

How Should we Measure Public Sector Performance?

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Abstract: The methodology applied for measuring the public sector performance is a disputed topic both in academia and for decision-making policies implementation. Thus, in this paper, we analyze the importance of the topic for researches and also try to identify the methodologies considered within the literature for measuring public sector performance, which would allow comparison between states, and reporting to certain values. The novelty of our approach is that, firstly, we draw a content analysis, with a focus on the methodologies applied for measuring the performance in the public sector in terms of productivity, efficiency, and performance. Secondly, with the support provided by the VOSviewer it is performed a bibliometric analysis and science mapping. We focus our research on keywords co-occurrence, authors co-citation and co-authorship to observe countries and institutions that generate publications on “public sector performance”. On the one hand, our results reveal that entail Analysis of Main Components has proven to be an effective tool to perform complex analysis of public sector performance, through the composite indicator that achieves an aggregation of several important areas of the public sector, considering its complexity and large size. On the other hand, strong links between keywords, researcher’s networks and country and institutions where the research is concentrated where highlighted.

Keywords: *public sector, performance, measurement methodologies, content analysis, bibliometric analysis.*

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1. Introduction

The global economy is struggling in the worst recession in decades (the crisis that started in 2008 and the pandemic of 2020) and the economies around the world are facing significant shortages of financial resources. Moreover, citizens began to notice and express dissatisfaction regarding the quality of the services provided by the government. Struggling in this environment and in order to solve the “bad situations”, the government had to become more inventive and embrace new strategies. For example, the need for performance measurement of the entire public sector in its multidimensional character and not just from the financial area. In general, periods with crisis (economic, financial, pandemic) offers more perspectives on the way that systems in societies are measured (Van Dooren et al., 2015).

Starting from the current stage of the literature and in addition, the practices specific to the field of the public sector, we find that at the base of the evaluation of this sector, are data for outlining the inputs, outputs and results by the instrumentality of performance measurement methodologies. In order to perform a reliable and neutral evaluation, it is needed to account for the integrity of the influencing factors of the analyzed phenomenon (quantitative and qualitative elements of the outputs).

The measurement of one’s country performance begins to be harder and harder to determine since nowadays financial indicators are no longer seen as sufficient and it arises the need to investigate the multidimensional reality of the economy. Almost all world economies are trading and generate spillovers, migration is another important factor that should be considered, and public sub-sectors such as education, health, environment and the general well-being of the nation. Academia, public and international institutions started to create complex indicators, namely composite indicators that capture the complexity of one’s country. Factor analysis, mainly Principal Component Analysis (PCA) are key elements when composite indicators are constructed. PCA is a mathematical method developed to create an objective connection between a large set of variables, to be more precise a large number of interest variables are transformed in fewer variables (“principal components” that capture all the information). The practical implications of the performance measures of the various sub-sectors of the public sector are a key factor in achieving a global and sustainable performance of a nation.

More and more international institutions developed methods to determine public sector performance and composite indicators in order to provide international comparison, pointing out the importance of the

selected sub-indicators whereas the analysis of the public sector is a judicious and representative one. It is important to mention that these composite indicators can serve governments, more precisely decision-makers from low-performing countries can identify the sub-sectors of their economies that generate lower values, encounter problems, and thus generate policies specifically created to improve them in order to improve the entire country general growth and well-being of their citizens. Furthermore, the business environment and the population perceive the real position of their country economy and can decide their further actions.

The research is based on content analysis and bibliometric analysis in order to investigate the public sector performance measurement throughout the literature. Our research revealed that the complex method to measure the performance in this domain, namely the public sector is through composite indicators. Furthermore, special attention is necessary when selecting the sub-indicators to consider and the sub-sectors of the economy to create the indicator. We affirm this since it can send ambiguous policy information, to be more precise if some dimensions of the studied phenomenon are not correct captured then policymakers may encounter difficulties in generating and applying the proper policy. When performing the bibliometric analysis, our results reveal the existence of strong links. In terms of keywords, we selected at least 4 co-occurrences and obtain 9 clusters with “public sector” and “performance management” as the strongest keywords, while when considered authors co-citation with a threshold of 20 citations we identified 38 authors grouped in 4 clusters. Furthermore, we looked at authors countries and institutions and observed a concentration of publishing studies from authors with USA and English affiliation and observed that the most important institution among the 4 clusters is Nova University Lisbon.

