Institutional Performance Evaluation through Benchmarking in Public Administration: Methods and Impact

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ABSTRACT
In the context of accelerated technological development and the significant increase in data volume, the public administration in Romania faces the challenge of adapting its methods for evaluating activities and implicitly, institutional performance.
This scientific endeavor explores the hypothesis that the Romanian public administration can optimize its internal processes and achieve significant operational efficiency benefits by integrating data analysis models and internal benchmarking into administrative activities.
The research employs quantitative methods, specifically Data Envelopment Analysis (DEA), to assess the relative performance of public entities. The application of DEA allowed for the comparison of 42 similar units, namely county agencies for payments and social inspection in Romania, identifying specific inefficiencies and providing insights into their performance over a four-year period.
The results obtained contributed to identifying best practices in resource management and highlighting potential risk areas in their activities, thus providing a solid foundation for strengthening institutional performance in the field of social assistance.

KEYWORDS: *performance, benchmarking, public administration, efficiency.*

1. Introduction

In the context of accelerated technological development and the exponential increase in the volume of available data, public administration in Romania faces the challenge of adapting its methods for evaluating activities and, implicitly, institutional performance. Rapid technological changes, coupled with increasingly complex societal demands, necessitate the modernization of public administration to effectively address the needs of citizens and optimally utilize available resources.

This paper explores the hypothesis that the Romanian public administration can achieve significant benefits in operational efficiency and optimize internal processes through the integration of advanced data analysis models and internal benchmarking in administrative activities. In this regard, the research applies the DEA (Data Envelopment Analysis) method to assess the relative performance of public administration entities. DEA is a well-recognized quantitative technique in efficiency analysis, which enables the identification and measurement of

specific inefficiencies, providing valuable insights into organizational strengths and vulnerabilities.

The study analyzed 42 county agencies for payments and social inspection in Romania over a four-year period. This approach allowed for a detailed comparison between similar units, identifying effective resource management practices and potential risk areas in the activities of the evaluated units.

The results provide a solid foundation for recommendations to enhance institutional performance, thus contributing to better management of social assistance activities and more efficient use of public resources.

2. Evaluation of Institutional Performance in Public Administration

2.1. The conceptual aspects of measuring and evaluating institutional performance

Public institutions play a crucial role in society through their responsibilities towards citizens and the community. In this context, ensuring high institutional performance is relevant, and its improvement represents a strategic objective that can be achieved through the implementation of well-structured measures and policies. Performance evaluation in public administration is an ongoing process, necessary to ensure the quality of services and proper management of public resources in the face of a dynamic environment.

Institutional performance is influenced by a set of interdependent factors, including organizational characteristics, available resources, employee skills, and the level of accountability and transparency. These components form a complex system that contributes to the achievement of institutional objectives. Evaluating and addressing these factors are crucial for improving performance and reaching high standards in public administration.

Figure 1: Factors Influencing Institutional Performance

Source: Authors' perspective based on theoretical foundations

The evaluation of institutional performance in public administration is based on specific criteria and indicators; however, challenges often arise in defining and selecting the most relevant ones[1]. In this process, it is crucial to adopt an approach that integrates both the parameters of the

[1] Alina Profiroiu și Marius Profiroiu, „Cadrul de analiză a performanţelor sectorului public”, *Economie Teoretica şi Aplicată* 1, nr. 506 (2007): 41–50.

external environment and internal requirements, the latter being shaped by the particularities of past actions.

Performance in public administration is evaluated in correlation with how it is defined, in relation to the entity's activities or from the perspective of public policy design and implementation, as well as service delivery to citizens. Definitions in the literature suggest that institutional performance is reference-dependent, in the form of a goal or objective[2]. However, there are reservations regarding objectivity, as it "brings a reality closer to a desire"[3].

In public administration, performance can be analyzed from multiple perspectives: managerial, where the interpretation of the concept depends on the meaning assigned by decision-makers in relation to the set of responsibilities; organizational, which implies interdependence with the objectives, mission, and goals assumed; and financial, focusing on the efficient, economic, and effective use of public resources.

The literature argues that performance at the level of public administration is determined by the ratio between expenditures and "subjective quality"[4], defined as an index that considers "bureaucracy, transparency, effectiveness, and corruption"[5], closely correlated with the provision of public services to citizens.

