ASSESSING THE EFFICIENCY OF PUBLIC INSTITUTIONS IN THE EU THROUGH DEA: EFFECTS OF STRATEGIC PLANNING AND THE COVID-19 PANDEMIC

Ph.D. Student, Mihaela BĂRBUȚĂ (MATEI)
Transilvania University of Brașov
E-mail: mihaela.barbuta@unitbv.ro

Abstract: *In light of economic and social challenges intensified by the COVID-19 pandemic, which has strained the capacity of public institutions to effectively meet citizens' needs, this paper presents a comprehensive examination of the efficiency of public institutions across the 27 member states of the European Union (EU) for the years 2019 and 2020, utilizing Data Envelopment Analysis methodology. The study investigates the relationship between resource allocation for strategic planning initiatives and the corresponding measurable outcomes, aiming to clarify how effectively public institutions convert investments in planning into significant achievements that provide tangible benefits for citizens and enhance public service delivery efficiency. Conducting a robust analysis requires careful assessment of both input and output variables, allowing for precise characterization of institutional performance. The selected input indicators—including governmental expenditures explicitly designated for strategic planning and the Corruption Perception Index—provide insight into resources directed toward strategic efforts and the effectiveness of systemic safeguards against corruption while fostering ethical responsibility. The analysis reveals complex interactions among these variables, underscoring the importance of thorough evaluation in shaping public policy. Additionally, the paper advocates for the integration of adaptive strategic planning and increased citizen participation to improve institutional effectiveness.*

Key words: *efficiency, public institutions, strategic planning, data envelopment analysis (DEA).*
JEL classification: *C61, H50.*

1. Introduction

In the wake of the unprecedented challenges presented by the COVID-19 pandemic, the efficiency of public institutions has emerged as a critical area of focus for policymakers and researchers alike. The pandemic has highlighted the critical need for effective governance and resource management, as countries navigated through unprecedented public health crises and their economic ramifications. This research seeks to investigate the influence of strategic planning practices on the performance of public institutions in Romania and the other 26 member states of the European Union, which together exemplify a diverse array of governance frameworks and resource allocation strategies.

The study employs Data Envelopment Analysis (DEA) as its primary methodological framework. By applying the Bunker, Charnes, and Cooper (BCC) Variable Returns to Scale (VRS) model within DEA, the research aims to accurately assess how public institutions operate under conditions of variable returns to scale, facilitating a comprehensive evaluation of their efficiency and effectiveness in resource utilization. This methodological approach allows for an exploration of the unique performance dynamics present within the public sector, yielding valuable insights for potential reforms and improvements in governance.

The efficiency scores for these countries are informed by several pertinent input indicators: government expenditures related to strategic planning, the Corruption Perception Index, and the number of personnel in public administration. These factors are crucial for assessing governmental capacity during crises, particularly in challenging situations like a global pandemic.

On the output side, this analysis will evaluate indicators of government effectiveness, the Voice and Accountability Index, and citizen satisfaction with public services. These metrics provide insights into the responsiveness of public institutions to citizen needs during emergencies.

Data for this study have been meticulously gathered for the years 2019 and 2020, providing a comparative framework for assessing the impact of the pandemic on efficiency scores. The primary sources of data include Eurostat, the Organisation for Economic Co-operation and Development (OECD), the World Bank, Transparency International, and Eurobarometer. The analysis is conducted utilizing RStudio, with visual representations of the findings generated in Excel.

The innovative aspect of this research lies in its methodological approach to examining public sector efficiency across EU member states, particularly in relation to strategic expenditures and governance outcomes that have been shaped by the COVID-19 pandemic. This analysis provides valuable insights into how governmental efficiency can fluctuate in response to external circumstances, such as the COVID-19 pandemic, and underscores the importance of adaptability and proactivity in state leadership.

2. Literature review

Strategic planning is an essential activity in organizations, aligning their objectives with future environments, and has undergone significant evolution in definitions and approaches over the past three decades. Defined variably in the literature, strategic planning can be viewed as a systematic process aimed at envisioning a desired future and transforming that vision into defined objectives, as noted by Drucker (1974) and Porter (1985). Mintzberg et al. (1998) highlight that traditional strategic planning processes, which struggle in uncertain environments like the COVID-19 pandemic, similarly pose challenges in the public sector, revealing the need for more adaptive and flexible approaches to effectively address rapidly changing circumstances and enhance service delivery. Such uncertainty necessitates the adoption of flexible strategies, as emphasized by Ringland (1998), to effectively navigate challenges and achieve organizational goals. Schoemaker et al. (2018) reinforces the idea that a systematic approach to strategic planning, which incorporates scenario planning and real-time strategy adjustments based on emerging information, is crucial for organizations to respond adeptly to environmental changes.

