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CLUSTERING TAX ADMINISTRATIONS IN EUROPEAN UNION MEMBER STATES

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Abstract

The European Union Member States use different organizational and functional models of tax administration that could determine better or worse performances. This paper analyzes the way of organization and operation of tax administrations in European Union Member States from the perspective of the 21 variables obtained based on the information made available on the OECD's Tax Administration Comparative Information Series. Using the hierarchical clustering procedures, tax administrations in the European Union Member States were grouped into clusters. The purpose of this approach was to observe if the respective clusters can be associated with a certain grouping of the tax administrations, made according to their classification, from the point of view concerning the activity efficiency. The efficiency of the activity was evaluated based on 5 indicators developed in the specialty literature. The research showed that the tax administrations in the formed clusters can be found in one of the ranking parts. Therefore, the grouping of tax administrations based on variables that reflect their characteristics can be a useful tool in identifying an organization and functioning model for the tax administration that associated with a certain efficiency level.

Keywords: cluster analysis, efficiency, organizational models, performance, tax administrations.

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1. Introduction

Tax administration (TA) is the public institution with the most important role in collecting tax revenue. The tax policy of a country is applied through the TA which is the main interface between state and taxpayers. Nowadays, TA is required to use adequate tools and to apply modern methods for tax planning, tax collection, in such a way that tax revenue collection and compliance of taxpayers with their tax obligations should be as high as possible.

In-depth research on the specific problems of the TA, from the performance perspective that it must achieve, is an important topic in the current economic and social context.

On the one hand, the citizens' demands in relation to the services provided by the state institutions have increased considerably, and therefore the TA must improve especially the activities through which it gets in direct contact with taxpayers. On the other hand, current neo-liberal policies have generated a reduction in tax pressure and require the state to use public money much more rationally and efficiently. Within this context, the pressure exercised on the TA to achieve a tax revenue collection, as high as possible, grows. The above-mentioned aspects can also be seen in the policies and strategies promoted by the International Monetary Fund, the World Bank, the Organization for Economic Co-operation and Development (OECD), etc.

This research aims at grouping the TAs of the 28 European Union Member States (EU MS) by cluster analysis, using data provided by the OECD (Tax Administration 2019 Comparative Information on the OECD and Other Advanced and Emerging Economies) in order to highlight if a certain pattern of organization and functioning of TAs can be associated with the high TA performance. The fact that TAs in the EU MS are performing differently is revealed by the differences of the values from indicators calculated and published by the World Bank, OECD and European Commission (for example, cost of collection ratios, the size of the tax gap, time to prepare and pay taxes, etc.). One problem in solving the research question was that TAs in the EU MS are not yet ranked after a composite index to reflect their performance. An evaluation report of TA based on the new assessment tool developed for TAs (The Tax Administration Diagnostic Assessment Tool—TADAT) is not available for EU MS.

The main research question is whether we can identify organization and functioning models of TAs in the EU MS that can be associated with a certain level of performance of the activity carried out.

The information regarding the organizational characteristics of TAs in the EU MS and their performances were based on the OECD's Tax Administration Comparative Information Series—a database developed on the basis of information provided by MS through questionnaires and on data published in the 'Paying Taxes' Report, a part of the World Bank's Doing Business project, and in Study and Reports on the VAT Gap in the European Union—28 Member States (Davoine, 2019).

The first part of the paper includes an analysis of how the assessment of TA performance is reflected in the specialty literature, as well as a number of relevant infor-

mation on certain aspects related to the activity of TAs in the EU MS. In the following parts the research methodology is described and the results, discussions and conclusions are thus presented.

This research is a first attempt, in the specialty literature, to link the characteristics of a TA (from the perspective of the structure-function) to its efficiency. A number of output indicators have been presented, based on which the TAs in the EU MS can be ranked.

The study has shown that the efficiency of TAs in the EU MS is related to the way they are organized and operated.

2. Considerations regarding the organization and functioning of the tax administrations

There are various models of organization and functioning of TAs around the world, the differences between them being generated both by legislative elements (for example, the way taxes are collected: at national or sub-national level), as well as by cultural, historical or political elements (OECD, 2019, p. 106). A study carried out by OECD shows that, generally, TAs in the EU MS are organized as unified semi-autonomous bodies with main responsibilities in administrating direct and indirect taxes, but they also carryout other activities such as payment of welfare/ benefits and customs administration or the collection of social security contributions (OECD, 2011).

The organizational structures of TAs that can be identified in the EU MS (organization by type of taxes collected, organization by functions performed and organization by type of taxpayer, combinations of two or more types of organizational structures) were analyzed in the specialty literature (OECD, 2009; Kidd, 2010; Murdoch *et al.*, 2012; Jacobs *et al.*, 2013) in terms of the advantages and disadvantages generated in use. The analysis of the specialty literature showed the use tendency of the functional structures in more and more TAs.

The way of organizing and functioning of the TAs influences their degree of autonomy, materialized in the freedom to elaborate and implement adequate procedures for achieving the fiscal policy objectives. Numerous studies highlight the tendency to increase the autonomy degree of TAs (Murdoch *et al.*, 2012; Jacobs *et al.*, 2013; Crawford, 2013; OECD, 2019), with the aim of reducing the risk of political intervention in tax collection and improving the effectiveness of the TAs in the conditions of increasing the taxpayer's respect for the tax authority. In this context, there have been situations of outsourcing the activities of TAs to the private sector or other public institutions. Activities related to information technology, tax compliance activities, tax returns and the processing of tax payments are frequently outsourced. The authors who studied the effects of these trends point out that the outsourcing of some activities by TAs should not seek to reduce costs, as the only objective, but to represent a complex process to simultaneously increase the efficiency and the quality of services provided to taxpayers (Hartrath, 2015; Lemgruber *et al.*, 2015; Davies *et al.*,

2018). Sassi *et al.* (2018) and Walker and Tizard (2018) showed that outsourcing can be considered useful, to the extent that it generated savings for TAs, but the outsourcing impact on the quality of services provided to taxpayers is difficult to evaluate, so that this exploitation tendency must be done with caution. However, maintaining control over the basic functions of the TAs is essential.

