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A Critique and Bibliometric Analysis of the Studies on Health System Effectiveness

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ABSTRACT

This study examines the literature on the evaluation and measurement of the performance of healthcare systems. It has been determined that various methods and criteria are used for evaluating healthcare systems in the literature, and these evaluations generally rely on inputs such as healthcare expenditures, sociodemographic structure, healthcare facilities, and personnel numbers. As a result of the use of different evaluation criteria and methods in studies, it has been found that the rankings of the most successful countries also vary. This indicates that publication bias and the input parameters can influence evaluation results. The findings suggest that further research is needed for a more accurate assessment of healthcare system performance and the establishment of a platform involving all healthcare systems globally. Additionally, the bibliometric analysis of the study reveals which countries are focusing on studies related to healthcare system performance and which topics are being researched more. It emphasizes the importance of collaboration and knowledge sharing among countries. Adopting a more comprehensive and multidimensional approach to evaluating healthcare systems, determining standardized evaluation criteria, and using different methods together to obtain more robust results are recommended. Implementing these recommendations will contribute to

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more accurately measuring and improving the effectiveness and efficiency of healthcare systems.

Keywords: Bibliometric Analysis, Health Systems Performance, Measurement Assessment, OECD Countries, Türkiye

INTRODUCTION

Before it was defined as "a state of complete well-being" by the World Health Organization (WHO), health was described as a need that creates a common image in everyone's minds when it is mentioned but cannot be fully revealed at a conceptual level. Human sciences have focused on this concept and looked at it from their own perspectives. For example, in the 1948 Universal Declaration of Human Rights in sociological and legal terms, the concept was viewed on the basis of "rights" (Leary, 1994). From a medical perspective, health is generally associated with disease and defined as the absence/opposite of disease and disability (Svalastog et al., 2017). Thus, health can be analyzed and discussed at the level of sub-concepts that may be related. The factors that can be affected by this concept have been relatively more prominent than all other related sub-headings. The factors affecting health, and the diversity and effects of these factors have been investigated by many researchers. In order to understand their impact on human health, it is necessary to evaluate many different areas such as physical, psychological, environmental and genetic factors (Brevik et al., 2020). Assessing the factors affecting health also provides an understanding of derived concepts such as the health system.

The health system is a complex structure that embodies the fragility of humanity and the need for solidarity, undertaking the mission of protecting and improving life. It constitutes one of the cornerstones of a society's well-being and determines its quality of life through its success in the fight against disease. Health systems are generally defined as a structure that regulates the organization, financing, and access to health services in a society or country. Health systems are formed through the interaction of a number of factors and often include many variables such as history, culture, economy, political structure, and social norms.

Reexamining Concepts for a New Perspective

Healthcare System

The health system is a complex structure that aims to provide a healthy, happy, productive, and qualified life through the effective use of public resources in a country (Atun & Moore, 2021). As a social system, it is a structure that interacts with its environment and involves complex relationships between various components.

In order to understand the functioning of the health system well, it is necessary to examine the basic components in detail such as the inputs needed for the production of health services, the processes followed, and the outputs obtained. Inputs include financing resources, information and knowledge, human resources, medical equipment, and materials. However, inputs are not limited to material resources; policymakers and civil society organizations also have a significant impact on the health system. On the other hand, the success and efficiency of the health system are closely related to the effective use of these inputs and the improvement of the health status of the country in general after the delivery of health services to individuals. Health policies and the strategies pursued to realize these policies can have a direct impact on the delivery, financing, access, and quality of health services, and therefore, they determine the success of the health system.

Health System Performance and Efficiency

Performance is generally defined as the quantitative and qualitative determination of the extent to which decision-makers are able to achieve the targeted result with the efforts they make or the inputs used to realize their objectives (Spekle & Verbeeten, 2014). Efficiency is the measure of how well resources are used and effective results are achieved. Although productivity means different things to different people and disciplines, it is basically the relationship between the quantity and quality of goods and services produced and the resources used to produce them.