Strategic planning and efficiency analysis within the public sector are fundamental components of effective public institution management, with Data Envelopment Analysis serving a pivotal role in the evaluation of performance and enhancement of services delivered to citizens. DEA facilitates the comparison of inputs with outputs, enabling the identification of efficient units and fostering the adoption of best practices (Afonso and Fernandes, 2008; Asghar et al. 2009). Gordon (2005) assert that establishing a synergistic relationship between strategic planning and performance control is vital for ongoing adaptation to the challenges faced in the public sector. Furthermore, Cooper et al. (2011) provide an in-depth examination of DEA and associated software tools for assessing efficiency, while Kalb (2010) underscores the obstacles encountered in performance evaluation and the critical need for resource optimization. Consequently, a systematic approach to strategic planning not only advances the long-term viability of public institutions but also promotes the responsible stewardship of public resources (Bryson, 2024).

The DEA method ranks essential management approaches, allowing for the evaluation of efficiency based on selected inputs and outputs, with its initial implementation occurring in 1978 as a CCR model by Charnes, Cooper, and Rhodes (Charnes et al., 1978). Subsequently, in 1984, Bunker, Charnes, and Cooper introduced the BCC variant, which assesses the efficiency of decision-making units under the assumption of variable returns to scale, emphasizing the importance of incorporating decision makers' preferences into DEA models (Omrani et al., 2020).

The foundational DEA models include the CRR input and output-oriented model, the BCC input and output-oriented model, and the SBM model, alongside modified-variate models such as the Malmquist index and the super-efficiency model. The super-efficiency model functions on the principle of treating efficient units as zero, effectively excluding them from the ensemble to establish a new efficiency frontier from which performance is assessed, enabling robust comparisons among organizational units, or decision-making units (DMUs), each utilizing a specific number of inputs to produce defined outputs (Charnes et al., 1978; Cova-Alonso et al., 2021).

In terms of model orientation, three distinct variants are recognized: input-oriented, output-oriented, and non-oriented models. Each orientation serves a specific analytical purpose, allowing for a tailored evaluation of efficiency based on the unique characteristics of decision-making units. For instance, input-oriented models focus on minimizing inputs while maintaining output levels, whereas output-oriented models aim to maximize outputs given a certain level of inputs (Po et al., 2009). The non-oriented approach, on the other hand, offers a balanced perspective, providing insights into efficiency without a specific directional bias (Krejnus et al., 2023).

The significance and objectives of the analysis are contingent upon the selected inputs and outputs within the model, which must be logically interconnected, reflecting the essence of a production process. To guarantee the appropriate selection of these inputs and outputs, correlation analysis is employed, serving as a critical tool for establishing valid relationships between them (Data Envelopment Analysis, 2024; Laerd Statistics, 2024).

In addition to ensuring the appropriate correlation coefficient among the right-hand side variables, it is essential to align the inputs and outputs with the number of decision-making units (DMUs). A common guideline stipulates that the sum of inputs and outputs should not exceed one-third to one-fifth of the total number of DMUs. The correlation coefficient, which ranges from -1 to 1: a value of -1 signifies absolute inverse dependence, 0 denotes no linear dependence, and 1 indicates absolute direct dependence. In the context of DEA analysis, it is crucial that the correlation coefficient does not surpass 0.8 to avoid potential bias in efficiency results, with an ideal correlation coefficient falling between 0.3 and 0.8, validated at a significance level of 0.05 depending on the number of units analyzed (Šoltés, 2008).

The DEA analysis often entails complexity due to the extensive number of input and output variables involved; thus, utilizing a singular index for both inputs and outputs theoretically streamlines the model by reducing dimensionality and enhancing result interpretation, while the assignment of equal weights to each variable ensures fairness and transparency, ultimately facilitating a holistic assessment of overall efficiency without undue emphasis on individual variable performance.

