstrates the desire of the state to develop both the country and the
economy (in particular, the tax sphere) in the field of digital reality. The program helps to create
conditions for the comprehensive development of society, including the economic sphere, personnel
training and state security. Also to this program and the implementation of digitalization in the tax
system of the Russian Federation can be attributed a tax monitoring system (SNM), the impact of
which will be evaluated in this article [6, 7].

3. Analysis of the tax monitoring system in the transport industry in the Russian Federation

One way to solve the problem of the need to digitalize the tax system of the Russian Federation was
the introduction of the Federal Tax Service of the Russian Federation a tax monitoring system. Tax
monitoring is a system of remote tax control. This system came into force on January 1, 2016, and its
main point is that companies open their information accounting systems for tax authorities. In turn, the
tax authorities do not conduct field audits; instead, companies provide them with online access to the
company's accounting and tax reporting [8].

Providing the tax authority with direct access to data in the online mode allows, on the one hand, to
significantly limit the range of control measures for each organization, and on the other hand, to
optimize the business costs of fulfilling the requirements of tax legislation.

Now, there are conditions for tax monitoring, which are fixed by law:

- the total amount of VAT, excise taxes, income tax and mineral extraction tax payable for the
  previous year is at least 300 million rubles;
- the total amount of income received is at least 3 billion rubles;
- the total value of assets according to the accounting (financial) statements of the organization is
  at least 3 billion rubles [9].

In 2016, the Federal Tax Service of Russia introduced the tax monitoring system as a new form of
tax administration. In the first year of tax monitoring, participating organizations were given the
opportunity in practice to test the regime of enhanced information interaction with tax authorities.
The result of such cooperation between companies and tax authorities is to minimize tax risks and increase the level of certainty among taxpayers regarding both completed transactions and planned ones.

The entry of companies to the new tax monitoring system reduces the risk of tax evasion, as well as the prospect of companies leaving the shadow business. One of the reasons for the increase in tax revenues to the budget can be considered an increase in the number of large participants in the country's economy (companies) to a transparent tax control system [7].

According to the head of the Federal Tax Service, the reasons for the active joining of organizations to this tax monitoring system are the following factors:
1. Reduction in the number of desk audits, tax fines and penalties;
2. Public and official recognition of the organization as a reliable and responsible taxpayer;
3. Halving the reserves for uncertain tax positions, which directly affects the financial performance of the company;
4. Minimization of tax risks (at the stage of transaction planning, the organization may seek the opinion of the tax authority);
5. Improving the transparency of accounting, optimizing the company's business processes, organizing internal control through the introduction of an internal control system.

The advantage of introducing a tax monitoring system is that this approach reduces the company's labor costs for tax audits by 30%. At the same time, the closing of the annual period is three times faster, which is also a great advantage for the transition of companies to this system [8, 10].

In addition, according to the report on the work of the Federal Tax Service for 2019, the number of field tax audits decreased by 35% or almost 5 thousand, and the effectiveness of each of them increased by 5.8%. Such positive dynamics was achieved due to the motivation of the Federal Tax Service of taxpayers to voluntarily fulfill their actual tax obligations, as well as the introduction of a tax monitoring service.

4. Analysis of the dynamics of participants joining the system of tax monitoring and changes in tax deductions to the federal budget of the country

To determine how the tax monitoring system influenced the tax system of the Russian Federation, for a start it is necessary to analyze the dynamics of changes in tax deductions to the federal budget and calculate the increase in indicators relative to 2015. Also during the study, an analysis was made of the dynamics of companies that joined the tax monitoring system, the results are shown in table 1 [11].

Table 1. Dynamics of tax deductions to the federal budget and the number of participants joining.

| Year     | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Growth 2019 to 2015 |
|----------|------|------|------|------|------|------|---------------------|
| Contributions to the federal budget. trillion rub. | 6.80 | 6.90 | 9.2  | 10.7 | 11.2 | -    | 65%                 |
| Number of tax monitoring system participants | 0    | 7    | 14   | 26   | 44   | 95   | -                   |

The reporting year for comparison is 2015. As you can see, after the introduction of the digitalization program, it has changed for the better, there has been active growth and by 2019, allocations to the federal budget increased by 65% compared to 2015, which favorably affects the federal budget as a whole and the decrease in the deficit the budget.