Mainly, the TAs in the EU MS want to be modern, characterized, according to D'Ascenzo (2015), by transparency and adaptability, in order to reduce international tax risks and to promote a positive investment climate and thus to reduce the causes of non-compliance.

3. The efficiency evaluation of tax administration

Because of the way TAs carry out their activity, which has an important impact on the total amount of public money, there is a high interest from the side of all factors involved in public finance that the activity of public administration is a performing one. The indicator of performance evaluation of the TA with generalized acknowledgment is maximizing the tax revenue collection, among which Serra (2005, p. 20) found the following: minimization of compliance costs and simpler performance measures, staff motivation and satisfaction of excise staff and taxpayers (James *et al.*, 2006, p. 93), maximizing visibility and results in wider acceptance of the tax system, minimizing the administrative burden and minimizing service delivery transaction times (Yoon *et al.*, 2014, p. 38).

Developing tools for the performance evaluation of TA has been an important concern for the specialists, international organizations and the European Commission.

A first initiative for creating a tool that would have allowed the TAs from the EU to identify its strengths and weaknesses dates from 2007, and took the shape of a fiscal blueprints set, that included the concept of measurement via a scoring system. The set of fiscal blueprints covers the following aspects: the overall framework of the TA, structure and organization, tax legislation, human and behavioral issues, ethics, human resources, revenue collection and enforcement, tax audit, administrative cooperation and mutual assistance, fraud and tax avoidance, taxpayer services, taxpayer rights and obligations, systems for taxpayers' management, voluntary compliance, information technology and communications (European Commission, 2007, pp. 13–56).

Collecting the necessary data to achieve the scoring profiles must be done through a questionnaire. In 2008, the European Organization of Supreme Audit Institutions proposed a series of performance indicators considered as being measurable, time-related and comparable that could be used internationally in benchmarking the performance of TA. The suggested indicators are: tax gap, collection gap, timely filling, completeness and accuracy of taxpayers' tax returns, take up of electronic services, efficiency and productivity, total expense-to-revenue ratio of administration of taxes to revenue, overall customer satisfaction rating, quality of the TA's work—consisten-

cy, correctness and speed of response to customers, cost to compliant taxpayers, and compensating the customer (European Organization of Supreme Audit Institutions, 2008, pp. 8–11). Without using the appropriate data for all mentioned indicators (due to their unavailability), the study attempted to set up a group of 32 TAs in 32 states based on 6 variables.

In 2011, a study proposed a set of high-performance indicators for TA (23 indicators) structured into three categories: TA framework and systems, compliance and risk education, services, enforcement and management, organization and responsibility (Crandall, 2011).

A recent assessment TA tool is The Tax Administration Diagnostic Assessment Tool (TADAT) supported by the European Commission, Germany, the International Monetary Fund, Japan, the Netherlands, Norway, Switzerland, the United Kingdom and the World Bank. TADAT is a comprehensive TA diagnostic tool, performance evaluation being based on 28 indicators, built on 1 to 4 dimensions (OECD, 2016). A series of evaluation reports on the performance of TAs in developing countries are available.

There are authors (Mansor and Tayib, 2015) who consider that a prescriptive set of measures or a series of verification indicators will not necessarily lead to an increase in the performance of a TA. Specific aspects of the guidelines that help identify ways to improve performance management in a TA and, in this sense, identifying measures that can be taken by other TAs can, however, improve performance management.

Other authors consider that tax assessment performance indicators, such as cost for TA and net revenue collected, do not allow for comparison of TA efficiency as there are many differences in responsibilities, geographical location, cost administration and process automation, proposing a multifactor model for assessing efficiency of such authorities (Pētersone *et al.*, 2016). Hauptman *et al.* (2014) consider that the level of communication between a tax auditor and a taxpayer may be an evaluation indicator of the TA performance. Jurušs and Kalderauska (2017) reveal that the best practice of customer relationship management in business should be adjusted and implemented in the TA.

In the literature, we find several attempts to analyze some factors that the performance of TAs may depend on. For example, Katharaki and Marios (2010) argued that diverse factors such as location, inflation, etc. could play a significant role in TA performance. Esteller-Moré (2011) has attempted to show that it can be determined to a certain extent that the tax gap is due to TA's inefficiency or the predisposition of taxpayers to avoid paying their taxes. Kotsogiannis and Serfes (2016) analyzed the role of incentives of tax inspectors and the role of multiple tax inspectors in assessing non-compliance. It has shown that the reward of the tax inspector is not correlated with the magnitude of the discovered tax evasion. Profeta and Scabrosetti (2017) explored the hypothesis that political constraints help explain the inefficiencies in TA, issues that have been mentioned since 2001 by Devas *et al.*, and Esteller-Moré in 2005.

Given the statistics available, a series of assessments can be made regarding the performance of the TAs in the EU MS. To achieve a hierarchy of TAs from the point of view of the efficiency of the activities carried out, the information available in the 'Paying Taxes' report, published in November 2018, a part of the World Bank's Doing Business project was used.

Thus, the EU MS were compared in terms of the number of hours required to pay taxes, as well as the number of annual payments that a medium-sized company has to make in order to pay its tax obligations.

It is noted the fact that in 2018, medium-sized companies in Luxembourg, Italy, Cyprus, Bulgaria, Austria, Romania, Croatia, Belgium and Hungary made a larger number of payments over the year than the European average, which was about 10 annual payments (Figure 1). Also, the time allocated for calculating, completing and filing tax returns was higher than the European average (about 172 hours per year) for medium-sized companies in Bulgaria, Croatia, the Czech Republic, Germany, Greece, Hungary, Italy, Poland, Portugal, Slovakia and Slovenia (Figure 2).