The selection of the output-oriented BCC (Banker, Charnes, Cooper) VRS (Variable Returns to Scale) methodology is theoretically grounded in its capacity to accommodate variable scalability, recognizing that the relationship between inputs and outputs can differ

significantly based on the size and characteristics of the unit being analyzed; this flexibility is essential for accurately capturing the operational dynamics of diverse decision-making units (DMUs) within the public sector.

By employing standardized input and output indices, the BCC methodology not only simplifies the DEA analysis but also enhances the comprehensibility and interpretability of the results. Efficiency scores will range from 0 to 1, where values approaching 1 indicate optimal efficiency, thereby reflecting the unit's capacity to utilize its resources effectively in relation to its counterparts. This theoretical framework paves the way for identifying best practices and benchmarking performance across various public institutions, ultimately guiding policy decisions that aim to enhance overall effectiveness and responsiveness in public service delivery.

3. Data and methodology

The objective of this research is to assess the performance of public institutions in the 27 member states of the European Union during the years 2019 and 2020, utilizing the Data Envelopment Analysis methodology. This study aims to analyze the relationship between the resources allocated for strategic planning initiatives (input indicators) and the resulting performance outcomes of these institutions (output indicators). The findings will enhance our understanding of how public resources are utilized and their impact on institutional effectiveness, especially in the context of the challenges faced by EU member states following the COVID-19 pandemic.

The research is guided by the following questions:

1. *What role does strategic planning play in determining the performance of public institutions in relation to citizen satisfaction?*
2. *How has the COVID-19 pandemic impacted the performance scores of EU member states?*

The years 2019 and 2020 were selected for this analysis because they provide the most recent data published by reputable international organizations such as Eurostat, the World Bank, and Transparency International. The year 2019 was characterized by stability in both economic and political domains, allowing for a performance assessment of public institutions unmarred by external disruptions. In contrast, the year 2020 is critical for examining how these institutions responded to significant challenges presented by the COVID-19 pandemic. Data from 2020 sheds light on governmental measures, resource management efficiency, and institutional adaptability in crisis situations. By comparing the performance outcomes of 2019 and 2020, the study will illuminate trends in institutional effectiveness, identifying both achievements and areas that require enhancement.

To provide clarity and structure regarding the variables used in assessing public institution performance, these will be detailed in Table 1. This table will include descriptions for each variable, specifying their type (input or output), the data sources, the units of measurement, and their relevance to the research context.

Table 1. Variables used in the analysis.

Indicator	Unit of measurement	Abbreviation	Type of indicator	Data source	Relevance
Government expenditures	% of Gross Domestic Product	GEX	Input	Eurostat	Reflects investments in public services.
Expenditures on strategic planning	% of Government expenditures	ESP	Input	World Bank	Indicates the level of resource allocation for consultancy.
Number of employees in the public sector	Per 1,000 inhabitants	NE	Input	OECD	Measures human resource capacity in the public sector.
Corruption perception index (rescaled)	Score (1-10)	CPI	Input	Transparency International	Reflects the perceived level of corruption in public administration.
Government Effectiveness	Score (-2.5; 2.5)	GE	Output	World Bank	Evaluates the quality and efficiency of public services.
Control of corruption	Score (-2.5; 2.5)	CC	Output	World Governance Indicators	Reflects the capacity to control corruption.
Voice and accountability index	Score (-2.5; 2.5)	VAI	Output	World Governance Indicators	Indicates citizens' ability to influence political decisions.
Citizen satisfaction with public services	%	CS	Output	Eurobarometer	Reflects citizens' perceptions of public services.

Source: Author's proceedings.

Unlike parametric methods, DEA is non-parametric and does not impose restrictive assumptions on the relationships between inputs and outputs, allowing for flexibility given the multiple interdependencies influencing public sector efficiency. DEA supports a multidimensional analysis that integrates various inputs—such as government expenditures, employee numbers, and corruption perception—with outputs like governance quality and citizen satisfaction. Traditional statistical methods often fail to capture the complexity of these interactions. The BCC VRS model (Banker, Charnes, Cooper – Variable Returns to Scale) is utilized to account for efficiency variations according to the size and characteristics of the public sector in each member state. An output-oriented approach is chosen to evaluate how effectively member states maximize results from available resources since improving governance and other key inputs enhances public sector performance. The DEA analysis, involving 27 decision-making units (DMUs) and 8 variables (DMUs/variables ratio = 3.375),

yields robust and generalizable results, exceeding the recommended 3:1 threshold and minimizing the risk of overfitting. While current findings are satisfactory, a larger number of DMUs would improve precision and robustness. Correlation analysis between input and output variables is vital for clarifying relationships and optimizing the model structure, supported by heat maps for clear visual representation of interactions (Krejnus et al., 2023).