Another doctrinal approach suggests that performance in the public sector can be evaluated by analyzing the design of public policies, the implementation processes, and the outcomes achieved, in relation to the entity's objectives, goals, and mission. Additionally, the evaluation includes aspects such as efficiency, effectiveness, and economy in the management of public resources.

Measuring performance in public administration seeks to establish the relationship between outputs and the resources used, as well as between objectives and the services provided[6]. Performance is "always the result or product of a comparison"[7]. Since performance is determined through comparisons with other "entities," it becomes a "relative measure, while the outcome appears as an absolute concept"[8].

In a dynamic approach, performance is associated with action and behavior, being more than just a simple outcome and defined as a consequence of a "deliberate mental construct"[9]. The concept of performance is observable and measurable. The specialized literature offers detailed models for operationalizing and measuring performance in the public sector, providing various

[2] Horia Mihai Raboca, *Măsurarea performanţelor în sectorul public* (Accent, 2015): 12-17.
[3] Ibid.
[4] Profiroiu și Profiroiu, 41–50.
[5] Ibid.
[6] Profiroiu și Profiroiu, 41–50.
[7] Raboca, 12-24.
[8] Claudiu Marian Gruian, „Ce înţelegem prin performanţa companiei”, *The Scientific annals of Constantin Brâncuşi Târgu Mureş, Economic Series*, nr. 4 (2010): 243–55.
[9] Raboca, 12-24.

theories and systemic approaches to the concept. The traditional perspective focuses on measuring performance through results, using generic indicators that analyze revenues and expenditures, but also offers conceptualizations related to job satisfaction or employee loyalty[10].

Measuring the performance of public entities provides substantial information for strategic decision-making, process optimization, and identifying areas that require attention and improvement. However, it is important to note that, in many cases, performance evaluation and measurement within public administration entities are often superficial and formal, limiting their actual contribution to achieving real performance. This discrepancy highlights the need for a deeper, more applied approach to performance evaluation, so that the information gathered can be effectively used to generate positive change.

To evaluate the performance of public entities, relevant indicators and criteria are used, adapted to the specific domain or sector of activity. These indicators can be financial, operational, quality-related, as well as citizen or employee satisfaction, encompassing both quantitative and qualitative aspects.

From the perspective of result evaluation in public administration, the literature extensively analyzes the "causal model of performance"[11], which correlates current actions with future outcomes. This performance model explains how a public entity undergoes the "process of creating and building its organizational performance"[12], considering both the individual performances of employees and the performance of the organization as a whole.

Specialized literature identifies various categories of metrics that enable performance evaluation, focusing on aspects such as efficiency, resource economy, and effectiveness. The concept of performance in the public sector is examined in the scientific literature through three generic dimensions that are causally interconnected: "outcomes, processes, and foundations" [13].

Performance in the public sector is evaluated by reference to concepts derived from the production process specific to the economic field, namely “inputs, throughput, output, and outcome”[14]. The causal model of performance structures results and outputs into categories, considered as “views”[15], thus highlighting that performance is the result of processes and activities carried out within the public organization.

The causal performance measurement model has clarified the concept of performance and led to the formulation of a set of assertions that give it multiple meanings, depending on the evaluator's perspective. Thus, performance can be associated with a specific area of responsibility or defined as a set of parameters and indicators that describe the processes through which results are obtained. Additionally, this approach suggests that performance can be perceived as a "social

[10] Profiroiu și Profiroiu, 41–50.
[11] Raboca, 12-24.
[12] Ibid.
[13] Ibid.
[14] Ibid.
[15] Raboca, 12-24.

construct, a concept without an objective description"[16], that exists only insofar as results are quantifiable. This diversity of meanings underscores the complexity of performance evaluation in various contexts and the need to tailor measurement methods to the specific characteristics of each situation.

The methodical approach to performance as part of the systemic management perspective focuses on managing and developing organizational activities. Performance measurement enables managers to assess activities and make informed decisions to optimize the conversion of resources into public services. Performance acts as an information system, providing data on internal processes and facilitating decision-making. Thus, performance measurement and evaluation become the core of the managerial system, offering continuous analysis and a clear picture of the public organization's progress toward achieving its goals.