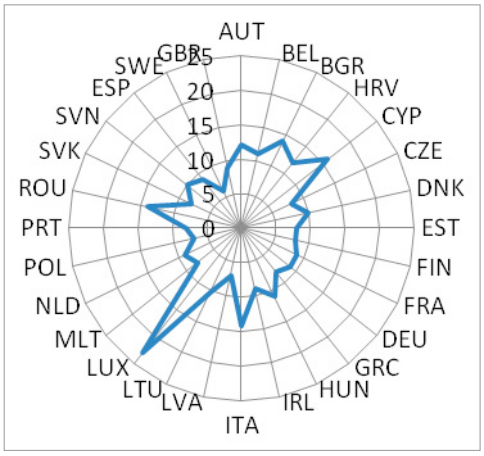

Figure 1: Number of annual payments due for tax obligations

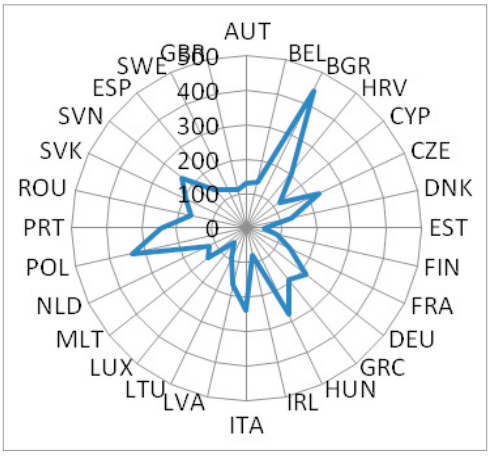

Figure 2: Number of hours per year for payment of the due tax obligations

Source: World Bank and PricewaterhouseCoopers (2018), 'Paying Taxes 2019'

From the perspective of the ease with which a company can obtain the value added tax (VAT) refund (Figure 3), the TAs in Belgium, Bulgaria, Cyprus, Greece, Italy, Malta, Romania, the Czech Republic and Slovakia had procedures considered to be more difficult than the EU average (about 16 weeks). Also, in case of correcting some errors in the tax return statement on the profit tax (Figure 4), the companies in Bulgaria, Croatia, Finland, Malta, Slovenia have to spend more time than the European average (about 6 hours).

The fiscal gap is a relevant indicator for evaluating the performance of TAs, at the EU level being available only information regarding the VAT gaps percent of VAT

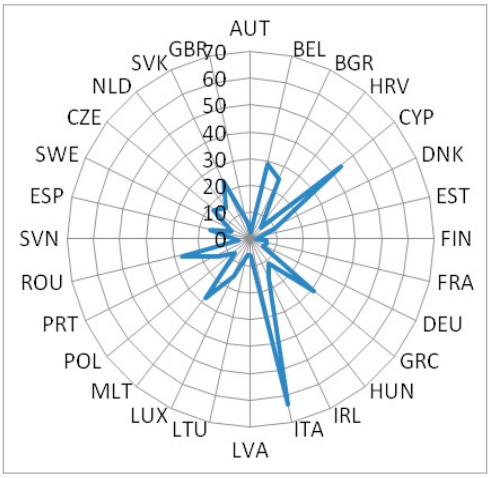

Figure 3: Time to obtain VAT refund (weeks)

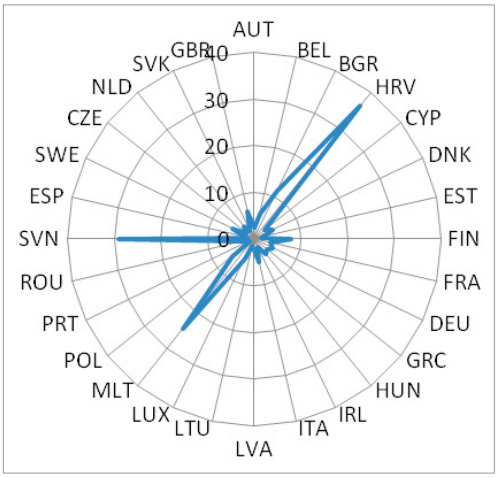

Figure 4: Time to comply with a corporate income tax correction (hours)

Source: World Bank and PricewaterhouseCoopers (2018)

total tax liability. The VAT gap is an estimate of income losses due to fraud and tax evasion, avoidance of tax liabilities, bankruptcies, financial insolvencies, as well as calculation errors.

In order to limit the influence of certain conjuncture short-term factors on the level of VAT gap, the average levels are presented for the period 2012-2018 (the values for 2018 were estimated) as it can be seen in Figure 5.

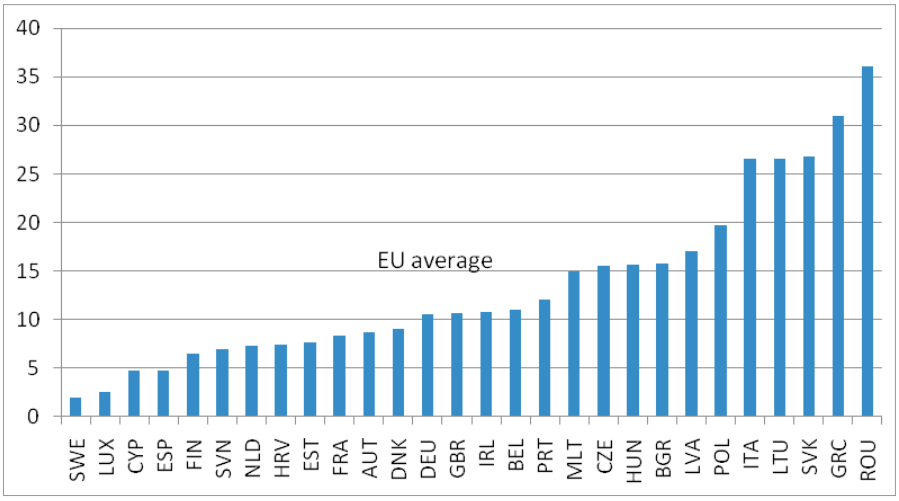

Figure 5: VAT gap as percent of VAT total tax liability (medium level for period 2012-2018)

Source: Davoine (2019, pp. 21-50)

The worst results in the collection of VAT revenues were recorded by the TAs in Romania, Greece, Slovakia, Lithuania and Italy, where the VAT gap was 2 and even almost three times higher than the EU average.