Table 2. Correlation coefficients for the years 2019 and 2020.

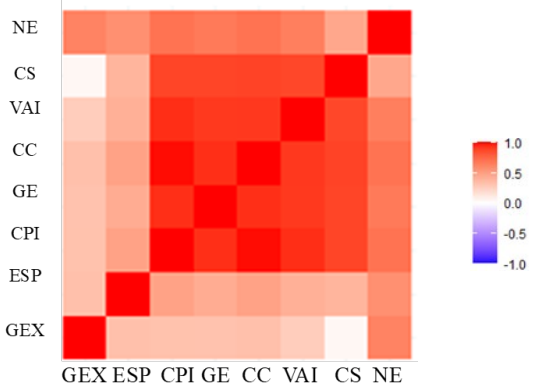
	2019							
	GEX	**ESP**	**NE**	**CPI**	**GE**	**CC**	**VAI**	**CS**
GEX	1	0.33	0.63	0.32	0.32	0.33	0.26	0.04
ESP	0.33	1	0.57	0.48	0.43	0.48	0.41	0.38
NE	0.63	0.57	1	0.70	0.67	0.70	0.65	0.46
CPI	0.32	0.48	0.70	1	0.94	0.99	0.94	0.88
GE	0.32	0.43	0.67	0.94	1	0.94	0.91	0.88
CC	0.33	0.48	0.70	0.99	0.94	1	0.91	0.88
VAI	0.26	0.41	0.65	0.94	0.91	0.91	1	0.87
CS	0.04	0.38	0.46	0.88	0.88	0.88	0.87	1
	2020							
	GEX	**ESP**	**NE**	**CPI**	**GE**	**CC**	**VAI**	**CS**
GEX	1	0.22	0.56	0.17	0.15	0.16	0.17	-0.10
ESP	0.22	1	0.56	0.45	0.42	0.49	0.43	0.34
NE	0.56	0.56	1	0.70	0.65	0.70	0.66	0.48
CPI	0.17	0.45	0.70	1	0.93	0.98	0.91	0.88
GE	0.15	0.42	0.65	0.93	1	0.92	0.90	0.90
CC	0.16	0.49	0.70	0.98	0.92	1	0.90	0.88
VAI	0.17	0.43	0.66	0.91	0.90	0.90	1	0.84
CS	-0.10	0.34	0.48	0.88	0.90	0.88	0.84	1

Source: Author's proceedings in RStudio.

Through the application of heat maps derived from the data presented in Table 2, this analysis enables the swift identification of significant correlations, which are crucial for clarifying the interpretation of direct or inverse relationships. Furthermore, by addressing complexity and alleviating multicollinearity issues, this method assists in prioritizing variables based on their impact on outputs, as elucidated by Wilks (2011) and Xu et al. (2018).

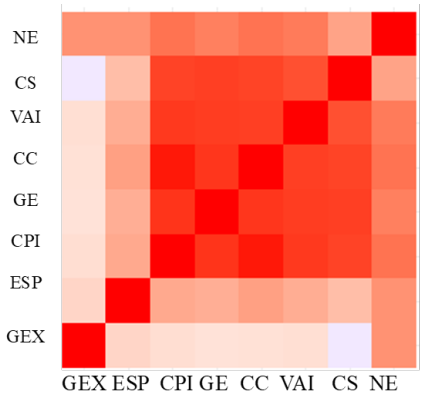
The use of heat maps for the correlation coefficient matrix—covering both 2019 (Figure 1) and 2020 (Figure 2)—elucidates the intricate relationships among the variables incorporated in the model, thereby facilitating informed, data-driven decision-making and enhancing both the effectiveness and interpretability of the model.

Figure 1. Heat map of the correlation coefficients for data collected in 2019.



Source: Author's proceedings in RStudio.

Figure 2. Heat map of the correlation coefficients for data collected in 2020.



Source: Author's proceedings in RStudio.