The rest of the paper is structured as follows: Section 2 reveals a brief presentation of the performance measurement concept throughout the literature, Section 3 shortly present the data and methodology used in this paper, Section 4 discloses the identified methodologies used for measuring the public sector performance and the results after performing bibliometric analysis and Section 5 concludes.

2. Literature review

Performance measurement is a concept whose definition cannot be made precisely because it goes beyond the scope of a particular scientific field. Performance is a term that defines the purpose, i.e. the successful

fulfilment of an activity carried out by the organization. This concept is generally defined as a system of designating, monitoring and unbiased indicators, which can be considered repeatedly in order to indicate the level of performance, whether we refer to public organizations, public projects or the public sector as a whole.

The conception of the public sector is comprehensive and can be defined in several ways according to the point of interest. Thus, in general, Hatry (2006) defines performance measurement as a process aimed at periodically providing valid information about the performance indicators of results and outputs. Ghalayini et al. (1997) further mention the use of a multidimensional set of indicators to highlight performance.

More recently, Smalskys (2010) explains that the public sector is similar to a company system that considers public resources and therefore his performance needs to be measured. Moreover, in his paper, he mentions the five functions that public sector organizations fulfil, namely (i) regulation, (ii) distribution, (iii) redistribution, (iv) creation of institutions and (v) provision of public goods. In addition, Mihiţ et al. (2019) reveal that there are difficulties in characterizing and measuring performance in the public sector, mentioning among others: the variety of the economic and social environment, information asymmetry, unqualified staff delegated to measure the public sector performance, the political influence in government decisions and the perception of the public sector as a whole.

3. Materials and methods

Performing statistical analysis is becoming easier nowadays due to the growing number of statistical programs; however, it is difficult to select the appropriate statistical test or the appropriate methodology. In order to discover the most suitable and used methodology to measure public sector performance, we performed below two analysis. Firstly, we concentrated on papers collected from the Web of Science Core Collection database (WoS) but also Science direct platform and Wiley online library. We make use of content analysis after we performed a selection of papers constructed around the following keywords: “public sector”, “performance”, “performance measurement”.

Secondly, we draw on science mapping, specifically, we perform bibliometric research by employing VOSviewer software to reveal the existence of networks, clusters between authors on different dimensions: keywords, co-citation, co-authorship. The research is performed on studies available on the Web of Science Core Collection database since WoS is widely recognized as a high-quality source of scientific studies. In order to

obtain our results, our sample was collected by using keywords as “performance”, “public sector”, “performance tools” starting with the 2000 year. The extraction of the data took place at the beginning of November 2020 and was limited to articles. The final sample gathers a total of 490 documents.

4. Public sector performance measurement

As mention above, there are many statistical programs and methodologies available for researchers, but the selection should be made taking into account the nature of the data and what is the hypothesis of the study. An important step is data collection. In this area, we identified the following databases for our topic of interest, namely public sector performance: Eurostat; The European Commission; OECD - Organization for Economic Co-operation and Development; World Bank; International Monetary Fund; Transparency International; UNESCO Institute for Statistics; United Nations Statistics Division.

