

The 4th International Conference on Economics and Social Sciences
Resilience and economic intelligence through digitalization
and big data analytics
June 10-11, 2021
Bucharest University of Economic Studies, Romania

Is the Digitalisation of Tax Institutions a Solution
for Voluntary Tax Compliance?

Adriana PORUMBOIU^{1*}, Petre BREZEANU²

DOI: 10.2478/9788366675704-032

Abstract

In the stage of evolution in which the global society finds itself today, digitalisation is a key concept according to which new processes are designed, and efficient procedures solve current problems. Digitalisation, first implemented by the private sector, must also have a transposition in the public sector and can be a tool to improve the collection of tax obligations owed by individuals and legal entities, in the context where voluntary tax compliance is still a challenge for most member states of the European Union. This article aims to show the influence on the collection of tax receivables exerted by variables such as the share of tax obligations in income, educational level, and the degree of use of the Internet in relation to public institutions. The analysis takes into account EU countries over the last 12 years, during which time the use of the Internet has intensified. This analysis is a starting point in designing strategies for digitizing fiscal institutions, where they do not exist, depending on the specificities of each state.

Keywords: Tax compliance, fiscal revenues, digitisation.

JEL Classification: H21, H30.

1. Introduction

We are at the beginning of a new era of industrialisation, in which the digitalisation component is the key concept to intuit the direction of the changes we are experiencing. According to Cărăuș & Călugăreanu (2015), we live a digital age transition to an economy that focuses on information. Due to the COVID-19 health crisis that quickly spread its effects in all areas, the world society was put in an unforeseen situation and had to rethink, counter clockwise, ways of working, procedures and techniques in order not to remain in lockdown. In this context,

¹ Bucharest University of Economic Studies, Bucharest, Romania, porumboiudadriana12@stud.ase.ro.

* Corresponding author.

² Bucharest University of Economic Studies, Bucharest, Romania, petre.brezeanu@fin.ase.ro.

digitalisation has been one of the reforms adopted by many organisations, private or governmental, to maintain and streamline business.

Increasing the quality of public services through digitalisation requires public institutions, first of all, to take measures to facilitate the implementation of digitalisation: to provide the legislative framework, logistical support, infrastructure. Digitisation in the public sector involves major investments in equipment, software, networks, technologies, but also in staff in public institutions, through tailored training, promising instead to streamline processes and reduce long-term costs. Of course, the efficiency of public institutions, of the results illustrated in society, is not immediate and also depends on the level of the population's adaptability, openness to the new and the speed with which it acquires new skills. However, the adoption of digital tools in public administration and even the idea of e-government represents new objectives in public sector digital innovation (Burwell & Jorn, 2020). The costs for digitisation are significant, and the efficiency of the public sector will only increase if new technologies are assimilated to ultimately increase the performance of public services provided. The effort of public authorities in charge of implementing digitalisation in various fields is far from strictly financial and material (we are talking about the budget allocated by governments, therefore an operational conditioning). The difficulty lies in the way resources are distributed and the key people in the institutions accept and convince the rest of the staff of the importance of digitisation - of allocating resources and supporting the effort at the level of human resources.

However, digitalisation can improve many technical processes, services provided to the population can be carried out faster, with reduced physical contact, with a declining staffing need. For a state budget, digitalisation can be a solution to reduce long-term costs in terms of reducing administrative and personnel costs. However, it is interesting to study whether digitisation is also a way to increase budget revenues, if the collection of taxes increases thanks to the digitalisation of collection services.

2. Problem Statement

Unlike the private sector where digitalisation is a tool for greater profitability and where its influence is easier to quantify, in the public sector digitalisation must take into account the particularities of the latter and be applied to facilitate the fulfilment of state functions. The conditions related to legality, integrity, democracy will be taken into account (Manzoor, 2014), and also that the objectives of the state are: to provide solutions for social pressure, to allocate resources to meet the needs of individuals (Kotler & Lee, 2011), to redistribute revenues according to the public interest (Mihaiu et al., 2010).