This correlation analysis provides robust justification for the selection of key indicators, including government expenditures (GEX and ESP), administrative size (NE), corruption perception (CPI), government efficiency (GE), control of corruption (CC), accountability of government (VAI), and citizen satisfaction with public services (CS), collectively yielding a comprehensive understanding of governmental performance and citizen engagement.

The strong positive correlations observed in 2019 between the Corruption Perception Index (CPI), government efficiency (GE), control of corruption (CC), and accountability of government (VAI) suggest an ideal scenario where a low perception of corruption is closely linked to effective governance and greater citizen engagement. This positive association reinforces the hypothesis that good governance contributes to reducing corruption and increasing civic satisfaction. In contrast, the weaker positive correlation noted between government expenditures (GEX) and the number of employees in the public sector (NE) indicates a potential connection between rising expenditures and an expanding civil service, warranting further analysis to determine whether it reflects efficient spending or merely budget expansion.

The weakening of positive correlations in 2020 indicates a possible deterioration of the situation, potentially implying a rise in perceived corruption or a decline in governmental efficiency and accountability. This shift requires examination to ascertain whether it reflects a changing reality or a statistical fluctuation. The slight negative correlation between government expenditures and citizen satisfaction (CS) is surprising and suggests inefficient resource allocation or a disconnect between governmental spending and citizen perceptions. The strong positive correlations between good governance and low corruption perception noted in 2019 diminished in 2020, likely due to the impacts of the COVID-19 pandemic.

Overall, the correlation analysis emphasizes the importance of variable selection in the model, providing a multidimensional perspective on the relationship between government expenditures, good governance, and citizen satisfaction. Although correlation does not imply causation, the analysis indicates that the selected variables are well-chosen to explain variations in governmental performance and public satisfaction.

The DEA analysis can become complex when utilizing a large number of input and output variables; therefore, employing a single index for both inputs and outputs significantly

simplifies the DEA model, reducing dimensionality and facilitating result interpretation. This approach, which assigns equal weights to each variable in calculating aggregate indexes, ensures fairness and transparency while avoiding subjectivity, allowing for a comprehensive assessment of overall efficiency without focusing on individual variable performance.

The choice of the output-oriented BCC (Banker, Charnes, Cooper) VRS (Variable Returns to Scale) methodology is theoretically justified, as it allows for variable scalability, recognizing that the relationship between inputs and outputs can vary based on the size of the unit being analyzed. Recognizing that the public system cannot be considered to be functioning at an optimal scale (Debnath and Shankar, 2014), this research paper employs the BCC VRS (Banker, Charnes, Cooper - Variable Returns to Scale) model to provide a nuanced analysis of efficiency. This choice is predicated on the understanding that public institutions often face inherent challenges that inhibit optimal performance, such as resource constraints, varying operational capacities, and external pressures.

By employing a standardized input and output index, this approach simplifies the DEA analysis, enabling a comprehensive assessment of public institutions' performance, with efficiency scores ranging from 0 to 1, where values closer to 1 indicate greater efficiency. In other words, this research effectively combines the standardized values of the identified variables into one input variable and one output variable, ensuring that each variable is given equal importance in their respective indices to provide a balanced representation within the analysis.

4. Results and discussions

Table 3 presents the relative efficiency scores calculated using the output-oriented BCC model for the years 2019 and 2020, reflecting the comparative performance of the analyzed countries in utilizing available resources and allowing for the identification of both top performers and trends in operational efficiency across the two periods.

Each unit with an efficiency score of 1 is considered 100% efficient, while countries with scores below 1 are classified as inefficient. The analysis identified five countries that achieved 100% efficiency in terms of citizen satisfaction as well as governmental quality for both years assessed, taking into account the resources utilized. These resources include strategic planning expenditures embedded in government budgets, as well as the size of administrative agencies.

Table 3. Efficiency scores obtained using the BCC VRS model.