Another question that arises is how to effectively assess public sector performance. For example, OECD (1994) analyze performance giving increasing attention to the following areas: hot to measure the efficiency and effectiveness in the public sector, the quality of public services, the expenses and resource savings, but also the overall financial performance. Pastuszkova and Palka (2011) recommend that in order to evaluate performance it is needed to analyze together the economy, effectiveness and efficiency, naming them the 3E. They also mention that in this way you can aim for general growth, but particular cases need special attention and specific measures. A few years later, Mihaiu (2014) suggests adding environment and equity in addition to the three mentions above and names them the 5E system. The author suggests the addition of new indicators, considering the first three are in the financial sphere, so it can lead to a failure of social objectives and of the environment, and therefore the performance of the public sector may be measure incorrect.

Furthermore, Reinholde (2015) emphasize the role of performance indicators in policy development focusing on Latvia economy. More recently, Lapuente and Van de Walle (2020) reveal that New Public Management reforms have transformed public administrations. To be more precise, performance in the public sector has evolved from input and process to output and outcome. Thus, we can state that performance measurement can be analyzed from a one-dimensional view through financial indicators (cost-benefit analysis, net present value savings) or from

a multidimensional point of view by taking into consideration variables, indicators that capture the social sector, environment, education, health, well-being.

4.1. Public sector performance measurement – content analysis

In the context of globalization, more and more international institutions recognize in the evaluation process of the society the need to supplement GDP with new, clear and measurable indicators that take into account resource efficiency, biodiversity, social inclusion, climate change, measuring long-term economic and social progress. The medium and long term emphasizes the need to create additional indicators. This gap in the performance measurement process was pointed out especially by the work of Stiglitz et al. (2009) or Noll (2011). Saisana et al. (2005) analyze the appropriateness of using composite indicators. The advantages of using composite indicators identified by the authors are: (i) the ability to perform complex analyzes on the performance and efficiency of states, (ii) the possibility of classifying or grouping states according to the results determined by composite indicators, (iii) determining performance states acting as a model for low-performing states; and (iv) providing a realistic picture of the public sector to citizens. The most important disadvantage of using composite indicators is the sensitivity to the robustness of the database, which can lead to erroneous conclusions. The European Commission, through the work of Afonso et al. (2006), reveals a set of composite indicators for the measurement of public sector efficiency and performance by considering the following sectors of the economy: (i) public administration, (ii) health, (iii) education, (iv) infrastructure, (v) revenue distribution, (vi) economic stability and (vii) economic performance. In this study, they analyze efficiency as spending-related performance and performance as a result of public policies and efficiency. The literature frames the first four above mentioned sectors in the opportunity indicators area and the last three in the Musgravian indicators.

Moreover, starting from the work of Afonso et al. (2006) to measure public sector performance and efficiency, Angelopoulos et al. (2008) developed a composite indicator, containing only four public sector-specific dimensions, in this case: (i) administration, (ii) stability, (iii) infrastructure and (iv) education. In addition, the authors estimate the technical efficiency by applying the frontier analysis of stochastic production, incorporating the two measures, both public sector efficiency and technical efficiency in an econometric model. Also based on the study by Afonso et al. (2006), Rouag

and Stejskal (2017) developed composite sub-indicators to measure performance in the North African and Middle East countries.

The Inter-American Development Bank through the work of Afonso et al. (2013) that starts from opportunity and Musgravian indicators assess the efficiency and performance in 23 Latin American countries. Furthermore, the World Bank provides a set of governance indicators that nowadays gathers around 200 countries. Kaufmann et al. (1999a, 1999b) denoted the importance of governance and the construction of governance indicators, namely bureaucratic quality, the rule of law, and political corruption. In addition, Kaufmann et al. (2005, 2010) reveal six indicators for analyzing governance, namely: voice and accountability; political instability and violence; government effectiveness; regulatory quality; rule of law, and control of corruption. Furthermore, Transparency International measures corruption in approximately 180 countries through the widely used composite indicator Corruption Perceptions Index (CPI), while World Bank created the Country Policy Index and the Institutional Index (IPTII) to measure the quality of public policies. Since 1990, the United Nations has defined and implemented the Human Development Index, a composite indicator of three basic dimensions, namely (i) long and healthy life, (ii) knowledge and (iii) a decent standard of living.