A summary of the above information is presented in Table 1, in which the TAs of the EU MS are grouped according to the value of the five indicators analyzed.

Table 1: The grouping of the TAs from the EU MS by the value of five indicators that show the efficiency of the activity

Indicator	High performance TA (the value of the indicator is in the first third of the ranking)	Average performance TA (the value of the indicator is in the second third of the ranking)	Low performance TA (the value of the indicator is in the last third of the ranking)
The number of annual tax payments	LVA, POL, SWE, CZE, EST, FIN, GRC, MLT, PRT, SVK	BEL, DNK, FRA, DEU, IRL, LTU, NLD, SVN, ESP, GBR, HUN	AUT, BGR, HRV, CYP, ITA, LUX, ROU
The number of hours per year to pay the tax obligations	EST, FIN, IRL, LTU, LUX, NLD, GBR, SWE	AUT, BEL, CYP, DNK, FRA, LVA, MLT, ROU, SVK, ESP, GRC	BGR, HRV, CZE, DEU, HUN, ITA, POL, PRT, SVN
Time to obtain VAT refund	AUT, HRV, EST, FIN, FRA, DEU, LVA, LTU, POL, SVN, SWE, GBR	DNK, HUN, IRL, LUX, PRT, ESP, CZE, NLD	BEL, BGR, CYP, GRC, ITA, MLT, ROU, SVK
Time to comply with a corporate income tax correction	AUT, CYP, EST, IRL, LVA, LTU, PRT, ROU, CZE, SVK, ESP	BEL, DNK, FIN, DEU, LUX, POL, SWE, GBR, HUN, GRC, NLD, FRA, ITA	BGR, HRV, MLT, SVN
VAT gap as percent of VAT total tax liability	SWE, LUX, CYP, ESP, FIN, SVN, NLD, HRV, EST, FRA, AUT, DNK	DEU, GBR, IRL, BEL, PRT, MLT, CZE, HUN, BGR	ROU, GRC, SVK, LTU, ITA, POL, LVA

Source: The authors

TAs in Bulgaria, Croatia, Romania or Cyprus can be found frequently in the last third of the ranking based on the values of 5 indicators that show the efficiency of the activity of these entities, and the TAs in Estonia, Austria, Netherlands or Spain can be found frequently in the first third of the ranking.

4. Methodology

The OECD data base (the OECD's Tax Administration Comparative Information Series) on TA represented the source of the required data for the quantitative analysis. This database contains information valid for 2017. This database contains the data provided by the 55 TAs (including the 28 TAs of the EU MS) about revenue collections, institutional arrangements, budget and human resources, segmentation, registration, return filing and payment, service and education, collection and enforcement, verification/ audit and dispute resolution.

In order to carry out the research, those data were selected on the basis of which variables can be defined that can characterize the TAs from the point of view of or-

ganization and functioning. The variables were defined only if the information from the OECD database was available for all EU MS. We mention that the possibility of defining variables was limited by the numerous situations in which the data were not available for all the analyzed TAs. The absence of data is generated by the fact that the OECD collects the data by applying a complex questionnaire and the representatives of the TAs in the EU MS do not answer all the questions of the questionnaire. For these reasons, we managed to define only 21 variables, presented in Table 2. Part of the previously mentioned variables was taken from the OECD database on TA, and others were developed by the authors.

Table 2: The variables defined as criteria for grouping

No.	Variable	Description
1	Institutional framework	TAs can be organized as: unified semi-autonomous body, unified semi-autonomous body with formal board or advisory group comprised of external officials, single directorate in Ministry of Finance, multiple directorates in Ministry of Finance or other type of organization.
2	Organizational structure	The types of organization structure are the following: tax type, function type, taxpayer type or combination thereof.
3	Nature of ICT solutions	ICT solutions are (a) developed or maintained in-house; (b) from an external supplier or (c) both.
4	Delegated authority of the TA (exercised by the administration without requiring external approval)	TA exercises discretion over operating budget or not.
5	Performance standards	Availability of performance standards related to solving tax dispute cases via administrative review. The possible variants are: no standard, no standard met, partially standard met and mostly standard met.
6	Organizational features related to return filing/ payment processing	Location of staff performing TA operational activities related to return filing/ payment processing. The possible variants are: centralized, localized and regionalized.
7	Organizational features related to managing taxpayer appeals/ disputes	Location of staff performing TA operational activities related to managing taxpayer appeals/ disputes. The possible variants are: centralized, localized and regionalized.
8	Human resources	The number of full-time permanent staff/ 1,000 inhabitants.
9	Importance of the audit activity from the perspective of the human resource	The personnel involved in audit, investigation and other verification as % of full-time (FT) permanent staff.
10	Complexity of the office network	The total number of offices (headquarters, regional and local offices and other offices) /1 mill. inhabitants.
11	Operating expenditure allocation	The salary cost as % of recurrent budget.
12	Remuneration and staff performance	The performance is linked to pay and reward or not.
13	Segmentation level	Specific programs for SME's exist or not
14	Electronic payment	Mandatory electronic payment. The possible variants are: (a) E-payment is available and mandatory for all taxpayers or for some taxpayers; (b) E-payment is available but not mandatory and (c) E-payment is not available.