Public sector performance refers to the results of activities, and Afonso et al. (2005) determine it by calculating the indicators of opportunity (results in health, education, justice and public administration) and those "Musgrave" (allocation, distribution, stability). Other authors take also into account indicators of national defence or infrastructure departments (Hagiu, 2017). Efficiency is an indicator that

also takes into account the amounts used to achieve the level of performance, for example the budgetary effort involved. Empirically comparing public sector performance and efficiency, Afonso et al. (2005) show that countries with smaller public sectors perform better and more efficiently than countries with larger public sectors, which indicates a decrease in the marginal product obtained by increasing public spending. As government financial resources are limited and the interest in public services is growing, numerous studies have focused on the efficient use of public money, often indicating that the results could have been achieved at a lower cost. A study made by Borge (2008) et al indicates that an increased democratic participation is associated with a better efficiency, while higher fiscal capacity weakens efficiency. Effectiveness shows the result obtained by the investments made - outcome (Veiss, 2012), the achievement of the final objective (Kjurchiski, 2014), which was actually achieved compared to what was programmed (Mandl et al., 2008) and is finally reflected in the living standard of the population. In other words, efficiency focuses on quality, and effectiveness on achieving goals (Popa, 2017). Moreover, the need to increase the performance of the public sector is accompanied by the requirement of citizens to see how public funds are used (Joumard et al, 2007).

Therefore, the digitalisation of public institutions, regardless of their particular purpose, must be implemented in order to increase their performance, reducing budgetary costs for better quality services (efficiency), which improve the social conditions of the population (efficiency).

3. Voluntary Compliance

The correct declaration to the state institutions of the properties and incomes, accompanied by the payment of the fiscal obligations within the terms provided by the law are the financial-fiscal form that it takes on the civic spirit. Conventionally, it is considered that taxpayers pay tax obligations for one of the following reasons: fear of not being caught avoiding / defrauding, or intention to submit and comply with fiscal rules (Scholz & Pinney, 1995). But, given the fact that the fiscal obligations are reflected in the budget of each taxpayer, there is a well-known, intuitive possibility for the latter to make a misreporting (Porumboiu et al., 2019). Studies on voluntary compliance show the need for paradigm shifts to increase the willingness of the population to pay taxes, to the detriment of using the coercive force of the state in collecting amounts due to the budget. The reasoning lies in the decrease of costs allocated to the collection of budget revenues, insofar as the use of state authorities for the collection of taxes, duties and contributions generates a cost higher than the amounts recovered.

The solution suggested by a World Bank study (2010) is in fact to simplify the tax system, because this aspect influences voluntary compliance, as well as taxpayers' tax knowledge (Saad, 2014). On the one hand, the legislation must be clear, easy to understand for all taxpayers, and on the other hand, the level set for taxes is also important. In other words, the taxpayer must be aware that additional state services cannot be obtained if individual payment obligations are not met,

because the public sector needs funding; also, the typology and values of tax obligations must be adapted to the national economy, because they will influence the way the taxpayer will direct their income.

The taxpayer's behaviour is a response to a series of stimuli, external - related to the economic, social context, but also internal - psychological, the latter being determined by the way the taxpayer perceives the tax system to which they must submit, the fairness of the tax system, the behaviour of other taxpayers (Erard & Feinstein, 1994). The compliance strategies that revenue-collecting institutions must have must aim at a “partnership” with the citizen, so that the latter responds positively and of their own intention to the fiscal requirements. The desideratum of fiscal compliance is voluntary compliance and the use of coercive force of law is only for exceptional situations, all the more so as, globally, capital mobility opportunities increase the size of tax avoidance (Phua, 2015). Frey (1992) provides evidence that strict monitoring and punishment lead ultimately to greater noncompliance.

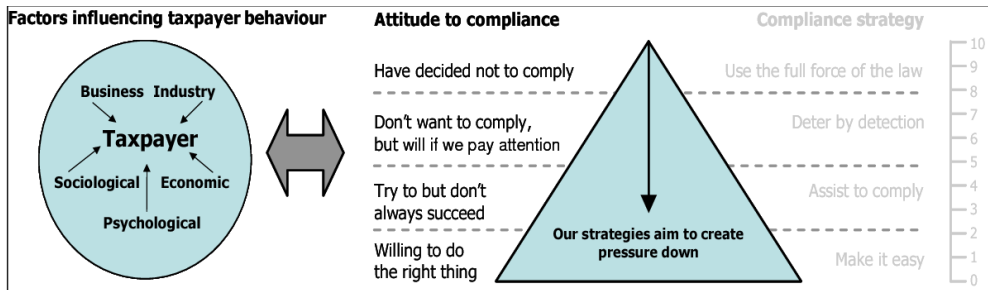


Figure 1. Spectrum of taxpayer attitudes to compliance

Source: Organisation for Economic Co-operation and Development (2009), p. 11.