According to the data presented, it can be observed that since 2016 the number of participants in tax monitoring has increased by about 14 times, and from 2020 tax monitoring will be carried out in relation to 95 companies that provide 30% of revenues to the federal budget, which indicates the attractiveness of this system for companies, which has a positive effect on tax revenues to the state
budget and reduction of tax risks. A study by the international consulting company Deloitte also confirms the growth of participants in the tax monitoring system in the future.

It is reported that almost 70% of companies in Russia show interest in this form of interaction with the tax service. So far, this is available only to large taxpayers, who form a significant percentage of tax deductions, but in the future, it is planned to introduce other entities in the process of digitalization of the tax system. Currently, by 2020, 1905 Russian companies comply with the conditions for participation in the tax monitoring system, and 687 of them are maximally prepared for such a transition [8, 12].

5. Assessing the relationship between the increase in the number of companies joining the tax monitoring system and the increase in tax deductions to the federal budget of the country using a correlation analysis

To accomplish the task of research and achieve the goal of the work, it was necessary to assess the impact of the participants of the tax monitoring system on the growth of tax deductions to the federal budget. A correlation analysis was carried out and the correlation coefficient was calculated according to formula 1, which allows us to assess how closely the relationship between the values exists, the initial data for the correlation analysis are presented in table 2 [11,13].

Table 2. Dynamics of tax deductions to the federal budget and the number of participants joining.

| i  | Year | 2015 | 2016 | 2017 | 2018 | 2019 |
|----|------|------|------|------|------|------|
| x  | Number of participants | 0    | 7    | 14   | 26   | 44   |
| y  | Contributions to the federal budget. trillion rub. | 6.8  | 6.9  | 9.2  | 10.7 | 11.2 |

\[
r = \frac{\sum (x_i - \bar{x}) \cdot (y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \cdot \sum (y_i - \bar{y})^2}}
\]

where \( r \) is the correlation coefficient, \( x_i \) are the values taken by the variable \( x \), \( y_i \) - are the values taken by the variable \( y \), \( \bar{x} \) - is the average for \( x \), \( \bar{y} \) - is the average for \( y \) [3,7]. Calculating this coefficient on the Cheddock scale, its value was 0.93. The closest correlation is observed with direct correlation and corresponds to a coefficient close to +1, which is observed in the analyzed case, which corresponds to a very high connection on the Cheddock scale.

Analyzing the correlation coefficient, it can be noted that it has a close relationship between the two values, so it can be concluded that the growth of organizations using the tax monitoring system has an effect on the growth of contributions to the federal budget. This trend can be traced due to the obvious reduction in tax risks and the transparency of companies.

To assess the tax monitoring system of the Russian Federation, a model was built for participants to join the tax monitoring system using a logistic curve.

As a result, the model parameters will acquire the following economic meaning:

\[
\frac{dQ}{dt} = \delta \cdot Q \cdot \frac{K - Q}{K} - \text{Fergelst Pearl logistic curve, (2)}
\]

where \( Q \) – the number of participants in the tax monitoring system;

\( t \) – season;

\[
\frac{dQ}{dt} - \text{growth in the number of participants in the tax monitoring system per unit time;}
\]

\( \delta \) - potential growth of tax monitoring system participants.

\[
\frac{dQ}{dt} = \delta \cdot Q \cdot \text{geometric growth;}
\]

\( K \) - potential capacity of participants;
Currently in Russia in 2020, 1905 Russian companies comply with the conditions for participation in the tax monitoring system, 44 organizations participate in the system. The average growth rate for the year is about 58% (0.58). From the point of view of participants joining the tax monitoring system, the value of the logistic curve consists not so much in describing the dynamics of joining as in forecasting based on the curve of their future growth. To do this, it is necessary to solve the differential equation of the logistic curve and build a graph [14, 15].

\[
Q(t) = \frac{K}{1 + c \cdot \exp(-\delta \cdot t)},
\]

where \( c = \frac{K - Q_0}{Q_0} \) - relative growth potential at the start of the tax monitoring system.