Health system performance and efficiency measure the ability of a country or region to deliver and manage health services (Kruk & Freedman, 2008). These concepts are related to the utilization of resources related to the delivery of health services but are often associated with health outcomes. The efficien-

cy of the health system aims to achieve the best results through the optimal use of resources. When performance, which can be briefly summarized as the degree to which a health system achieves the set targets, comes together with efficiency gains, which can be defined as producing the highest level of output using the minimum level of input, the targeted results in the health system are achieved in the best way (Porter, 2010).

Increasing health expenditures raise questions about whether the resources allocated to health systems are being used appropriately. The concept of health systems performance has been discussed in detail in the report published by WHO in 2000, with discussions on both the efficient use of resources and the objectives to be achieved. Efforts and discussions in the direction of both monitoring the improvements in the performance levels of countries and benefiting from the experiences of other countries in relative terms have also tended to increase rapidly.

Many factors affect health system performance. Access to health services, quality of health services, training of health personnel, impoverishing health expenditures, improvement in health status, and appropriateness of health policies are among the most discussed factors (Arah et al., 2003; Eze et al., 2020).

Performance indicators aimed at measuring the effectiveness of healthcare systems (such as life expectancy at birth or the ratio of impoverishing health expenditures) and resource utilization indicators (such as total healthcare expenditures or number of healthcare workers) can contribute to the classification of a country's healthcare system as efficient or inefficient. The obtained results help identify the strengths and areas needing improvement within the healthcare system. However, due to the heterogeneous nature of compared healthcare systems and their vastly different organizational, financing, delivery, and infrastructure systems, the results are relative. Furthermore, considering the significant goals of healthcare systems, such as increasing both the length and quality of life, accepting and understanding a certain level of inefficiency may reduce countries' efforts and willingness to change their healthcare systems. For example, developed countries generally have better access to healthcare and the capacity to provide higher-quality services. They often allocate more resources to healthcare financing and continually improve healthcare infrastructure. Since a country's level of healthcare status is directly associated with its level of development, even if it is classified as inefficient, a country may be

reluctant to reduce healthcare expenditures or allocate additional resources to the healthcare system due to its impact on improving healthcare status.

The effectiveness of health systems is critical for societies' access to and quality of health services. However, the role of factors such as publication bias in the publication process and interpretation of the results of research in the literature should not be neglected. The aim of this paper is to draw the attention of researchers to such a risk area. For this purpose, a bibliometric analysis of the studies that comparatively examine the health system performances of countries in the last three decades years has been conducted and the results obtained are discussed. Such a perspective may help health policymakers, healthcare providers, and researchers to obtain more accurate and reliable information on the performance of health systems and to learn better lessons from the *experiences of other countries*.

A Bibliometrics Analysis on Health System Performance Measurement

A total of 1148 studies between the years 1992-2023 (the first publication on health system performance measurement appeared in 1992) were reached and a bibliometric analysis was carried out by using the keywords provided by the authors of these studies. Those studies using the keyword "health system performance measurement" in all fields and published in English in the Web of Science database were stored in Rayyan to evaluate the adequacy of the studies. R-biblioshiny, which is an open-source program, was used for bibliometric analysis.

A significant portion of the studies analysed were produced by authors associated with the United States of America (USA) and many of these studies were published in Medical Care, International Journal of Quality in Health Care, and BMC Health Services Research. The relationship between performance and quality is an undeniable fact and this is also reflected in the studies. Although more general performance criteria are used to measure the performance of the country's overall health system, quality, patient satisfaction, and the state of primary health care services in countries will continue to be the subject of constant debate. In addition, analysis methods such as data envelopment analysis and balanced scorecard used in performance measurement seem to be the main themes discussed in these studies (Figure 1).