The European Commission applies the Economic Sentiment indicator, obtained by aggregating five sectoral indicators: (i) the industrial confidence indicator, (ii) the services confidence indicator, (iii) the consumer confidence indicator, (iv) the consumer confidence indicator retail trade.

Assessing the performance of the public sector is a complex task, that requires special attention in the construction process of composite indicators since nowadays we are working with a consistent set of data. Mazziotta and Pareto (2013) point out that the analysis of more complex phenomena can be performed only with the help of composite indicators and the most appropriate and frequently used methodology for determining composite indicators is PCA. Lobonț et al. (2018) apply the PCA to determine a barometer of democracy by aggregating 13 sub-indicators: GDP, globalization, inflation, Human Development Index (CPI), CPI, participation in elections, total population, representation of women in Parliament, electoral system, the structure of Parliament, old and new democrats, religion and the political system.

Considering the mathematical analysis of public sector performance, we observed that border analysis methods are among the most sophisticated performance measurement tools that allow the investigation of the complex process of multidimensional production. Border analysis methods can be

divided into two groups: parametric, namely (i) Stochastic Frontier Analysis (SFA), (ii) Distribution-Free Analysis (DFA), (iii) Thick Frontier Approach (TFA) and non-parametric, namely (i) Data Envelopment Analysis (DEA) and (ii) Free Disposal Hull (FDH).

Before deciding between using a parametric or nonparametric test, the researcher must know the advantages and disadvantages and, of course, the differences in the use of one over the other. For example, when we need to decide between a parametric and a non-parametric test we should remind that a parametric test is a test in which the data sample is considered to be too large from a normally distributed population. When analyzing the data it is important to see if they are better represented by the mean or median. If the data are better represented by the median, then apply a nonparametric test. So, it is important to consider the distribution of the population, the scale of data measurement and the homogeneity of variations. Among the most employed parametric tests we mention: (i) Pearson correlation coefficient, (ii) Variance Analysis (ANOVA), (iii) Student Test (T) and (iv) Z test, while for the non-parametric test we remarked: (i) Spearman/ Kendall correlation coefficient, (ii) Kruskal-Wallis Test, (iii) Mann-Whitney U Test and (iv) Testul Wilcoxon. We present in table 1 the most known and used methods to assess performance in literature and public practice:

Table 1. *Summary of methodologies applied to measure public sector performance*

Performance method	measurement	Description
The Common Assessment Framework (EFF)	Self-Framework	Used for the functioning of public institutions. It is a tool for Total Quality Management (TQM). It is constructed around the idea that excellent results regarding organizational performance, citizens/clients, staff and society can be accomplished through leadership leading strategy and planning, staff, partnerships, resources and processes.
Strategic Reporting (SMART) Pyramid	Measurement and Technique Performance	The model developed by Lynch and Cross is a structural model for a new information network that recognizes the importance of internal influence and external performance factors and allows the construction of a performance monitoring system. cascading, combining quality management with the organization's internal processes and operations, combining financial with non-financial indicators.
PRISM	PERFORMANCE	This model of Neely and Adams looks at

Model	measuring performance in terms of meeting the requirements and needs of stakeholders, starting from the idea that it is not possible to create values for shareholders without creating values for other stakeholders.
Benchmarking	It is a tool that allows the measurement of performance in the public sector by referring to a standard or compared to best practices. Thus, it allows the identification of the main deficiencies and measures to be implemented. The multiple dimensions of performance have made comparative studies to be broadly used in the public sector.
Balanced Scorecard	It is a multidimensional measurement model by analyzing four angles, namely the financial angle, the customer angle, the internal processor angle and the learning and development angle.
Composite indicators	Are based on a set of relative indicators, grouped by socio-economic domains, which provide a relative, comparative view on the level of development of research units.