No.	Variable	Description
15	Importance of refunds	The value of refunds made (VAT and other refunds) as % of total net revenue collected by the TA.
16	Influencing taxpayer behavior	The TA has created a behavioral insights unit/team in order to influence taxpayer behavior or not.
17	Dispute resolution	The TA has ability to settle dispute with taxpayer or not.
18	Staff dynamics	The difference between hiring rate and attrition rate. Staff dynamics are positive if the hiring rate is greater than the attrition rate. Staff dynamics are negative if the hiring rate is smaller than the attrition rate.
19	Management practices	The TA use innovative approaches or not.
20	Performance management of human resources (HR)	Performance management of HR includes individual development plans or not.
21	HR strategy	HR strategy is competency-based or not.

The classification of cases in the database was performed using cluster analysis in SPSS. A hierarchical clustering procedure was used because some of the variables are binary or numbers. Hierarchical cluster analysis separates each case into its own individual cluster in the first step so that the initial number of clusters equals the total number of cases. At successive steps, similar cases or clusters are merged together (as described above) until each case is grouped into a single cluster (Yim and Ramdeen, 2015, p. 17). The best results were obtained using method Ward Linkage and range Euclidean distance.

To represent the cluster analysis graphically, a dendrogram was created. For this purpose, we opted to use the Ward Linkage method, considered by Armeanu *et al.* (2012) 'the most efficient and most efficient of all hierarchical classification algorithms', given the fact that 'at each step, those two clusters are merged for which the variability of the resulting cluster is the lowest of all cluster merging possibilities'.

5. Results and discussions

Clustering TAs in the EU MS led to the formation of 5 clusters, the main characteristics being presented in Table 3.

From the point of view of the institutional framework, TAs in most EU MS operate as a unified semi-autonomous body. This type of organization is viewed as the most efficient, from the revenue collection point of view and the TA manages most direct and indirect taxes.

From the point of view of the TA organizational structure, in most EU MS, various combinations of three types of established organizational structures are used: tax type, function type and taxpayer type. Thus, the disadvantages of the exclusive use of one of the respective organizational structures are avoided. For example, the flexible use of the staff whose competence was largely limited to a certain tax or the useless fragmentation of the tax system is the disadvantage of a tax type, or the impossibility of taking into account the different characteristics, behaviors and attitudes of taxpayers in relation to tax compliance is a disadvantage of the function tax.

Table 3: Results of clustering TAs in the EU MS

Variable	Cluster 1 AUT, BEL, DNK, EST, SWE, GBR, NLD, ESP, DEU, HUN, SVN	Cluster 2 CZE, FIN, POL, SVK	Cluster 3 PRT, FRA, BGR, HRV	Cluster 4 GRC, IRL, LVA, LTU, CYP, ROU, MLT, ITA	Cluster 5 LUX
No.1	Unified semi-autonomous body – 64% of total TAs.	Multiple directorates in Ministry of Finance – 50% of total TAs.	Single directorate in Ministry of Finance – 75% of total TAs.	Unified semi-autonomous body – 75% of total TAs.	Multiple directorates in Ministry of Finance.
No.2	Function type – 46% of total TAs.	Taxpayer type – 50% of total TAs.	Any combination of tax type – 50% of total TAs.	Tax type – 75% of total TAs.	Tax type.
No.3	Developed or maintained in-house and from an external supplier in most (55%) TAs.	From an external supplier centralized in a half of TAs.	Developed or maintained in-house and from an external supplier centralized in a half of TAs.	Developed or maintained in-house and from an external supplier in most (75%) TAs.	Developed or maintained in-house and from an external supplier.
No.4	80% of total TAs exercise delegated authority without requiring external approval.	75% of total TAs exercise delegated authority without requiring external approval.	100% of total TAs exercise delegated authority without requiring external approval.	63% of total TAs exercise delegated authority without requiring external approval.	TA exercise delegated authority without requiring external approval.
No.5	Mostly met – 45% of total TAs.	No performance standards – 50% of total TAs.	Mostly met – 75% of total TAs.	Mostly met – 88% of TAs.	Mostly met.
No.6	Centralized in most (75%) TAs.	Localized in most (75%) TAs.	Localized in most (75%) TAs.	Centralized in a half of TAs.	Centralized.
No.7	Centralized in a part (46%) of TAs.	Regionalized in a half of TAs.	Centralized in a half of TAs.	Centralized in a half of TAs.	Centralized.
No.8	Not significantly different from the EU average.	Above the EU average.	Not significantly different from the EU average.	Below the EU average.	Well above the EU average.
No.9	Above the EU average.	Below the EU average.	Below the EU average.	Not significantly different from the EU average.	Well above the EU average.
No.10	Well below the EU average.	Below the EU average.	Well above the EU average.	Below the EU average.	Well above the EU average.
No.11	Not significantly different from the EU average.	Below the EU average.	Above the EU average.	Below the EU average.	Well above the EU average.
No.12	The performance is linked to pay and reward in all TAs.	The performance is linked to pay and reward in all TAs.	The performance is linked to pay and reward in a half of TAs.	The performance is linked to pay and reward in most (75%) TAs.	The performance is not linked to pay and reward.
No.13	No specific programs for SME's exist in most (64%) TAs.	No specific programs for SME's exist in all TAs.	No specific programs for SME's exist in most (75%) TAs.	No specific programs for SME's exist in most (75%) TAs.	No specific programs for SME's exist.