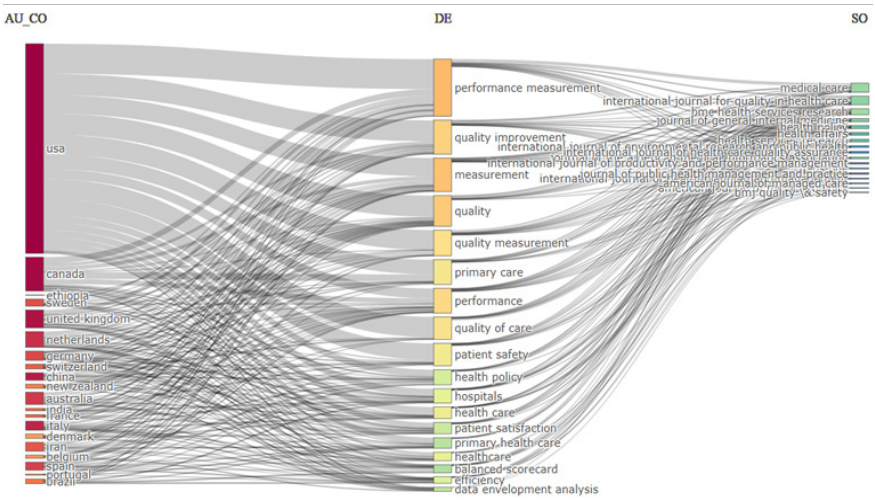

Figure 1. Three fields plot showing the country of correspondent author (AU_CO), author's keywords (DE), and journals publishing studies (SO)

The word cloud in Figure 2 clearly shows that quality management and improvement, which are important components of performance, are frequently used in health system performance evaluation studies. However, the visibility of concepts such as patient safety and satisfaction among the frequently used words suggests that patient-oriented measurement methods gain more importance in efficiency measurement studies.

Figure 2. Keyword frequencies used by the authors

Figure 3 shows the evolution of studies on health system performance over the years based on the keywords used by the authors. Among these topics, it seems the keyword "performance measurement", together with "quality measurement and improvement", has been increasing its importance among the most frequently studied topics over the years. Along with both of these topics, the data envelopment analysis technique, which is frequently used in technical efficiency measurement, is one of the main themes that continues to maintain its importance. In addition, machine learning seems to be one of the new topics that will be frequently discussed in performance measurement studies in the coming periods. Interestingly, well-being was found to be a topic that is no longer studied or is not often found in performance measurement studies.

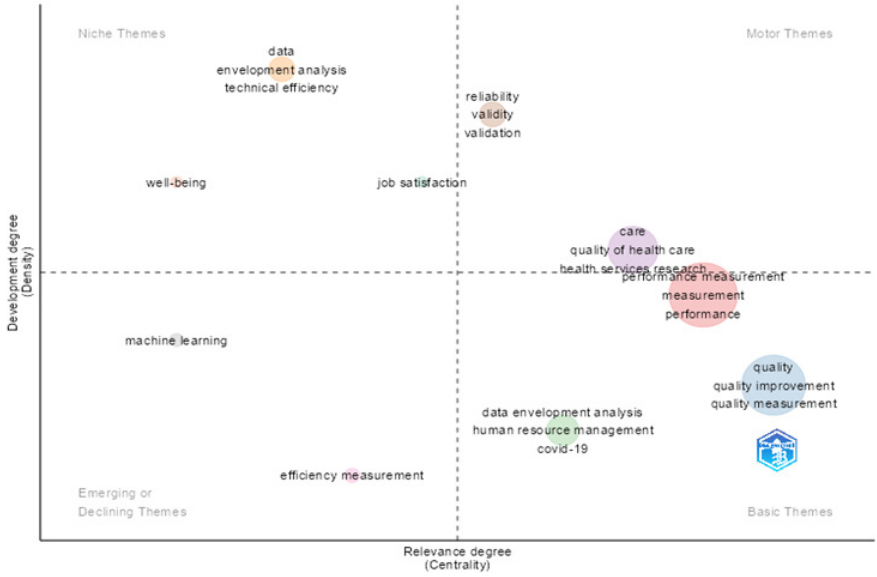

Figure 3. Evolution of issues related to health system performance

Looking at the evolution of topics over specific periods, Figure 4 reveals that studies on health system performance between 1992 and 2011 were more specific and about quality management, whereas the concept of performance measurement has become more inclusive and broader in the following years. It is important to mention that such a broad and inclusive concept may cause more specific and important concepts (patient safety or equity discussions) to be overlooked.