Source: authors compilation based on above-mentioned studies

As mention before, public sector performance measurement it's a complex task and we observed that the creditably way to do it is through composite indicators. We affirm this because nowadays is necessary to capture the multidimensional reality of the economy. Through composite indicators, a set of indicators are assembled taking into consideration socio-economic fields in order to provide the possibility for an accessible and coherent compare of development level at the national, regional sectoral level. The computation of a composite indicator starts with the selection of the relevant sub-indicators for the studied topic and closes with the choice of instrument to compute it. We observed that Principal Component Analysis is the main method used in the literature to generate composite indicators.

4.2 Public sector performance measurement – bibliometric analysis

Consecutive, we perform a bibliometric analysis to observed the importance of the public sector performance measurement topic in the research space. We tried to point out groups, clusters that arise taking into account: (i) keywords, (ii) co-citation, and (iii) co-authorship. As a general observation, we mention that the larger the word (keyword, author name,

country or institution) and the nodes between them, the larger the weights, the strength between them. Concerning the distance between nodes, we note that the larger the distance, the smaller the relationship between them.

4.2.1. Keywords Analysis

This selection wishes to highlight the most recurrent keywords through the keywords of the same article, namely keywords co-occurrence. We selected that only the author's keywords are to be considered and the software identified 1552 keywords in the 290 documents. Furthermore, we used a threshold of 4 co-occurrences that reduced the number of considered keywords to 54 and generated 9 clusters. Figure 1 reveals the keywords with the most co-occurrences and the nodes between them. If we consider the total link strength, we identify “public sector” and “performance management” (the topic of our analysis) as the two most recurrent keywords. The first cluster (red) is led by the keyword “new public management” (topic associated with public sector performance) and gathers 10 more items: “innovation”, “management tools”, “performance assessment”, “public administration”, “public services”, “quality management”, “reform”, “risk management”, “strategic management”, “strategic planning”. The second cluster (green) is led by “efficiency” (a performance component) and also contains: “data envelopment analysis”, “dea”, “performance evaluation”, “public management” and “simulation”. The blue, respectively the third cluster is led by the word “performance management” and is associated with: “accountability”, “balanced scorecard”, “local government”, “performance indicators”, “performance measurement” and “service delivery”. “Benchmarking” is the led word for the olive group and along with “healthcare”, “implementation”, “lean”, “municipalities” and “supply chain” form the fourth cluster. The fifth (purple) cluster has “performance” (our research topic) as the leading word and groups also the following keywords: “hospitals”, “management”, “public-private partnership”, “quality” and “strategy”. The sixth (light blue) is led by “sustainability” and contains also “content analysis”, “environment”, “green public procurement” and “sustainable development”. The seventh (orange) cluster is led by “public sector” (our research area) keyword and is associated with “governance”, “higher education”, intellectual capital” and “knowledge management”. The eighth (brown) cluster is led by “public sector reform” followed by “job satisfaction”, “performance measures”, “public sector organizations” and “public service motivation”, while the ninth (pink) cluster is a form of “communication” and “indicators”.

(30 citations, 103 link strength), Ramos (39 citations, 108 link strength), Testa (22 citations, 105 link strength), Walker H. (23 citations, 121 link strength) and Yin (34 citations, 162 link strength).