A key challenge in public sector performance evaluation is the clear and specific definition of objectives and expected outcomes, considering that many public institutions carry out intangible activities, whose effects cannot be economically measured or quantified in monetary terms. Generally, public administration aims to improve service quality, streamline processes, and optimize resource use in line with established goals and performance indicators. For accurate evaluation, it is essential to identify objective, measurable, and relevant indicators, such as citizen satisfaction, response times to requests, service costs, and compliance with regulations.

Performance indicators in public institutions are tailored to the specifics of each organization and its field of activity. These include financial indicators (such as allocated and used budget, cost-effectiveness, and efficiency of expenditures), process indicators (for example, request resolution time and service quality), or citizen satisfaction indicators (number of complaints and satisfaction levels). Additionally, learning and development indicators, such as employee training, use of digital technologies, or the level of employee engagement and motivation, are important for assessing institutional performance.

The performance measurement process involves stages of analysis and evaluation of the degree to which objectives are achieved, using specific indicators and various methods, such as benchmarking, cost-benefit analysis, and impact evaluation. Collecting accurate and up-to-date data is essential to ensure a correct assessment of institutional performance.

2.2.Benchmarking for Evaluating Public Administration Entities

Performance analysis through internal benchmarking evaluates the operations carried out within an entity, aiming to identify the most efficient practices for accomplishing a task. The purpose of internal benchmarking is to pinpoint the most effective approach for task fulfillment while minimizing effort and resource use. Internal benchmarking applies to organizational processes, practices, and outcomes, targeting the identification and implementation of suitable

[16] Ibid.

solutions. The success of evaluating and analyzing these processes depends on access to relevant internal data and information[17].

Internal benchmarking involves a self-assessment of the organization by examining its own processes and procedures. This activity includes analyzing both the aspects that work well and those that could be improved. The main objective is to identify best practices and methods applied in internal operations. Through this analysis, the public entity can uncover sources of inefficiency and develop new strategies to optimize existing processes.

The concept of internal benchmarking focuses on achieving efficiency and growth objectives. By implementing this method, the organization aims to reduce costs, improve service quality, and increase citizen satisfaction, thereby contributing to overall improved performance.

The proposed analysis is conducted at the level of regional agencies with responsibilities in the field of social assistance benefits and social inspection (AJPIS) across Romania's 42 counties. Each county agency represents a unit of study. The process under analysis centers on the scope of competencies and responsibilities established by applicable legislation, specifically in administering, managing, and disbursing social assistance benefits.

Internal benchmarking was applied to the 42 study units, namely, the county agencies for payments and social inspection, using publicly available data. These data were sourced from the budget execution accounts, prepared and submitted to the Ministry of Finance by each county unit at the end of the fiscal year. The comparison of the 42 units was based on input and output data. Using information from the National Reporting System and internal benchmarking techniques, we evaluated the performance of public entities in the field of social assistance in Romania. This internal benchmarking analysis facilitates the assessment of the efficiency of the public entities studied and their evolution over time. The research was conducted within a dynamic context over a four-year period, from 2019 to 2022, focusing on the annual development and efficiency growth of each public entity.

2.3.Institutional performance evaluation through Data Envelopment Analysis (DEA)

In operational research and economics, Data Envelopment Analysis (DEA) is used to estimate production frontiers. DEA is closely linked to production theory in economics, but it is also used in benchmarking for managing operations. DEA functions as a linear programming model that efficiently handles multiple input and output variables. The model allows for the analysis and quantification of inefficiencies for each evaluated unit, measuring performance based on selected variables. DEA belongs to the category of OSINT (Open-Source Intelligence) tools,

[17] Peter B. Southard și Diane H. Parente, "Un Model pentru Benchmarking Intern: Când și Cum?" *Benchmarking: An International Journal* 14, no. 2 (2007): 161-171.

which involves collecting and analyzing information from public sources to gain knowledge and understanding about various subjects, including organizations, individuals, events, or themes[18].

The empirical orientation of Data Envelopment Analysis (DEA) and the absence of numerous preliminary assumptions that accompany other approaches, such as standard statistical regression methods, have led to the adoption of this model in various studies, both in the public and private sectors. Initially, DEA was described by Cooper and cited by Seiford as a mathematical programming model applied to observational data[19], offering a new way of obtaining empirical estimates of relationships, such as production functions or identifying efficient production possibilities. DEA is officially a methodology focused more on frontiers rather than central tendencies[20].