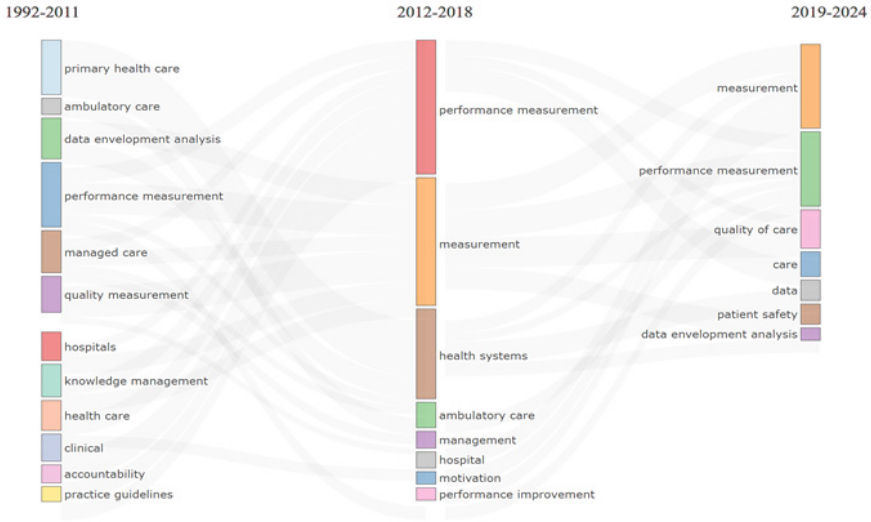

Figure 4. Evolution of study topics related to health systems by years

Comparison of Country Health Systems by Performance Levels

The results obtained through bibliometric analysis do not produce results on which countries are relatively more efficient or inefficient but rather provide some information on the areas and countries where the topics are concentrated and their evolution over the years. However, within the scope of this study, comparisons of countries in terms of health system performance results were also desired by evaluating full-text articles to see how Türkiye is good at performance level compared to other countries, and if there is publication bias in comparing countries either in selection of relevant inputs or output indicators or in using different measurement methods. Based on the evaluations of two researchers, 11 studies were analyzed carefully to get an idea on Türkiye's relative place and publication bias.

The expenditure data of 30 OECD countries were analyzed in the study of Castaldo et al. The results of the study found that the UK, Türkiye, Switzerland, Sweden, and Spain were among the least efficient countries. The most efficient countries were Australia, Austria, Belgium, Czech Republic, and Denmark. The most important point emphasized in the study is that if countries were fully efficient, they could use on average about 30-40% fewer resources to achieve the same results (Castaldo et al., 2020).

In a study by Ersoy and Aktaş, data from 37 OECD countries in 2020 were analyzed. They ranked the top five efficient countries as Australia, Austria, Belgium, Canada, and Chile. However, the USA, the UK, Türkiye, Switzerland, and Sweden were found to be the five least efficient countries (Ersoy & Aktaş, 2023). The study of Gavurova et al. (2021) used 2000, 2008, and 2016 data from OECD countries. The study used "the health-adjusted life expectancy" as one of the output variables and ranked the five least efficient countries as the USA, the United Kingdom, Türkiye, and Switzerland, and the five most efficient countries as Australia, Austria, Belgium, Canada, and the Czech Republic.

Ngami and Ventelou (2023) used the data of OECD countries by using stochastic frontier model (SFM), and Türkiye was found to be among the least successful countries like Mexico, Latvia, Lithuania, and Estonia. Şenel and Cengiz (2016) also analyzed the data of 29 OECD countries between 1997-2009 by using Bayesian Stochastic Frontier Analysis (BSFA) method, and they also listed Türkiye as one of the least successful countries. They found Australia, Greece, Korea, Iceland, and Mexico as successful countries.