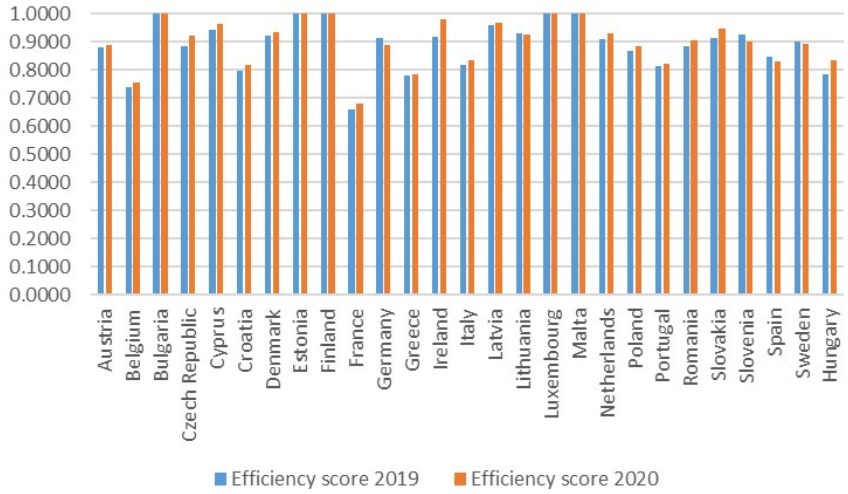
Country	2019		2020	
	Efficiency scores 2019	Ranking 2019	Efficiency scores 2020	Ranking 2020
Austria	0.8795	18	0.8896	17
Belgium	0.7394	26	0.7540	26
Bulgaria	1.0000	1	1.0000	1
Czech Republic	0.8851	16	0.9206	13
Cyprus	0.9445	7	0.9651	8
Croatia	0.7957	23	0.8177	24
Denmark	0.9209	10	0.9328	10
Estonia	1.0000	1	1.0000	1

Finland	1.0000	1	1.0000	1
France	0.6597	27	0.6788	27
Germany	0.9152	12	0.8877	18
Greece	0.7817	25	0.7855	25
Ireland	0.9181	11	0.9822	6
Italy	0.8187	21	0.8352	21
Latvia	0.9598	6	0.9673	7
Lithuania	0.9296	8	0.9267	12
Luxembourg	1.0000	1	1.0000	1
Malta	1.0000	1	1.0000	1
Netherlands	0.9116	14	0.9306	11
Poland	0.8667	19	0.8858	19
Portugal	0.8139	22	0.8216	23
Romania	0.8835	17	0.9058	14
Slovakia	0.9145	13	0.9484	9
Slovenia	0.9247	9	0.9014	15
Spain	0.8487	20	0.8324	22
Sweden	0.9006	15	0.8935	16
Hungary	0.7824	24	0.8356	20
Minimum	0.6597		0.6788	
Average	0.8887		0.8999	
Std. dev.	0.0868		0.0834	

Source: Author's proceedings in RStudio.

The countries that demonstrated efficiency in both analyzed years (Bulgaria, Estonia, Finland, Luxembourg, and Malta, each consistently achieving a score of 1) exemplify how effective governance and administrative efficiency are rooted in strategic public expenditures and a low corruption perception index. These factors have significantly contributed to high levels of citizen satisfaction with public services, positioning these states as exemplary models for others in the region (Mitu and Stanciu, 2023; Briguglio, 2024). The average efficiency of the 27 member states of the European Union in 2019 was approximately 89%, with a minimum of 66%, a score obtained by France. This variability in efficiency scores suggests a diversity in how each country manages its resources and prioritizes the needs of its citizens. In the following year, a slight increase in average efficiency was observed, reaching approximately 90%. However, France recorded a modest improvement in 2020, attaining a score of approximately 68%, as can be seen in Figure 3. This indicates challenges in governance and administrative efficiency in France that continue to affect citizen satisfaction with public services.

Figure 3. Histogram of efficiency scores for the years 2019 and 2020 for EU countries.



Source: Author's proceedings in Excel

This evolution can be partially explained by the influences generated by the COVID-19 pandemic, which had a significant impact on all countries. The health crisis forced governments to redirect resources and adopt swift measures in response to unprecedented challenges (Mathonsi, 2023). While some countries were able to adapt rapidly, maintaining high governance standards and ensuring citizen satisfaction, others, such as Germany, Slovenia, Spain, and Sweden, encountered difficulties in managing the crisis, which was reflected in a decline in their efficiency scores.

Additionally, the management of financial and human resources during the pandemic was crucial. Countries that implemented effective communication strategies and were able to quickly mobilize their resources succeeded in maintaining citizen satisfaction. In contrast, nations that faced challenges in organizing healthcare systems or adopting administrative responsibilities suffered setbacks.