Unlike the standard statistical regression approach, DEA facilitates understanding the level of efficiency or the hypothesis that one decision-making unit is more efficient than another. DEA achieves this through a simple approach, avoiding the need for explicit hypotheses and variations used in different model types, such as linear and nonlinear regression. The primary purpose of DEA is to measure the efficiency of each unit, evaluating how efficiently it transforms multiple inputs into multiple outputs. It does not require a specific functional form or assumptions about the underlying production process.

The DEA model is based on the assumption of constant returns to scale and the existence of efficient units within the analyzed data set, which are fundamental for a relevant comparison of the study units. Initially, DEA analysis involves identifying inputs (resources used) and outputs (results achieved).

DEA constructs a performance frontier or boundary by comparing the inputs and outputs of all the units in the data set. This frontier defines the maximum level of performance achievable for a specific combination of resources (inputs). Each decision-making unit is evaluated in comparison to this performance frontier. Units that lie on the frontier are considered efficient, while those below the frontier are classified as inefficient, relative to the best performers.

The relative efficiency of each unit is determined using a non-parametric method, relying solely on the observed data and the basic assumptions for developing an optimization model[21]. The DEA model allows differentiation between efficient and inefficient entities, while also encouraging the identification of opportunities for improving operational performance. Comparative evaluation through Data Envelopment Analysis enables the

[18] João Rafael Gonçalves Evangelista et al., „Systematic literature review to investigate the application of open source intelligence (OSINT) with artificial intelligence", *Journal of Applied Security Research* 16, nr. 3 (2021): 345–69.
[19] Lawrence M Seiford și Joe Zhu, „Data Envelopment Analysis: History, Models, and Interpretations", *Handbook on Data Envelopment Analysis, eds. WW Cooper, LM Seiford and J. Zhu*, 2004.
[20] Seiford și Zhu.
[21] Mario Martín-Gamboa și Diego Iribarren, „Coupled life cycle thinking and data envelopment analysis for quantitative sustainability improvement", în *Methods in sustainability science* (Elsevier, 2021), 295–320.

identification of the most efficient study unit and highlights the best practices in the analyzed field.

The DEA model offers three main options for analysis. The first refers to the use of standard models CRS (Constant Returns to Scale Model) and VRS (Variable Returns to Scale Model), which assume the calculation of technical efficiencies and scale efficiencies [22].The second option, outlined by Fare in 1994 and detailed in the DEAP guide[23], expands these models by considering costs and allocated resources. The third, more complex option is DEA Malmquist, a method for calculating indices of Total Factor Productivity (TFP), technological changes, technical efficiency, and scale efficiency. This approach allows for a detailed evaluation of the productivity changes over time and the evolution of efficiency in the context of technological advancements[24].

Starting in 1957, modern efficiency measurement initiated by Farrell led to the analysis of two key components: technical efficiency, which reflects a unit's ability to achieve maximum production from a given set of inputs, and allocative efficiency, which reflects the ability to use inputs in optimal proportions[25]. Allocative efficiency, often used in the economic field, shows how resources are distributed to meet society's demands and needs in the most efficient possible way. By combining these methods, a measure of overall economic efficiency can be obtained.

Farrell highlighted and explained his own concepts related to the analysis of technical efficiency, adopting an input-oriented approach that answers the question: how much can the input quantities be proportionally reduced without affecting the output production? This approach focuses on minimizing the use of resources while maintaining the same level of output, which is fundamental for assessing the efficiency of organizations or systems.

Unlike the input-oriented approach, Farrell measures technical efficiency using output-oriented measures, which can answer the question: how much can the quantities of output be proportionally increased without changing the quantities of inputs used? Farrell's output-oriented efficiency measures represent technical inefficiency and are expressed as the amount by which outputs could be increased without requiring additional inputs.

The methods developed by Farrell in mathematical programming, capable of performing various tasks, were the basis for the 1978 discoveries by researchers Charnes, Cooper, and Rhodes, who introduced the term Data Envelopment Analysis (DEA)[26]. They proposed a model with an input orientation and assumed constant returns to scale (CRS).