In the study of Tchouaket et al. (2012), 2007 data from 27 OECD countries were analyzed. The data used in the study were evaluated in the dimensions of efficiency, productivity, and productivity based on a certain average value by classification method. For this reason, the results of the study were evaluated at different levels in three different groups. In the study, Canada, Denmark, Spain, Finland, and Greece were among the top five countries that were found to be successful in terms of efficiency. Germany, Australia, the USA, Luxembourg, and the Czech Republic were ranked among the least successful countries. Türkiye was not among the countries evaluated in this study.

The study by Çelik et al. (2017) used the data of OECD countries between 1995 and 2013 by using Output-Oriented DEA analysis. They used GDP per

capita, health expenditures per capita, literacy, and urbanization rates as input variables. Life expectancy at birth and out-of-pocket payment ratio relative to total health expenditures were selected as output variables. The authors discussed that the health outcomes of the countries changed over a period of 18 years, and Türkiye was found to be one of the efficient countries together with Belgium, New Zealand, Finland, Korea, and the United Kingdom. However, Russia, Azerbaijan, Armenia, Montenegro, and Lithuania were found to be the least efficient countries.

DISCUSSIONS AND CONCLUSIONS

This study provides a brief review of the current state of the literature on the evaluation and performance measurement of health systems. It is clear that different methods and criteria in relation to the situation in question are used in the literature to measure the efficiency of health systems and that these measures are generally based on inputs such as health expenditures, sociodemographic structure, health facilities, and number of personnel. Although the studies generally have different structures and types, they have a common structure in using inputs such as health expenditures, sociodemographic structure, health facilities that are important for health service delivery, number of personnel, and obtaining an evaluation result from the inputs used (Braithwaite, 2020; Reibling et al. 2019; Sevim & Aldogan 2024).

In the majority of the studies, it was found that methods such as Data Envelopment Analysis (DEA) were used extensively. It was also observed that the peak period of evaluation studies was between 2020 and 2024 and that there was a significant increase in the number of publications in this field, especially after 2016. Since different evaluation criteria and methods were used in the evaluation studies, it was determined that the rankings of the most successful countries also differed. This revealed that publication bias and the input parameters used may affect the evaluation results.

It is an obvious fact that different results are obtained with similar parameters and methods. Based on this fact it might be biased to discuss the studies have publication bias. However, this fact also recommends that the efficiency of health systems mainly depends on how you define and measure efficiency as well as the used variables. It also mainly depends on what you want to achieve.

Decision-makers, health policy makers, and even researchers may prefer to have different perspectives, use different measurement methods, and even limit the pool of countries to which they can compare. All of these choices may have scientific and justifiable justifications. In the end, all the results of analyses and classifications of efficient and inefficient countries may become relative. In such a situation, evaluating the performance of a health system may become a means for a health policymaker or decision-maker to justify his or her decisions or to improve the prestige of the country, rather than an objective point of view.

The first recommendation based on the findings of this study is that more research is needed to more accurately assess the performance of health systems. The second recommendation might be to create a platform where all health systems at the global level can engage and critically interact. In this context, it is important to adopt a more comprehensive and multifaceted approach to the evaluation of health systems, to establish standardized evaluation criteria and to achieve more robust results by combining different methods. Implementation of these recommendations will contribute to more accurate measurement and improvement of the effectiveness and efficiency of health systems.

Ethical Approval: Authors declare that the study presented in the manuscript entitled "A Critique of Publication Bias on Health System Effectiveness: A Bibliometric Analysis" does not require ethical approval.

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REFERENCES

Arah, O. A., Klazinga, N. S., Delnoij, D. M., Asbroek, A. T., & Custers, T. (2003). Conceptual frameworks for health systems performance: A quest for effectiveness, quality, and improvement. International Journal for Quality in Health Care, 15(5), 377–398. https://doi.org/10.1093/intqhc/mzg049

Atun, R., & Moore, G. (2021). Building a high-value health system. Oxford University Press.