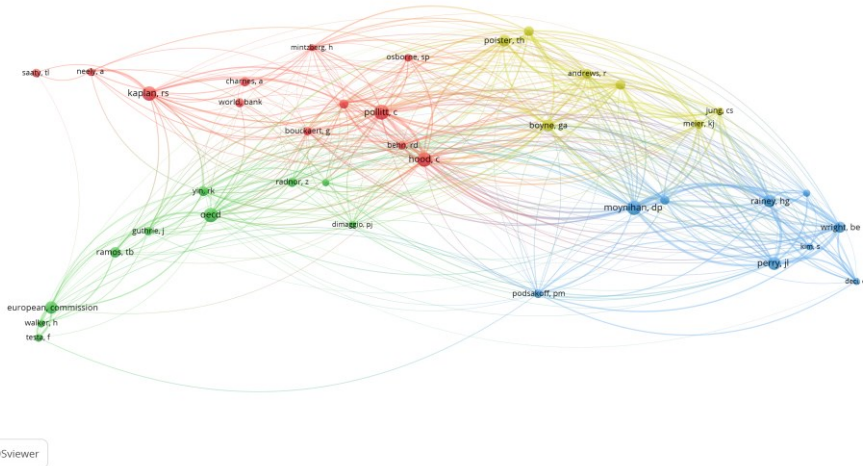


Figure 2. Authors co-citation network regarding performance measurement
Source: authors compilation in VOSviewer

If we consider the total strength link the first position (777) is occupied by Moynihan (74 citations), the led author of the third (blue) cluster, which groups: Bozeman (20 citations, 159 link strength), Deci (21 citations, 228 link strength), Heinrich (31 citations, 281 link strength), Kim (20 citations, 265 link strength), Perry (62 citations, 637 link strength), Podsakoff (25 citations, 200 link strength), Rainey (58 citations, 631 link strength) and Wright (45 citations, 628 link strength). The fourth group is led by Poister (52 citations, 565 link strength) and gathers Andrews (35 citations, 473 link strength), Boyne (51 citations, 592 link strength), Bryson (37 citations, 364 link strength), Jung (24 citations, 318 link strength), Meier (31 citations, 356 link strength) and Walker RM (34 citations, 446 link strength).

4.2.3. Countries Co-authorship Analysis

We investigated the geographical area in which public sector performance is analyzed. To be more precise we wish to observe the shaped research collaborations among researchers. Considering a threshold of 4 as a

minimum number of documents per country, the software returns 45 countries that fulfil the requirements out of 71 countries.

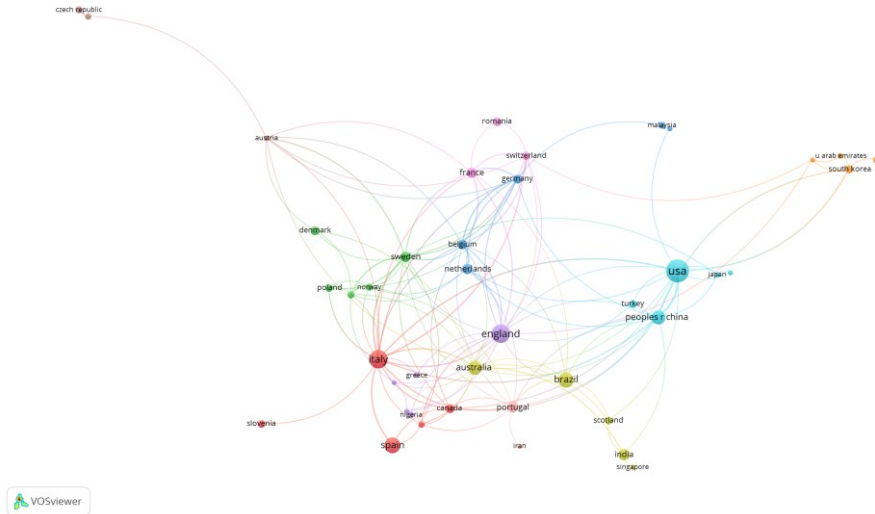


Figure 3. Countries Co-authorship network on performance measurement
Source: authors compilation in VOSviewer