Since then, numerous papers have been published expanding and applying the DEA methodology. The CRS assumption is relevant only when all decision-making units operate at optimal scale, without considering funding constraints or other factors that may influence the

[22] Tim Coelli, „A guide to DEAP version 2.1: a data envelopment analysis (computer) program", *Centre for Efficiency and Productivity Analysis, University of New England, Australia* 96, nr. 08 (1996): 1–49.
[23] Ibid.
[24] Ibid.
[25] Coelli, 1–49.
[26] Ibid.

operation. Subsequent developments took into account alternative sets of assumptions and introduced the variable returns to scale (VRS)[27], model, which was frequently used in the 1990s.

The VRS methodology measures the technical efficiency of a unit under conditions of variable scaling. A unit is considered technically efficient in VRS if it cannot improve production using the same quantities of inputs and outputs in a balanced way.

By using the CRS model, technical efficiency is measured under constant scaling conditions. A unit is considered technically efficient in CRS if it cannot improve production using the same quantities of inputs and outputs, regardless of its size.

The DEA model is extremely useful for comparing units with multiple input and output variables, with the primary objective of measuring the efficiency of each study unit, treated as a decision-making unit. Efficiency measurement is performed by analyzing the unit's capacity to transform various input resources into multiple outcomes, providing an integrated perspective on performance. Subsequent advancements in the application of DEA methods have led to the development of a variety of computational tools that support performance evaluation and comparative analysis between similar units. These developments allow for the adaptation of the DEA methodology to diverse contexts and facilitate the obtaining of relevant and precise results in the benchmarking and efficiency measurement process.

In this research, DEA was applied to analyze the efficiency of county payment and social inspection agencies, enabling an empirical evaluation of performance in public resource management. The model was implemented using the DEAP software, Version 2.1[28], a publicly accessible tool, which facilitated a detailed analysis of the decision-making units' efficiency over a four-year period, contributing to the strengthening of performance in the public social assistance sector.

3. Research Methodology

For this scientific endeavor, we used the DOT technique[29] in document analysis, focusing on the indicators and data extracted from the annual budget execution accounts of the studied units. Since our research concentrated on temporal evolution analysis, we incorporated the use of the Malmquist index (M) in the methodological approach to measure performance from a quantitative perspective, based on panel data. As an analytical tool, we used the Data Envelopment Analysis (DEA) application to evaluate the 42 county agencies under the Ministry of Labor (AJPIS), according to the algorithm described on pages 43-44 of the DEAP Guide[30].

[27] Ibid.
[28] Ibid.
[29] HBO-i. „Cadrul DOT - metode de cercetare TIC", data accesării 29 septembrie 2023, disponibil la: https://ictresearchmethods.nl/The_DOT_Framework.
[30] Coelli, 1–49.

In order to apply the internal benchmarking methodology through data analysis (DEA), we focused on collecting relevant data and information concerning the activities and operations conducted at the level of the public entity under study.

The research was based on a data collection methodology involving multiple sources. In this scientific endeavor, special attention was given to clearly defining the data elements to be analyzed, establishing selection criteria, outlining the steps for data processing, as well as identifying potential limitations and constraints associated with the study.

In the research, we primarily used secondary aggregated data, which were pre-existing and identified within the context of the reporting activity of the analyzed entities. These data, sourced from the annual financial reports of the study units, were particularly important for their reliability, as they were collected at the level of each county agency in the social assistance sector and were officially endorsed by these agencies through public documents. The availability and accessibility of secondary data through public sources facilitated the research process, saving time and resources that would otherwise have been allocated to direct information collection. These secondary data were extracted from the official website of the Ministry of Finance[31], where the annual financial reports were accessed by entering the tax identification codes corresponding to each county agency included in the analyzed sample. To obtain the aggregated secondary data, we downloaded the budget execution reports for each year from 2019 to 2022, specific to each county payment agency in the social assistance sector (AJPIS).

The budget execution reports were unified by year and county, where the territorial agencies operate, and the financial indicators were aggregated to create a cumulative budget execution. The resulting database also included the economic and functional classification of the categories of budget expenditures, according to the regulations of the Ministry of Finance. This process aimed to ensure a complete database, which allowed a preliminary analysis of the evolution of the budget execution indicators during the period 2019-2022. After performing the preliminary analysis of the aggregated data and consolidating them within the expenditure categories, we applied the materiality principle, focusing on the indicators with significant weight. Thus, we selected expenditures from classes 10 (personnel expenses) and 20 (goods and services expenses), which were later used in the construction of the input indicator (variable) for the quantitative analysis performed.