No.14	E-payment is available and mandatory for all taxpayers (36% of total TAs) or for some taxpayers (27% of total TAs).	E-payment is available and mandatory for all taxpayers in most (75%) TAs.	E-payment is available but not mandatory in most (75%) TAs.	E-payment is available but not mandatory in most (63%) TAs.	E-payment is not available.
No.15	Not significantly different from the EU average.	Well above the EU average.	Above the EU average.	Below the EU average.	Below the EU average.
No.16	The TA has not created a behavioral insights unit/team in order to influence taxpayer behavior in most (73%) TAs.	The TA has not created a behavioral insights unit/team in order to influence taxpayer behavior in all TAs.	The TA has not created a behavioral insights unit/team in order to influence taxpayer behavior in most (75%) TAs.	The TA has not created a behavioral insights unit/team in order to influence taxpayer behavior in most (63%) TAs.	The TA has not created a behavioral insights unit/team in order to influence taxpayer behavior.
No.17	The TA has the ability to settle dispute with taxpayer in most (73%) TAs.	The TA has the ability to settle dispute with taxpayer in most (75%) TAs.	The TA has the ability to settle dispute with taxpayer in a half of TAs.	The TA has the ability to settle dispute with taxpayer in most (88%) TAs.	The TA has the ability to settle dispute with taxpayer.
No.18	Positive in most TAs.	Positive in most TAs.	Negative in all TAs.	Negative in most TAs.	Positive.
No.19	The TA use innovative approaches in most (91%) TAs.	The TA use innovative approaches in most (75%) TAs.	The TA use innovative approaches in most (75%) TAs.	The TA use innovative approaches in most (63%) TAs.	The TA use innovative approaches.
No.20	Includes individual development plans in most (82%) TAs.	Includes individual development plans in most (75%) TAs.	Not includes individual development plans in most (75%) TAs.	Includes individual development plans in a half of TAs.	Includes individual development plans.
No.21	HR strategy is competency-based in most (82%) TAs.	HR strategy is competency-based in most (75%) TAs.	HR strategy is competency-based in a half of TAs.	HR strategy is competency-based in most (63%) TAs.	HR strategy is competency-based.

The percentage of TAs that exercise delegated authority without requiring external approval is higher in the case of cluster 1 compared to cluster 4. The existence of performance standards related to resolving tax dispute cases via administrative review was observed to a greater extent in the case of the TAs in the clusters 3 and 4. The location of staff performing TA operational activities related to return filing/ payment processing is centralized in 17 of the 28 TAs of the EU MS.

Regarding the location of staff performing TA operational activities related to managing taxpayer appeals/ disputes, EU MS have opted in equal proportions for centralized and localized location. The number of full-time permanent staff/ 1,000 inhabitants, the salary cost as % of recurring budget and the value of refunds made (VAT and other refunds) as % of total net revenue collected by the TA are below the EU averages in the case of TAs in cluster 4.

Personnel involved in audit, investigation and other verification as % of full-time permanent staff is above the EU average in the case of TAs in cluster 1. The performance is linked to pay and reward in all TAs in cluster 1. This feature can be observed to a much lesser extent in the case of TAs in clusters 3 and 4. In cluster 1 are the most TAs that have specific programs for SMEs. E-payment is available but not mandatory in most of the TAs in clusters 3 and 4. Also, these clusters are characterized by negative staff dynamics. The percentage of TAs using innovative approaches, individual development plans of HR and competency-based HR strategy is higher in case of cluster 1 as compared to clusters 3 and 4.

The dendrogram for the formed clusters, using the Ward method for calculating the distance between objects, can be found in Figure 6.

The dendrogram highlights the five formed clusters, certifying the robustness of the cluster analysis results.

The grouping of the TAs from EU MS in clusters, based on some variables that characterize aspects related to organization and functioning, demonstrates the heterogeneity of these institutions. This heterogeneity is natural given the existence of different tax systems in the EU. But, given the close links that must exist between EU TAs in the tax collection process, the trend should be to homogenize and standardize in terms of the main aspects that characterize the organization and functioning of these bodies.

The TAs in the EU MS are at relatively different levels of maturity (especially technological). The organization and functioning models outlined through the 5 identified clusters provide indications about the organizational level at which the TAs in the EU are.

The TAs included in cluster 1 can be considered to be at the highest level of maturity considering that they are based on functional structures, they pay more attention to IT infrastructure, practice large-scale delegation of authority and taxpayers appreciate that, in general, their appeals/ complaints are resolved in a timely manner by the TA, staff activity is based on performance indicators, staff are highly qualified for their functions and receive specific training, and that there are specific roles for headquarters and local directorates.