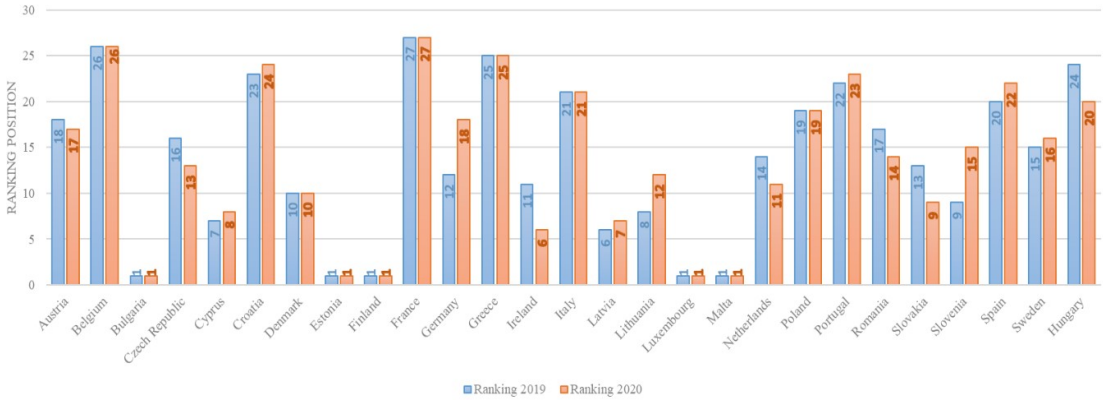
The observed decrease in standard deviation (see Table 3) may imply that, on the whole, nations across the EU have experienced similar enhancements in efficiency, resulting in diminished extreme variations. This trend could signify a positive shift in the adoption of governance policies throughout the region (Xanthopoulou and Plimakis, 2021). Furthermore, this decline may reflect the impact of collective interventions or policies implemented at the European level, which have contributed to enhancements in governmental efficiency. For example, initiatives enacted in response to the COVID-19 pandemic may have significantly shaped the manner in which governments allocated and managed their resources.

The results of the DEA analysis for the years 2019 and 2020 offer a perspective on changes in economic efficiency and resource allocation among the 27 European countries studied. The observed changes in rankings reflect the interaction of multiple factors: economic structure, public policies, dynamics of international markets, as well as global events like the COVID-19 pandemic, as illustrated in Figure 4.

The performance of Bulgaria, Estonia, Finland, Luxembourg, and Malta, which achieved perfect scores, underscores exemplary resource management and reinforces the potential for effective governance in optimizing funding and implementing sound economic policies. Recent research highlights that smaller nations with well-structured policies often

exhibit superior performance both economically and environmentally, suggesting a model for larger countries to emulate (Paliova and Nova-De Lisivkova, 2022).

Figure 4. Histogram of rankings for the years 2019 and 2020 for EU countries.



Source: Author's proceedings in Excel

Ireland's ascension from 11th to 6th place reflects significant adaptability and progress in its economic strategies, with improvements in efficiency closely tied to strategic investments in technology and infrastructure (Egan et al., 2024). The Czech Republic, similarly, has made notable strides, moving from 16th to 13th position, largely due to structural reforms and effective utilization of European funds (Kocsis, 2023).

In contrast, Germany's drop from 12th to 18th in the DEA efficiency rankings between 2019 and 2020 highlights the considerable challenges faced in maintaining optimal efficiency amidst global economic disruptions. Structural issues—including bureaucratic processes and sluggish decision-making—appear to hinder performance. As noted by Carlin and Soskice (2008), these rigidities are prevalent in larger economies, constraining their ability to swiftly adapt to market changes and impeding long-term competitiveness. KPMG's analysis (2022) further indicates that countries burdened by complex administrative structures and stringent regulations may face delays in innovation and crucial reforms required to enhance operational efficiency.

Belgium and Greece exhibit similar stagnation in efficiency, underscoring an urgent need for structural reforms. France faces comparable challenges, where its bureaucratic system may stifle innovation and efficiency. It is imperative for France to implement policies aimed at simplifying administrative processes to facilitate economic growth.