Voluntary compliance is related to the state's ability to increase fiscal morality among citizens and represents the consolidation of a social norm of compliance (Luttmer, 2014). For the state, a low level of voluntary compliance is a fiscal risk and coincides with the possibility of not collecting the tax claims at the expected level (Porumboiu & Brezeanu, 2019). Trust in public institutions is strongly correlated to tax morale (Torgler, 2007). The fiscal behaviour of the population is influenced primarily by the level of income, but the influence of other factors is also indisputable, and we randomly list some of them: the perception of tax rules, the type of link created with certain public institutions, risk aversion, education, standard of living, etc. Therefore, the fiscal revenues of the state are a result of the fiscal policy and the economic situation (Mara et al., 2009) on the one hand, but also of the fiscal behaviour of the taxpayer, on the other hand.

4. Aims of the Research and Research Methods

This article aims to quantify the influence that several variables have on tax revenues in European Union countries, and to indicate whether more frequent

internet use and digitisation could increase voluntary compliance and the collection of fiscal obligations.

In this analysis, in order to measure the impact of several independent variables on the tax revenues from the states under study, we used as a dependent variable the share of fiscal revenues in the gross domestic product, which ensures the proportionality of the compared values. Figure 2 indicates that, for the most part, the level of taxes collected in GDP remained constant in the analysed states, between the two reference periods. However, there are indisputable differences between the weights from one country to another, from 27% of GDP in Romania or about 30% in the Baltic States, to 46% of GDP in Belgium or Denmark. If we take into account the absolute level of GDP of the mentioned countries, it can be deduced as a consequence that the amounts that make income to the national budgets are incomparable, hence the different capacity of the governments to develop the public sector.

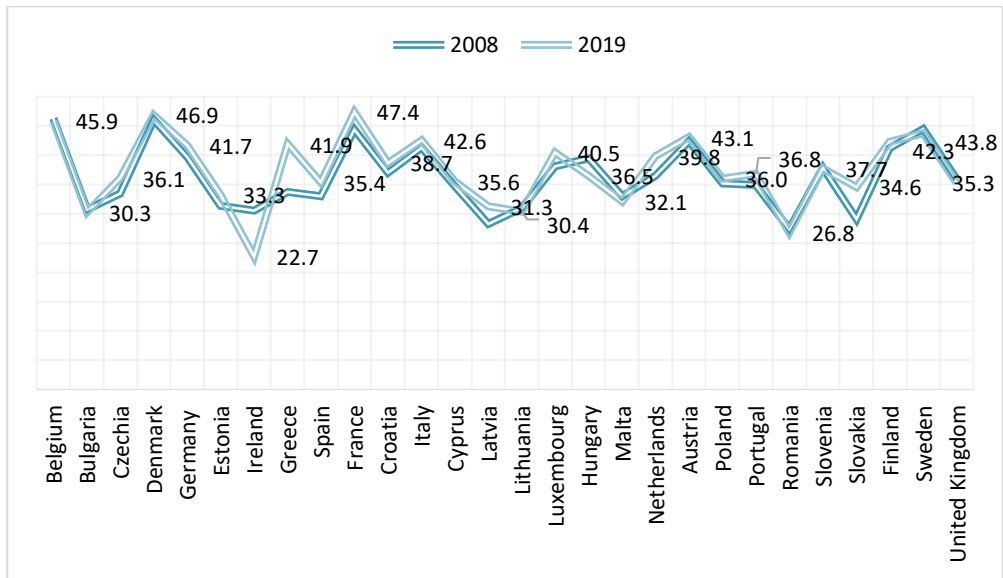


Figure 2. Fiscal revenues related to GDP in 2008, 2019 respectively, in European Union Member States

Source: Eurostat Database.

To see if the level of tax revenues in GDP is influenced by the level of education, the share of tax revenues in national net income and the degree of internet use in relation to public institutions, we conducted an analysis using Eurostat data for 2008-2019 on the Member States of the European Union. The method used is panel regression, comprising the following variables:

Table 1. Variables used in the present analysis

Variable name	Variable type	Calculation	Variable expression
Taxes/GDP	Dependent	Total taxes and fees (which constitute tax revenue), relative to gross domestic product (GDP)	%
Taxes/NNI	Independent	Total taxes and fees (which constitute tax revenue), relative to national net income (NNI)	%
Digital	Independent	The degree of Internet use in relation to public institutions, compared to the total contacts with these institutions	%
Education	Independent	The population that graduated a form of tertiary education (university, college, business school), from the total population	%

Source: Authors' synthesis.