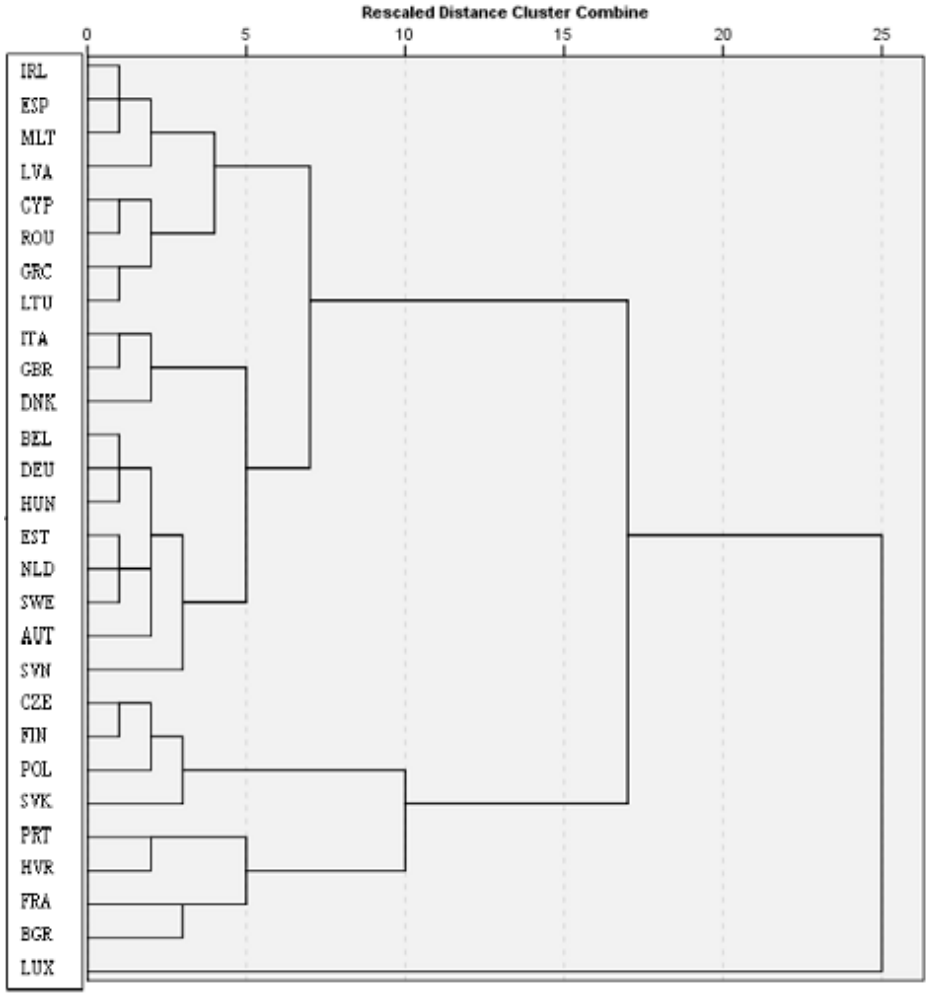

Figure 6: Dendrogram using Ward Linkage

6. Conclusions

We note that the TAs in cluster 1 can be found frequently in the first part of the ranking, based on 5 indicators that reflect the efficiency of the activity, and the TAs in clusters 3 and 4 can be found frequently in the last part of the respective ranking. Therefore, we can say that the efficient TAs in the EU MS have organizational and operational characteristics specific to cluster 1.

In order to improve the efficiency of the TA activity, the decision makers should consider the change of some elements that aim at its organization and functioning, so that:

- the degree of autonomy to increase;
- to implement IT solutions in all activities;

- to use innovative approaches in management, based on stimulating the performance of human resources and increasing the importance given to auditing;
- to expand function-based organization for TA, based on matrix management, which are the most likely to launch and implement reforms;
- deepening the segmentation of taxpayers; and
- rethinking the organization scheme, so that it becomes supple and flexible, avoiding bureaucratization in terms of information flow, decision making and providing services to taxpayers.

In order to provide high quality services to citizens, to improve revenue collection and to provide operational excellence, TAs are required to innovate quickly.

The present research has shown that the grouping of TAs based on variables that reflect their characteristics can be a useful tool in identifying a model of organization and functioning of the TA associated with a certain level of efficiency. Such an instrument could provide TAs with a starting point for evaluating the way they are organized and functioning, in order to adopt the changes that could generate the efficiency of the activity. Such an instrument could be used complementarily with the assessment tools of the TAs presented in the first part of the paper.

A limitation of research is related to the inexistence of an aggregate indicator of measuring the performance of a TA that can allow a classification of the TAs of the EU MS. Also, the possibility of choosing the variables regarding the organization and operation of TAs of EU MS has been limited by the many situations where the information was not available because the questionnaires received from the OECD were not fully completed.

The grouping of TAs on the basis of variables that reflect their characteristics in order to identify the organization and functioning models of the TA that can be associated with a certain level of efficiency could become much more accurate if the information from the OECD database is complete.

References:

1. Armeanu, Ş.D., Vintilă, G., Moscalu, M., Filipescu, M.O. and Lazăr, P., 'Using Quantitative Data Analysis Techniques for Bankruptcy Risk Estimation for Corporations', 2012, *Theoretical and Applied Economics*, vol. XIX(1), no. 566, pp. 97–112.
2. Crandall, W., 'Feasibility Study. Developing a Tool to Assess Tax Administration Performance', 2011, [Online] available at https://pefa.org/sites/default/files/asset/study_document/Eng-Vc-Final-version-May-27-2011-PEFA-TaxAdminFeasibilityStudy.pdf, accessed on January 15, 2020.
3. Crawford, D., 'Strategic Planning', in Deloitte Consulting LLP (ed.), 'Detailed Guidelines for Improved Tax Administration in Latin America and the Caribbean', 2013, pp. 390-417, [Online] available at https://www.usaid.gov/sites/default/files/LAC_TaxBook_Ch%2015%20-%20ENGLISH.pdf, accessed on January 15, 2020.
4. D'Ascenzo, M., 'Global Trends in Tax Administration', 2015, *Journal of Tax Administration*, vol. 1, no. 1, pp. 81–100.