The second data source identified at the county agencies level is related to the specific activity of the studied units and contributed to the construction of the output indicator, which refers to the time required for the payment of the entire volume of social assistance benefits. In this

[31] Ministerul Finanțelor Publice (MFP), „Sistemul Național de Raportare”, data accesării 28 mai 2023. https://extranet.anaf.mfinante.gov.ro/anaf/extranet/EXECUTIEBUGETARA/info_utile/!ut/p/a1/hc5NC4JAEAbg3-LBqzMqinbbIBSLSorSvYTCuhq6K-vm70-jk_Qxt3d4XmaAQgZUFGPDC91IUbRzpv4tCmK0wxMmGJ4DJMfUTTfOxcbIm0A-AfwyBP_1r0AXxD_MBNexv986GDlv8ONEApS3sny9mxNRugEHqljFFFPWQ03rWut-WJloYlc1ohCaWVyOlpImfurUctCQLSj0XYZ3rx13xDCeBIZRIQ!!/dl5/d5/L2dBISEvZ0FBIS9nQSEh/.

research, a sample consisting of five types of social assistance benefits was selected, based on their significance in terms of value weight and relevance within the context of social assistance. Each type of benefit involves a set of operations, such as verifying applications, issuing decisions, pre-payment checks, and communication with beneficiaries, each with distinct times depending on the type of benefit.

The data collected, provided by the staff of the county agency, related to the estimated effort required for the payment of the five types of social assistance benefits, i.e., the average working time allocated for granting each benefit over the lifetime of the social service, and the average duration of granting social assistance rights for each year from 2019 to 2022, were used to construct the output indicator (variable). The third component of this indicator refers to the number of operations performed monthly, by benefit type, information obtained from public data sources available on the websites of the territorial agencies. Thus, the resulting indicator, or output variable, can be conceptualized as the level of effort required by an agency to ensure the payment of social assistance benefits.

To obtain the two variables that were analyzed using the Malmquist index, I performed a series of calculations similar to infinitesimal calculus, reducing the total time required for the payment of a benefit to an average monthly administration time over the duration of the provision.

For the quantitative analysis, I integrated all relevant data elements into a unified system and created an aggregated database, including the time indicator (the time required to pay the entire volume of social assistance benefits) and the resource indicator (the value of budget expenditures from classes 10 and 20). These data were entered into the analysis system specified in the DEAP manual[32], with the aim of assessing the efficiency of obtaining the final result by utilizing the allocated resources, namely personnel expenditures and expenditures for goods and services (classes 10 and 20), and the time required for the payment of the selected social assistance benefits in the analysis sample.

4. Results obtained

For the DEAP analysis, a matrix was configured in the application, including the following elements: 42 study units (corresponding to the county agencies), four time periods (years 2019-2022), five categories of social benefits, one input indicator (values of budget expenditure categories from classes 10+20), and one output indicator (administration time required). The data from the matrix, extracted from the aggregated database, was entered into the Instructions file (Eg1-ins.txt) in the DEA application. Subsequently, the application processed the matrix from the instructions file (Eg4-ins.txt) upon activation.

After processing the data in the DEAP application, an output file was generated, presenting the technical efficiency indicators for each year in the analyzed period (with 2019 marked as year

[32] Coelli, 1–49.

1 and 2022 as year 4) and for each study unit (numbered from 1 to 42, in the alphabetical order of the counties corresponding to the territorial agencies). The output file was then transferred and processed in Excel, resulting in an output matrix that includes the technical efficiency indicators for the 2019-2022 period and for each study unit, as presented in Figure 2.