Thus, the equation will have the form:

\[
Q(t) = \frac{1905}{1 + 271.14 \cdot \exp(-0.58 \cdot t)}.
\]

Figure 3. Logistic curve of participants joining the STM.

To assess the identified relationship between the number of participants in the tax monitoring system and deductions to the federal budget, we construct a linear regression equation:

\[
y = b \cdot x + a
\]

where \( a \) and \( b \) are respectively estimates of the number of participants in the tax monitoring system and contributions to the federal budget.

Thus, the regression equation has the form:

\[
y = 0.11 \cdot x + 7.04
\]

The coefficients obtained show that the average change in contributions to the federal budget is 110 billion, and the formally projected level of contributions is 7.04. It is also worth noting that the relationship between the number of participants in the tax monitoring system and contributions to the federal budget is direct.
To assess the quality of the obtained regression equation, the absolute approximation error was calculated by formula 4

$$\bar{A} = \frac{1}{n} \sum_{i=1}^{n} |y_i - \hat{y}_i| \cdot 100\%$$

(4)

where $\bar{A}$ – absolute approximation error, $y_i$ - real values of deductions to the federal budget, $\hat{y}_i$ – deduction values calculated using the regression equation [8].

The permissible approximation error should not exceed 10%, according to the calculations, the approximation error of the analyzed regression equation is 2%, which means that this equation can be used as a regression.

In addition, an important indicator for evaluating the regression equation can be considered the coefficient of determination, equal to the square of the correlation coefficient.

The coefficient of determination of the analyzed regression equation is 0.86. This indicator means that 86% of cases of changes in the number of participants in the tax monitoring system lead to a change in deductions to the federal budget, the accuracy of the selection of the regression equation is high, the remaining 14% of changes in deductions to the federal budget are explained by factors that are not taken into account in the model under consideration [15].

Based on the obtained linear regression model and the logistic curve, we construct a forecast of tax deductions to the federal budget for the next 5 years.

Table 3 shows the calculation of the predicted values of contributions to the federal budget of the country for the next five years according to the obtained regression model and the planned values of the affiliated participants obtained because of constructing a logistic curve.

| Year | The number of participants in the tax monitoring system | Contributions to the federal budget, trillion rub. |
|------|--------------------------------------------------------|--------------------------------------------------|
| 2020 | 95                                                     | 17.5                                             |
| 2021 | 121                                                    | 20.3                                             |
| 2022 | 205                                                    | 29.6                                             |
| 2023 | 338                                                    | 44.3                                             |
| 2024 | 531                                                    | 65.5                                             |

Figure 4 clearly shows the actual values of the impact of the tax monitoring system on the growth of contributions to the federal budget, as well as the forecast values obtained in the analysis.

As a result of calculating the forecast values and plotting the schedule, one can observe a significant increase in deductions to the federal budget due to the introduction of tax monitoring system technology by 2024, it is expected that about 531 companies will join and participate, which will ensure an increase in deductions to the federal budget to 65.5 trillion. rub.
6. Conclusion
The study analyzed the accession of participants to the tax monitoring system in the transport industry, revealed the growth and interest of companies in cooperating with tax authorities on the new tax administration model, determined the close relationship between the increase in tax monitoring participants and the growth of tax deductions to the federal budget of the Russian Federation by determining the coefficient correlations, a regression model is built and evaluated for the relationship between the number of participants in the tax monitoring system and federal contributions to the budget. The construction of the logistic curve made it possible to determine the forecasted value of the number of companies that joined the tax monitoring system, which contributed to the calculation of the forecasted value of deductions to the federal budget due to the influence of digital technology as a tax monitoring system. This model confirmed the linearity and high dependence between the analyzed indicators. The advantages of this system for tax authorities and companies are also identified. The analysis demonstrates the importance and feasibility of digitalization and transformation of the state tax system. The tax services of the countries of the world can use the experience of the Federal Tax Service of the Russian Federation to modernize and improve the tax administration of their country. Thus, the implemented tax monitoring system, like the digitalization of the tax system in the transport industry, shows a positive effect both for the country and for companies, and as a result, for the state economy as a whole.

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