5. Findings

We first proceeded to calculate the correlation coefficients, to see if the variables used are strongly correlated or not. The result indicates a moderate correlation between the level of taxes in GDP and that of taxes relative to NNI, the other correlations being weak or non-existent.

Table 2. Coefficients of determination (Pearson)

Variables	Taxes/ GDP	Taxes/NNI	Digital	Education
Taxes/GDP	1	0.631	0.275	0.025
Taxes/NNI	0.631	1	0.276	0.063
Digital	0.275	0.276	1	0.410
Education	0.025	0.063	0.410	1

Source: Own calculation.

Table 3. Multiple linear regression results obtained using Excel

rsq	0,584			
adjrsq	0,580			
	Estimate	Std. Error	z-value	Pr(> z)
(Intercept)	11.085	1.418	7.819	<0.0001
Taxes/NNI	0.564	0.030	18.515	<0.0001
Digital	0.037	0.009	4.269	<0.0001
Education	-0.079	0.025	-3.159	0.002

Source: Own calculation.

From the point of view of the three explanatory variables, only the level of taxes in the national net income and the share of internet contacts with public institutions are strongly statistically significant as the probabilities associated with the coefficients ($Pr (> | z |))$ are less than 1%. Considering the coefficient of determination R-sq, 58% of the variation of fiscal revenues in GDP is explained by the three independent variables, the difference of 42% being determined by variables that were not included in this analysis. The model equation obtained is:

$$\text{Taxes/GDP (\%)} = 11,085 (\%) + 0.564 * \text{Taxes/NNI (\%)} + 0.037 * \text{Digital contact (\%)} - 0.079 * \text{Education (\%)} \quad (1)$$

```

Fixed-effects (within) regression           Number of obs   =       336
Group variable: Taral                     Number of groups =        28

R-sq:                                     Obs per group:
    within = 0.5758                        min =          12
    between = 0.6609                       avg =         12.0
    overall = 0.6562                       max =          12

                                           F(3, 305)       =       138.02
corr(u_i, Xb) = -0.0373                   Prob > F        =       0.0000
    
```

TaxePIB	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Taxevenitn~1	.5669785	.0326409	17.37	0.000	.5027486	.6312084
Contactdig~1	.035657	.0088359	4.04	0.000	.0182701	.053044
Educatie	-.0764507	.0258277	-2.96	0.003	-.1272738	-.0256277
_cons	10.94825	1.32522	8.26	0.000	8.340514	13.55598
sigma_u	3.4440426					
sigma_e	.96148518					
rho	.92769731 (fraction of variance due to u_i)					

F test that all u_i=0: F(27, 305) = 146.90 Prob > F = 0.0000

Figure 3. Fixed effects regression results obtained using Stata

Source: Own calculation.

For estimating the model using the Stata software (Torres-Reyna, 2007), the results are as shown in Figure 3. Since the associated value $Prob > F = 0.0000$ is less than 0.05, the fixed effects are appropriate. Compared to the multiple regression estimated by Excel, we notice that the values of the regression coefficients, as well as their sign, are very close. According to the values displayed, the model equation is the following one:

$$\text{Taxes/GDP (\%)} = 10.948 (\%) + 0,566 * \text{Taxes/NNI (\%)} + 0,035 * \text{Digital contact (\%)} - 0,076 * \text{Education (\%)} \quad (2)$$

Figure 4 shows the degree of use of the Internet by the population in interaction with public institutions, as a way to quantify the digitalisation of contact of individuals and legal entities with the public sector. Differences between states are extremely large.