Figure 2: DEAP Results - Output Matrix Excerpt

an	judet	firm	inr t-1	to tech t	to rel t+1	vrs te
1	ALBA	1	0	0,701	0,562	0,849
1	ARAD	2	0	0,633	0,508	0,828
1	ARGES	3	0	0,476	0,382	0,844
1	BACAU	4	0	0,482	0,387	0,882
1	BIHOR	5	0	0,52	0,417	0,906
1	BISTRITA-NASAUD	6	0	0,698	0,56	0,833
1	BOTOSANI	7	0	0,579	0,464	0,757
1	BRAILA	8	0	0,773	0,619	0,835
1	BRASOV	9	0	0,43	0,345	0,763
1	BUCURESTI	10	0	0,305	0,245	1
1	BUZAU	11	0	0,601	0,482	0,83
1	CALARASI	12	0	0,868	0,695	0,96
1	CARAS-SEVERIN	13	0	0,882	0,707	0,899
1	CLUJ	14	0	0,372	0,298	0,741
1	CONSTANTA	15	0	0,425	0,341	0,765
1	COVASNA	16	0	0,784	0,628	0,799
1	DAMBOVITA	17	0	0,669	0,536	0,972
1	DOLJ	18	0	0,509	0,408	0,902
1	GALATI	19	0	0,439	0,352	0,653
1	GIURGIU	20	0	0,793	0,636	0,858
1	GORJ	21	0	0,693	0,555	0,799
1	HARGHITA	22	0	0,625	0,501	0,757
1	HUNEDOARA	23	0	0,754	0,604	0,885
1	IALOMITA	24	0	0,778	0,624	0,842
1	IASI	25	0	0,43	0,345	0,941
1	ILFOV	26	0	0,517	0,414	0,787
1	MARAMURES	27	0	0,618	0,495	0,919
1	MEHEDINTI	28	0	0,977	0,783	1
1	MURES	29	0	0,518	0,415	0,84
1	NEAMT	30	0	0,54	0,433	0,804
1	OLT	31	0	0,814	0,653	1
1	PRAHOVA	32	0	0,523	0,419	0,986
1	SALAJ	33	0	0,77	0,617	0,811
1	SATU MARE	34	0	0,656	0,526	0,77
1	SIBIU	35	0	0,541	0,434	0,767
1	SUCEAVA	36	0	0,51	0,408	1
1	TELEORMAN	37	0	0,687	0,55	0,819
1	TIMIS	38	0	0,416	0,333	0,784
1	TULCEA	39	0	1	0,801	1
1	VALCEA	40	0	0,783	0,628	0,935
1	VASLUI	41	0	0,588	0,471	0,854

Source: DEAP Application, Version 2.1.

In the DEAP analysis, technical efficiency is an indicator that measures a unit's ability to transform inputs into outputs using the available resources. More specifically, technical efficiency refers to a unit's capability to produce the same or even greater quantities of outputs using the same or fewer inputs compared to other units within the same evaluation sample. In the context of DEAP efficiency analysis, the differences between a unit's actual output and the maximum theoretical level possible, represented by the efficiency frontier, indicate the unit's degree of inefficiency.

To evaluate institutional performance, we chose to use the Malmquist option in the DEAP application, assessing 42 study units across each of the 4 years (2019–2022). The Malmquist index

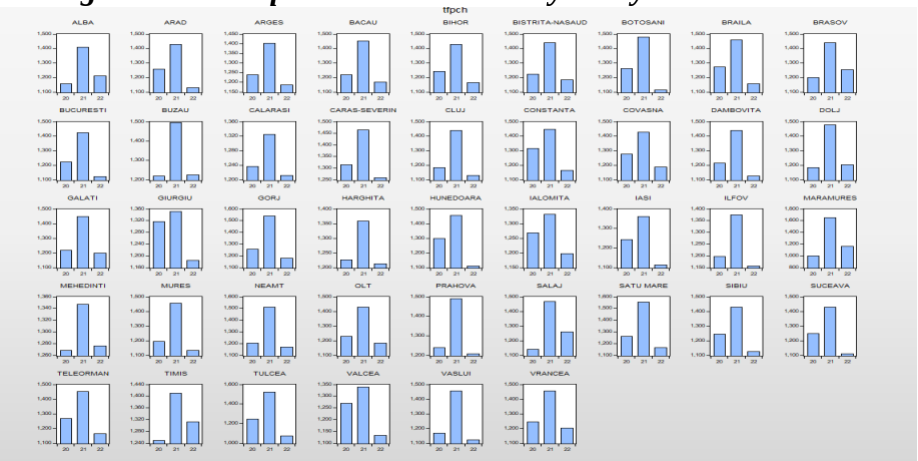
is a measure of progress that reflects changes in efficiency and productivity of an entity between two distinct periods[33]. Used in frontier analysis within the production process, it assesses the technical efficiency of units over a specific period, providing valuable information on performance changes and enabling the comparison of efficiency across different points in time.

The Malmquist TFP (Total Factor Productivity) index is used to assess changes in total productivity by analyzing two main components: changes in technical efficiency and technological changes over time. This indicator reflects the dynamics of productivity and technical efficiency evolution for each regional social payments and inspection agency analyzed.