It can easily be observed in Figure 3 that research on this topic is concentrated in USA (70 documents, 2037 citations) and England (48 documents, 877 citations). Furthermore, according to total link strength, Italy (45 documents, 652 citations) ranks first (40 link strength) and leads the first (red) cluster along with Canada (12 documents, 183 citations), Slovenia (9 documents, 46 citations), Spain (34 documents, 237 citations) and Wales (6 documents, 85 citations). The second (green) cluster is led by Sweden (15 documents, 251 citations) and gathers Denmark (11 documents, 169 citations), Finland (7 documents, 123 citations), Norway (7 documents, 46 citations) and Poland (8 documents, 8 citations). Furthermore, the third (blue) cluster is led by the Netherlands (14 documents, 127 citations) and grouping Belgium (13 documents, 132 citations), Germany (11 documents, 112 citations), Ghana (4 documents, 2 citations) and Malaysia (7 documents, 32 citations). The fourth (olive) cluster is led by Brazil (32 documents, 128 citations) along with Australia (27 documents, 298 citations), India (19 documents, 99 citations), Scotland (8 documents, 80 citations) and Singapore (4 documents, 51 citations). England is leading the fifth (purple) cluster, composed of Greece (5 documents, 23 citations), New Zealand (4 documents, 36 citations), Nigeria (6 documents, 20 citations) and Thailand

(4 documents, 66 citations), while the USA is leading the sixth (light blue) cluster along with Japan (4 documents, 225 citations), China (27 documents, 332 citations), Taiwan (4 documents, 167 citations) and Turkey (8 documents, 59 citations). South Korea (10 documents, 126 citations) is leading the seventh (orange) group composed of Russia (8 documents, 36 citations), Saudi Arabia (4 documents, 8 citations) and United Arab Emirates (5 documents, 28 citations). The eighth (brown) cluster is led by the Czech Republic (7 documents, 15 citations) along with Austria (4 documents, 91 citations) and Slovakia (6 documents, 30 citations). The ninth (pink) cluster is composed of 3 countries with France (15 documents, 127 citations) as a leading country together with Romania (11 documents, 54 citations) and Switzerland (10 documents, 208 citations). The tenth cluster is composed of Iran (4 documents, 87 citations) and Portugal (17 documents, 334 citations).

4.2.4. Institutions Co-authorship Analysis

In this section, we point out the most important institutions that are researching and publishing from our sample of 490 papers.

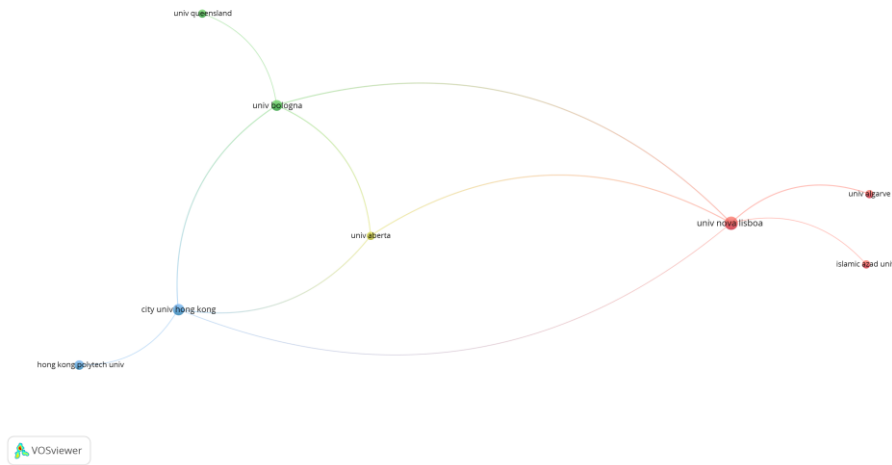


Figure 4. Institutions co-authorship network on performance measurement
Source: authors compilation in VOSviewer

We selected a threshold of 3 documents and the software reported 41 institutions that meet the conditions of which the first 8 with the highest connections are depicted in Figure 4. We can observe that the most

important institution among the 4 clusters is Nova University Lisbon with 8 documents, 168 citations which leads and forms the first (red) cluster together with Islamic Azad University (3 documents, 34 citations) and University of Algarve (3 documents, 87 citations). The second (green) cluster is composed of University of Bologna (5 documents, 48 citations) and University of Queensland (3 documents, 10 citations). The third (blue) cluster is formed of City University of Hong Kong (6 documents, 100 citations) and The Hong Kong Polytechnic University (4 documents, 19 citations), while the fourth (olive) cluster is represented by University of Alberta (3 documents, 28 citations).