5. Davies, R.B., Martin, J., Parenti, M. and Toubal, F., 'Knocking on Tax Haven's Door: Multinational Firms and Transfer Pricing', 2018, *The Review of Economics and Statistics*, vol. 100, no. 1, pp. 120–134.
6. Davoine, T. (coord.), 'Study and Reports on the VAT Gap in the European Union – 28 Member States', 2019, pp. 21-50, [Online] available at https://ec.europa.eu/taxation_customs/sites/taxation/files/2018_vat_gap_report_en.pdf, accessed on January 20, 2020.
7. Devas, N., Delay, S. and Hubbard, M., 'Revenue Authorities: Are They the Right Vehicle for Improved Tax Administration?', 2001, *Public Administration & Development*, vol. 21, no. 3, pp. 211–222.
8. Esteller-Moré, A., 'Is the Tax Administration Just a Money Machine? Empirical Evidence on Redistributive Politics', 2011, *Economics of Governance*, no. 12, pp. 275–299.
9. Esteller-Moré, A., 'Is There a Connection Between the Tax Administration and the Political Power?', 2005, *International Tax and Public Finance*, vol. 12, no. 5, pp. 639–663.
10. European Commission, 'Fiscal Blueprints – A Path to a Robust, Modern and Efficient Tax Administration', 2007, [Online] available at https://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/common/publications/info_docs/taxation/fiscal_blueprint_en.pdf, accessed on January 15, 2020.
11. European Organization of Supreme Audit Institutions, 'Benchmarking of Tax Administrations', 2008, [Online] available at https://www.eurosai.org/handle404?exporturi=/export/sites/eurosai/.content/documents/training/training-committe/Benchmarking-of-Tax-AdministrationsFinal-Report.pdf, accessed on January 15, 2020.
12. Hartrath, H., 'Administration and Payroll: Essentials of Shared Services and Outsourcing', in Zeuch, M. (ed.), *Handbook of Human Resources Management,* Berlin: Springer, 2015, pp. 1–22.
13. Hauptman, L., Horvat, M. and Korez-Vide, R., 'Improving Tax Administration's Services as a Factor of Tax Compliance: The Case of Tax Audit', 2014, *Lex Localis*, vol. 12, no. 3, pp. 481–501.
14. Jacobs, A., Crawford, D., Murdoch, T., Hodges, Y., Lethbridge, C., Jimenez, G., Osinski, D., Hinsz, S., Pulse, D. and Kameno, A., 'Detailed Guidelines for Improved Tax Administration in Latin America and the Caribbean', 2013, [Online] available at https://www.usaid.gov/sites/default/files/LAC_TaxBook_Entire%20Book%20-%20ENGLISH.pdf, accessed on January 16, 2020.
15. James, S., Svetalekth, T. and Wright, B., 'Tax Officials' Attitudes and Perceptions, Performance Indicators and the Efficiency of Tax Collection', 2006, Discussion Papers in Management, 06/01, [Online] available at http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.517.957&rep=rep1&type=pdf, accessed on January 15, 2020.
16. Jurušs, M. and Kalderauska, S.E., 'Possible Implementation of Key Account Management Principles in Tax Administration', 2017, *Acta Prosperitatis*, no. 8, pp. 24–34.
17. Katharaki, M. and Tsakas, M., 'Assessing the Efficiency and Managing the Performance of Greek Tax Offices', 2010, *Journal of Advances in Management Research*, vol 7, no. 1, pp. 58–75.
18. Kidd, M., 'Revenue Administration: Functionally Organized Tax Administration', 2010, IMF: Technical Notes and Manuals 10, [Online] available at https://www.imf.org/external/pubs/ft/tnm/2010/tnm1010.pdf, accessed on January 20, 2020.

19. Kotsogiannis, C. and Serfes, K., 'Optimal Performance Reward, Tax Compliance and Enforcement', 2016, *Economic Theory Bulletin*, no. 4, pp. 325–345.
20. Lemgruber, A., Masters, A. and Cleary, D., 'Understanding Revenue Administration. An Initial Data Analysis Using the Revenue Administration Fiscal Information Tool', International Monetary Fund, 2015, [Online] available at https://www.imf.org/external/pubs/ft/dp/2015/fad1501.pdf, accessed on January 20, 2020.
21. Murdoch, T., McMorran, R., Kamenov, A. and van der Walt, J., 'Tax Administration Reform: A Primer', USAID, 2012, [Online] available at http://pdf.usaid.gov/pdf_docs/PNAEA058.pdf, accessed on January 15, 2020.
22. Mansor, M. and Tayib, M., 'A Holistic Approach to Tax Administration Performance Management: Developing an Integrated and Open System Model', 2015, *International Journal of Education and Social Science*, vol. 2, no. 4, pp. 132–142.
23. OECD, 'Tax Administration 2019: Comparative Information on OECD and Other Advanced and Emerging Economies', 2019, [Online] available at https://doi.org/10.1787/74d162b6-en, accessed on January 18, 2020.
24. OECD, 'Tax Administration in OECD and Selected Non-OECD Countries: Comparative Information Series (2008)', 2009, [Online] available at https://www.oecd.org/ctp/administration/CIS-2008.pd, accessed on January 15, 2020.
25. OECD, 'Tax Administration in OECD and Selected Non-OECD Countries: Comparative Information Series', 2011, [Online] available at https://www.oecd.org/tax/administration/CIS-2010.pdf, accessed on January 18, 2020.
26. OECD, 'Tax Administration s and Capacity Building. A Collective Challenge', 2016, [Online] available at https://dx.doi.org/10.1787/9789264256637-en, accessed on January 18, 2020.
27. Pētersone, M., Ketners, K. and Laurinavičius, A., 'Improvements to the Performance of Customs and Tax Authorities', 2016, *Public Policy and Administration*, vol. 15, no. 4, pp. 591–607.
28. Profeta, P. and Scabrosetti, S., 'The Political Economy of Taxation in European Union', 2017, *Hacienda Publica Espanola*, no. 220, pp. 139–172.
29. Sassi, F., Belloni, A., Mirelman, A.J., Suhrcke, M., Thomas, A., Salti, N., Vellakkal, S., Visaruthvong, C., Popkin, B.M. and Nugent, R., 'Equity Impacts of Price Policies to Promote Healthy Behaviours', 2018, *Lancet*, vol. 391, no. 10134, pp. 2059–2070.
30. Serra, P., 'Performance Measures in Tax Administration: Chile as a Case Study', 2005, *Public Administration and Development*, vol. 25, no. 2, pp. 115–124.
31. Walker, D. and Tizard, J., 'Out of Contract: Time to Move on from the Love-in with Outsourcing and PFI', The Smith Institute, 2018, [Online] available at http://www.smith-institute.org.uk/book/contract-time-move-love-outsourcing-pfi, accessed on January 20, 2020.
32. World Bank and PricewaterhouseCoopers, 'Paying Taxes 2019', 2018, [Online] available at https://www.doingbusiness.org/content/dam/doingBusiness/media/Special-Reports/PwC---Paying-Taxes-2019---Smaller-19112018.pdf, accessed on January 20, 2020.
33. Yim, O. and Ramdeen, K., 'Hierarchical Cluster Analysis: Comparison of Three Linkage Measures and Application to Psychological Data', 2015, *The Quantitative Methods for Psychology*, vol. 11, no. 1, pp. 8–21.

34. Yoon, Y.S., Chaithanya, C., Won, Y. and Kong, D., 'Tool Kit for Tax Administration Management Information System', Asian Development Bank, 2014, [Online] available at https://www.adb.org/sites/default/files/publication/150133/tool-kit-tax-administration-management-information-system.pdf, accessed on January 25, 2020.