Braithwaite, J., Tran, Y., Ellis, L. A., & Westbrook, J. (2020). Inside the black box of comparative national healthcare performance in 35 OECD countries: Issues of culture, systems performance and sustainability. Plos ONE, 15(9), e0239776. https://doi.org/10.1371/journal.pone.0239776

Brevik, E. C., Slaughter, L., Singh, B. R., Steffan, J. J., Collier, D., Barnhart, P., & Pereira, P. (2020). Soil and human health: Current status and future needs. Air, Soil and Water Research, 13, 1178622120934441. https://doi.org/10.1177/1178622120934441

Castaldo, A., Antonelli, M. A., De Bonis, V., & Marini, G. (2020). Determinants of health sector efficiency: Evidence from a two-step analysis on 30 OECD countries. Economics Bulletin, 40(2), 1651–1666.

Çelik, Y., Khan, M., & Hikmet, N. (2017). Achieving value for money in health: A comparative analysis of OECD countries and regional countries. The International Journal of Health Planning and Management, 32(4), e279–e298. https://doi.org/10.1002/hpm.2375

Ersoy, Y., & Aktaş, A. (2023). Efektywność systemów opieki zdrowotnej w krajach OECD–badanie za pomocą metody granicznej analizy danych. European Management Studies (wcześniej: problemy zarządzania-management issues), 20(4), 90-109. https://dx.doi.org/10.7172/1644-9584.98.4

Eze, N. D., Mateus, C., & Cravo Oliveira Hashiguchi, T. (2020). Telemedicine in the OECD: An umbrella review of clinical and cost-effectiveness, patient experience and implementation. PloS One, 15(8), e0237585. https://doi.org/10.1371/journal.pone.0237585

Gavurova, B., Kocisova, K., & Sopko, J. (2021). Health system efficiency in OECD countries: Dynamic network DEA approach. Health Economics Review, 11(1), 40. https://doi.org/10.1186/s13561-021-00337-9

Kruk, M. E., & Freedman, L. P. (2008). Assessing health system performance in developing countries: A review of the literature. Health Policy, 85(3), 263-276. https://doi.org/10.1016/j.healthpol.2007.09.003

Leary, V. A. (1994). The right to health in international human rights law. Health and Human Rights, 1(1), 24–56. https://doi.org/10.2307/4065261

Ngami, A., & Ventelou, B. (2023). Respective healthcare system performances taking into account environmental quality: What are the re-rankings for OECD countries? Health Research Policy and Systems, 21(1), 57. https://doi.org/10.1186/s12961-023-01005-6

Porter, M. E. (2010). What is value in health care?. The New England Journal of Medicine, 363(26), 2477–2481.

Reibling, N., Ariaans, M., & Wendt, C. (2019). Worlds of healthcare: A healthcare system typology of OECD countries. Health Policy, 123(7), 611–620. https://doi.org/10.1016/j.healthpol.2019.05.001

Sevim, F., & Aldogan, E. U. (2024). Evaluation of health systems performance of OECD countries using MOORA method. Journal of Health Management, 26(1), 172–183. https://doi.org/10.1177/09720634231215131

Spekle, R. F., & Verbeeten, F. H. (2014). The use of performance measurement systems in the public sector: Effects on performance. Management Accounting Research, 25(2), 131–146. https://doi.org/10.1016/j.mar.2013.07.004

Svalastog, A. L., Donev, D., Kristoffersen, N. J., & Gajović, S. (2017). Concepts and definitions of health and health-related values in the knowledge landscapes of the digital society. Croatian Medical Journal, 58(6), 431–435. https://doi.org/10.3325/cmj.2017.58.431

Şenel, T., & Cengiz, M. A. (2016). A bayesian approach for evaluation of determinants of health system efficiency using stochastic frontier analysis and beta regression. Computational and Mathematical Methods in Medicine, 2016. http://dx.doi.org/10.1155/2016/2801081

Tchouaket, É. N., Lamarche, P. A., Goulet, L., & Contandriopoulos, A. P. (2012). Health care system performance of 27 OECD countries. The International Journal of Health Planning and Management, 27(2), 104–129. https://doi.org/10.1002/hpm.1110