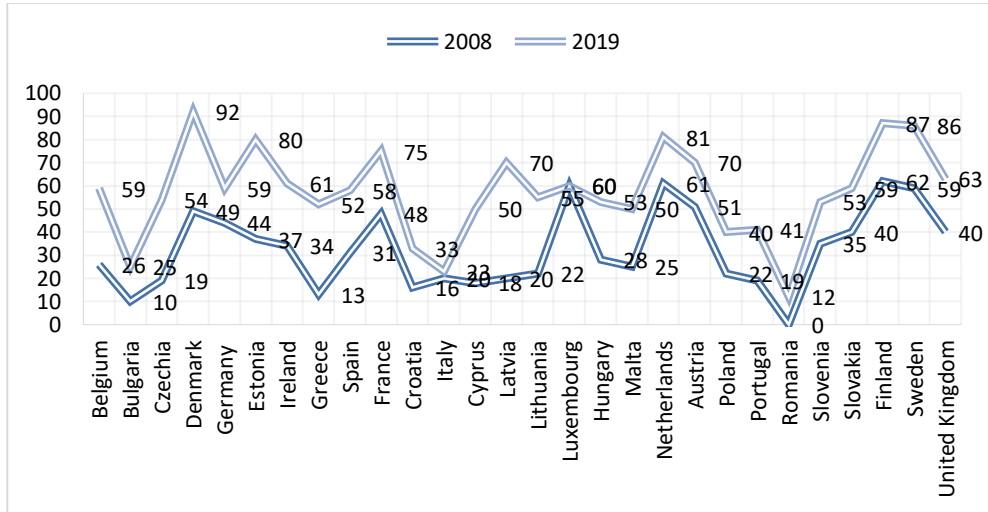


Figure 4. Digital contact with public institutions in 2008, 2019 respectively, in European Union Member States

Source: Eurostat Database.

In the case of Romania, the share of internet connections between citizens and public institutions in the period 2008-2019 was about 11% of total contacts, the lowest share in the European Union. At the opposite pole are countries with weights such as: Denmark - 82%, Sweden - 76%, Finland - 75%. There is a very big difference in the use of the Internet to contact public institutions by citizens of the European Union, with differences between states exceeding 50 percentage points.

If Romania had a use of the Internet in contact with public institutions similar to the countries mentioned in 2019, for example 75%, all other independent variables remaining unchanged, the value of tax revenues could have reached 30% of GDP, instead of 26.8%. Of course, tax revenues are not limited to the way digitalisation is used by the public sector, but its importance is undeniable. However, the share of tax revenue collection in GDP is an aspect to be studied closely, because it is not only the lack of digitalisation that explains the fact that Romania has the lowest share of tax revenue in GDP, of only 26.8% in 2019, while the EU average is 37.3%.

6. Conclusions

Voluntary compliance, rather than digitising public institutions, is a priority for most governments. EU member states with a low share of revenue in GDP need to

be aware that lower tax revenues also mean a lower financial capacity of governments to support the public sector. Fiscal strategies must be adjusted so as to increase the degree of voluntary compliance and the trust in institutions, and to ensure higher fiscal revenues to national budgets. Also, the trend of digitalisation in the economy must be implemented in the institutions of the states that have a low digital contact of the population with the public sector. The level of taxes related to income has a certain influence on tax revenues, and to a lesser extent the degree of use of the Internet with public institutions.

From the perspective of current social requirements, we can say that, regardless of the ability to increase or not the collection of tax receivables, the digitalisation of the public sector, including tax revenue institutions, is a necessary step in adapting state institutions to technological progress. The digitisation of the public sector must be conceived as a strategy to improve the service provided (for the citizen / taxpayer / beneficiary) and, at the same time, to increase the procedural efficiency (for the user institution).

In this case, with regard to the collection of tax revenues, digitisation must be a series of services for the taxpayer through which he can declare, verify, pay unconditional obligations such as the work schedule, and for tax institutions, it must be a lever to improve the relationship with the taxpayer, with an effect of increasing the degree of tax compliance.

References

- [1] Afonso, A., Schuknecht, L. & Tanzi, V. (2005). Public sector efficiency: An international comparison. *Public Choice*, 123, pp. 321-347.
- [2] Borge, L.E., Falch, T. & Tovmo, P. (2008). Public sector efficiency: the roles of political and budgetary institutions, fiscal capacity, and democratic participation. *Public Choice*, 136, pp. 475-495.
- [3] Burwell, F. G. & Jorn, F. (2020). *The Next Phase of Digitalization in Central and Eastern Europe: 2020 and Beyond*. Atlantic Council.
- [4] Cărăuș, M. & Călugăreanu M. (2015). How to increase voluntary compliance in the digital age, Proceedings of MAC-EMM 2015 in Prague, MAC Prague consulting Ltd., Czech Republic.
- [5] Erard, B. & Feinstein, J. (1994). Honesty and Evasion in the Tax Compliance Game. *The RAND Journal of Economics*, 25(1), pp. 1-19.
- [6] Frey, B. (1992). Tertium Datur: Pricing, Regulating and Intrinsic Motivation. *Kyklos – International Revue of Social Sciences*, 45 (2), pp. 161-184.
- [7] Gemmell, N. & Hasseldine, J. (2012). The Tax Gap: A Methodological Review *Advances in Taxation*, Vol 20, December 2012, Victoria University of Wellington School of Business Working Paper No. 09/2012, pp. 203-231.
- [8] Hagiu, M. (2017). Analiza eficienței cheltuielilor publice utilizând metoda Data Envelopment Analysis, WP nr. 5/2017, Colecția de working papers ABC-ul Lumii Financiare [Public expenditure efficiency analysis using Data Envelopment Analysis method, WP no. 5/2017, ABC Financial World working papers collection].