The stagnation in economic performance calls for urgent structural reforms to eliminate rigidities and foster adaptability, particularly through simplifying bureaucratic processes to enhance innovation. Additionally, prioritizing investments in technology and infrastructure is vital for maintaining competitiveness, as demonstrated by the Eurostat report (2023), which reveals that countries investing in digitalization see significant economic improvements, emphasizing the need for a unified strategy to address emerging challenges.

Romania’s advancement from 17th to 14th place in the DEA rankings between 2019 and 2020 illustrates significant progress in resource utilization and policy implementation. Analyses conducted by Mihai et al. (2021) and the Eurostat report (2023)

suggest that this improvement is largely attributable to strategic investments in infrastructure and digitalization, resulting in more efficient resource allocation. However, persistent internal challenges, such as institutional inefficiencies and corruption, continue to undermine the country's economic potential. Zaman and Georgescu (2014) and Lucian (2021) highlight how these obstacles can inhibit effective access to European funds and the essential reforms, ultimately leading to stagnation in efficiency growth.

Furthermore, concerns regarding sustainability remain paramount, accentuating the urgent need to address the transition to renewable energy sources. Research by Drăgoi et al. (2023) indicates that Romania must expedite this transition to reduce CO2 emissions and further a development model that not only enhances economic performance but also safeguards the environment, ensuring a sustainable future for upcoming generations.

In summary, the analysis of DEA ranking dynamics between 2019 and 2020 highlights significant challenges confronting economies, reinforcing the necessity for profound and well-structured structural reforms. These reforms must seek not only to improve economic efficiency but also to adapt to evolving market conditions and sustainability requirements. A more effective strategic planning approach is essential, as it could significantly enhance citizen satisfaction with public services. An integrated strategy must prioritize innovation and embrace green technologies, while public policies support research and development, fostering partnerships between public and private sectors, as indicated by Carbonara and Pellegrino (2019), which can lead to enhanced resource efficiency. Furthermore, it is crucial for development strategies to incorporate international collaboration, recognizing the complexity of global challenges such as climate change. Such collaboration can facilitate the transfer of sustainable technologies and the adoption of best practices, as suggested by Simionescu and Plopeanu (2023). Implementing policies that unify these diverse dimensions will not only support long-term economic stability but also contribute to establishing an ecologically sustainable future, crucial for the well-being of generations yet to come.

5. Conclusions, political implications and limitations of the research

This analysis delves into the intricate relationships among government expenditures, effective governance, and citizen satisfaction, underscoring the critical importance of meticulous variable selection within the research framework. It highlights the need for nuanced analytical approaches that consider contextual factors, particularly in light of the COVID-19 pandemic. The exceptional challenges encountered during this period emphasize the necessity for public institutions to implement adaptive strategic planning, informed by citizen feedback, to optimize resource utilization. The commendable performance of countries such as Bulgaria, Estonia, Finland, Luxembourg, and Malta can be attributed to strategic investments and a low perception of corruption, which together enhance citizen satisfaction.

The active involvement of citizens in decision-making processes, complemented by robust measures of transparency and accountability, is essential for improving governmental performance and fostering public trust. Romania’s advancement in DEA rankings, driven by investments in infrastructure and digitalization despite institutional challenges, exemplifies the significance of a participatory governance model for enhancing service delivery and addressing urgent issues of sustainability and economic resilience. This study reiterates the importance of integrating adaptive strategic planning that incorporates citizen feedback, thereby formulating dynamic policies that respond effectively to shifting societal needs.

The analysis acknowledges several limitations, primarily relating to the absence of a subnational approach; it does not incorporate a nuanced examination of public efficiency at the subnational and regional levels, particularly concerning the fulfillment of citizen needs amidst rising regional disparities within the European Union. The constrained sample size (2019-2020) may influence the relevance of the results, while the complexity introduced by numerous variables complicates the evaluative process, suggesting that a concentrated focus on key factors might significantly enhance clarity. Persistent internal challenges, such as inefficiencies and corruption, continue to impede nations' economic potential, and the study does not examine public efficiency from a subnational and regional perspective, particularly amidst increasing regional discrepancies within the EU.

This reality accentuates the imperative for diverse data sources and robust methodological frameworks to ensure accurate evaluations of efficiency. Addressing these limitations is crucial for cultivating a resilient public sector. By prioritizing such strategic approaches, public policies can become more effective and better aligned with the genuine needs of citizens, thereby substantially enhancing the overall quality of governance.

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