5. Conclusions

All international institutions have started to recognize the necessity to construct indicators that assess the whole state of society, from an economic and social point of view, and not just focusing on financial indicators (like GDP, growth, public debt). Concepts like social inclusion, wellbeing, climate changes, public resources efficiency need to be taken into consideration to create an objective and complete measurement system of the public sector performance. We identify important international institutions, like the European Central Bank, the World Bank or the OECD that are considered the generators of frameworks and complex indicators that allows for international analyses between countries. Performance measurement is a large and complex domain, thus its analysis requires special attention in order to identify the relevant sub-sectors to include when computing composite indicators.

As a general conclusion, we can say that currently, due to the evolution of the way of looking and thinking of performance measurement, any system for measuring the performance of a system, regardless of the degree of aggregation of measured performance indicators, the model and methodology chosen and/or implemented, is based on certain theoretical models and/or framework models, developed over time by specialists and which propose the development of certain general solutions regarding "what" and "how" an organization needs to measure performance achieved. Ensuring the sustainable performance of the public sector involves a set of difficult and complex actions. It is necessary to take into account several basic dimensions in a state when carrying out a comprehensive and exhaustive analysis in this regard.

The approach to measuring public sector performance must be considered by developing a set of clear and intelligible indicators that fulfil

the following criteria: theoretically coherent, relevant for the decision-makers and computable. This is desired in order to be able to realize comparative studies at the country and regional level and generate recommendations.

The bibliometric analysis was performed to identify the importance of “public sector performance” topic in academia and observed the existence of strong links. Firstly, when analyzing “keywords” we obtained 9 clusters with the following lead keywords: “new public management”, “efficiency”, “performance management”, “benchmarking”, “performance”, “sustainability”, “public sector”, “public sector reform” and “indicators”. Observing the above-mentioned words, we can easily affirm that there exists an interest in this topic, but also a connection with another topic that should be considered in future research. Secondly, we looked at the existence of a research network by considering a minimum of 20 citations and obtained 38 authors grouped in 4 clusters. The first cluster can be considered the most important one since it is led by Pollitt with 80 citations, the second cluster is led by OECD with 73 citations, third by Moynihan with 74 citations and fourth by Poister with 52 citations. Thirdly, when investigating the geographical area in which public sector performance measurement is analyzed, we selected a minimum of 4 documents and the software returns 45 countries that fulfil the requirements out of 71 countries. A number of 10 clusters were created and USA (lead of the 6 clusters) and England (lead of the 5 clusters) occupies the first two positions according to the number of documents. Furthermore, according to total link strength, Italy with 45 documents ranks first and leads the first (red) cluster. The second (green) cluster is led by Sweden with 15 documents, the third cluster is led by the Netherlands with 14 documents and the fourth cluster is led by Brazil with 32 documents. South Korea with 10 documents is leading the seventh cluster, the eighth cluster is led by the Czech Republic with 7 documents, the ninth cluster is led by France with 15 documents, while the tenth cluster is composed of Iran with 4 documents and Portugal with 17 documents.

Fourthly, when analyzing the institutions that generated the most studies on this topic the software identified 41 institutions (with at least 3 documents) of which the following 8 have the highest connections among them: Nova University Lisbon, Islamic Azad University, University of Algarve, University of Bologna, University of Queensland, City University of Hong Kong, The Hong Kong Polytechnic University and University of Alberta.

Our findings from the above analysis reveal that the measurement of public sector performance has become essential and necessary in the new

world context for decision-makers, academia and citizens. It does not matter at the level of the public sector the measurements performed, the same goal is pursued: improving performance.

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