- [9] Joumard, I., Curristine, T. & Lonti, Z. (2007). Improving Public Sector Efficiency: Challenges and Opportunities. *OECD Journal on Budgeting*. 7. 6-6. 10.1787/budget-v7-art6-en.
- [10] Kotler, P. & Lee, N.R. (2011). *Social Marketing: Influencing behaviours for Good*, SAGE Publications, Fourth edition.
- [11] Kjurchiski, N. (2014). Public Administration Efficiency in Resource Economies. May 2014, The Russian Presidential Academy of National Economy and Public Administration RANEPA.
- [12] Luttmer, E. & Singhal, M. (2014). Tax Morale. *The Journal of Economic Perspectives*, 28(4), 149-168.
- [13] Mandl, U., Dierx, A. & Ilzkovitz, F. (2008). The effectiveness and efficiency of public spending. European Commission, European Economy Economic Papers 301/February 2008.
- [14] Manzoor, A. (2014). A Look at Efficiency in Public Administration. Past and Future. *SAGE Open*, October-December 2014, pp. 1-5.
- [15] Mara, E. R., Inceu, A., Cuceu, I. & Achim, M. V. (2009). The Impact of Economic Crisis on The Fiscal Revenues, *Annals of Faculty of Economics*, University of Oradea, Faculty of Economics, vol. 3(1), pp. 252-257.
- [16] Mihaiu, D. M., Opreana, A. & Cristescu, M. P. (2010). Efficiency, Effectiveness and Performance of the Public Sector, *Journal for Economic Forecasting*, Institute for Economic Forecasting, vol. 0(4), pp. 132-147.
- [17] OECD (2009). *Managing and Improving Compliance: Recent Developments in Compliance Risk Treatments*, Forum on Tax Administration: Compliance Subgroup.
- [18] Phua, S. (2015). Convergence in Global Tax Compliance. *Singapore Journal of Legal Studies*, pp. 77-104.
- [19] Popa, F. (2017). Elements on the Efficiency and Effectiveness of the Public Sector, *Ovidius University Annals*, Economic Sciences Series, Ovidius University of Constanta, Faculty of Economic Sciences, vol. 0(2), pp. 313-319.
- [20] Porumboiu, A. E. & Brezeanu, P. (2019). A Literature Review on Fiscal Risks, *Finance – Challenges of the Future*, XIX, 21/2019, pp. 107-111.
- [21] Porumboiu, A. E., Butu, I., Ghetu, R. & Brezeanu, P. (2019). Fiscal Risk of VAT Uncollected in European Union, *The Annals of the University of Oradea*, vol. XXVIII (2), pp. 200-207.
- [22] Saad, N. (2014). Tax Knowledge, Tax Complexity and Tax Compliance: Taxpayers' View, *Procedia - Social and Behavioural Sciences*, 109, pp. 1069-1075.
- [23] Scholz, J., & Pinney, N. (1995). Duty, Fear, and Tax Compliance: The Heuristic Basis of Citizenship Behaviour, *American Journal of Political Science*, 39(2), pp. 490-512.
- [24] Torgler, B. (2007). *Tax Compliance and Tax Morale, A Theoretical and Empirical Analysis*, Edward Elgar Publishing, UK.
- [25] Torres-Reyna, O. (2007). *Panel data analysis fixed and random effects using Stata (v.4.2.)*, Data & Statistical Services, Princeton University.
- [26] Veiss, S. D. (2012). Eficiența și eficacitatea în sectorul public [Efficiency and Effectiveness in the Public Sector], *REGENT*, vol. 13, no. 3(36), pp. 368-378.