In the analysis of the Malmquist TFP Index, a coefficient equal to 1 signifies no changes in the technical efficiency of the evaluated units between two time periods or between groups of compared units. An index value greater than 1 indicates an increase in technical efficiency or productivity in the later period compared to the reference period. Conversely, a value less than 1 suggests a decrease in technical efficiency or productivity in the later period relative to the reference period.

Figure 3 presents an analysis of the Malmquist TFP index for each territorial agency, aiming to highlight changes in technical efficiency and shifts in total productivity of the activity analyzed.

Figure 3: Malmquist TFP Indicator by Study Units and Years



Source: Authors' Processing Based on DEAP Results, Version 2.1

Thus, Figure 3 reveals the evolution of changes for each county social payments and inspection agency over the analyzed period. One can observe the efficiency indicator's progression from year to year by comparing the subsequent period to the reference period—specifically, 2021 relative to 2020 and the changes in 2022 relative to 2021.

[33] Emili Grifell-Tatjé și CA Knox Lovell, „A note on the Malmquist productivity index", *Economics letters* 47, nr. 2 (1995): 169–75.

As illustrated in Figure 3, all territorial agencies experienced significant changes in 2021 in terms of production processes and resource management, notably in technical efficiency adjustments. These changes indicate an increase in technical efficiency in 2021 compared to the previous year, suggesting that the agencies managed to become more productive while using the same financial resources. They allocated more time to social assistance benefit provision and management activities, resulting in enhanced technical efficiency across the units studied.

According to the data presented in the same figure, the Malmquist index (tfpch) had values greater than 1, with substantial increases in this coefficient observed in 2022 for all the analyzed county units. However, there are regional variations in efficiency. For example, agencies in the counties of Vâlcea, Tulcea, Teleorman, Dâmbovița, and Arad recorded lower values of the coefficient in 2022 compared to 2020, suggesting a decline in technical efficiency. This evolution of the technical efficiency indicator points to lower performance in managing social assistance benefits, requiring further analysis to identify the causes of these discrepancies.

On the other hand, agencies in the counties of Timiș, Sălaj, Maramureș, Alba, and Brașov managed to improve their efficiency in 2022 compared to 2020, in contrast to other territorial units. These increases suggest that agencies in these counties implemented effective practices and utilized resources optimally, despite the declines observed in other territorial agencies. The analysis of the Malmquist index evolution thus provides a relevant perspective on technical and economic efficiency, highlighting the need for specific measures to support continuous performance across all counties.

Based on the results obtained by calculating the Malmquist TFP indices for each territorial agency evaluated and for each year of the analyzed period, the average indicator for each unit of study was determined, offering an aggregated perspective over the entire period. Thus, the study units were compared based on variations in productivity and technical efficiency over the period 2019-2022. The dynamics of efficiency during the four years studied is particularly relevant for understanding the institutional performance of each county agency.

5. Conclusions

The research validated the hypothesis that the use of advanced data analysis models within public administration in Romania can optimize internal processes and bring relevant benefits to operational efficiency. The use of these models for measuring and evaluating institutional performance is a useful tool for the efficient and results-oriented management of public entities in an ever-changing environment.

The obtained results confirm the applicability of the efficiency analysis model in evaluating the specific components of institutional performance of public administration entities in Romania.

The scientific approach led to the conclusion that, by applying advanced data analysis models, specific areas of inefficiency can be identified, thus facilitating the strengthening of operational efficiency in the activities of public administration entities.

Data analysis models and internal benchmarking offer multiple possibilities for evaluating and optimizing administrative processes to increase the performance of public administration entities. This evaluation method allows for the identification of strengths and vulnerabilities in the activities of public entities, as well as highlighting effective practices relevant for improving processes and public services.

The application of these modern performance evaluation techniques can provide a new and deeper perspective on how public resources are managed and utilized, supporting informed decision-making for optimizing administrative processes, with an impact on improving institutional performance in the long term.

The analysis conducted can be useful both for internal institutional evaluations, for example when the dynamics of efficiency over time are relevant for identifying opportunities to improve the management system, as well as for performance audits. Measuring technical efficiency can be a useful tool for auditing activities, as it highlights risk areas that can be identified at the level of the evaluated units.

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