DIAGNOSIS OF THE HEALTH SYSTEM IN ROMANIA AND PERSPECTIVES ON THE SUSTAINABILITY AND FINANCING OF THE SYSTEM

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Abstract: Health system strengthening is a critical component of public health and national economic development. The development and investment in the complex infrastructure of the health system, starting from human resources, represented by the medical and sanitary personnel to the health infrastructure on which the delivery of specific medical assistance and public health interventions depends, is a necessity in a modern health system. A sustainable development of the health system helps to create a strong system necessary to face some of the biggest global challenges we face, but also to ensure universal health coverage and access to high-quality health care services. Health systems must be accessible, effective and able to adapt to future changes and challenges, facing pressures that force them to evolve, modernize and adapt to a constantly changing environment. This paper proposes to make a diagnosis of the health system in Romania, the analyzes being carried out on a database with specific indicators for the medical infrastructure for the period 2014-2021. The research analyzes the resources allocated to the sanitary system in Romania for the mentioned period, in terms of efficiency, effectiveness and economy. The results of the research revealed a direct link between the allocation of resources in the health system and the sustainability of the system. Showing that although shocks destabilize a health system, they also open an opportunity for transformation, for adaptation. This must lead to the development of policies with the potential for long-term transformation of the health system.

Keywords: Health System, Sustainability, Economy, Development, Health Infrastructure

JEL classification: I15, H51

1. Introduction

Health and healthcare systems are crucial issues for all entities, whether political or social, that engage in a social field and reflect a certain developing and social reality. In general, social reality is determined by the political system along with how society organizes itself. The healthcare system is an essential element of public health that, in theory, should suit the demands of the community. Because of its importance, complexity, high level of innovation, human, material, and financial resources, and vulnerability, healthcare is a fragile sector in every society (Păunică et al., 2017).

Improved health outcomes are dependent on effective interventions delivered by improved health systems (World Health Organization, 2010). Inconsistent distribution of healthcare resources, as well as differences in socio-economic status, may affect the access of certain categories of people to healthcare resources, resulting in disparities and inequalities in medical service use. To eliminate such gaps, stakeholders and political actors must place importance on the roles they play in organizing the health system, planning healthcare resources, and implementing health policy. The U.N. conference additionally highlighted the importance of universal health coverage in improving health, social cohesion, and long-term human and economic development (United Nations, 2012; Dumitrache et al., 2016).

Population health is a complex, social, and biological phenomenon that reflects the overall level and characteristics of people's health (Iacob et al., 2015). Access to healthcare is an important issue, particularly for the poor people. Many poor people who require medical care aren't getting it (Scutariu et al., 2022).

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At the national level, health sector finance affects service performance thus impacting the health of the people. Researchers have studied the transformations of the Romanian health system from numerous viewpoints, with studies mainly focusing on nature, intensity, and their effects on various areas of life quality or the population's health status. Health status is directly related to the population's living standards, the implications of lifestyle, working conditions, and the social-economic system in which they live. Currently, the population's health is affected by access to health services, which is influenced by a variety of external factors including genetic factors, environmental factors, economic development factors, socio-cultural factors, and so on. The Romanian health system depends on social insurance and attempts to provide insured people with equal and non-discriminatory access to a basic selection of healthcare services. As a result, the Ministry of Health is always concerned about access to healthcare (Iacob et al., 2015). Financial resources can have an impact on the performance of the healthcare sector since they are managed. Financial resources and their efficient administration are critical components of the healthcare sector's effective functioning and performance. In Romania, the GDP percentage dedicated to health is low, and an inefficient administration of existing resources results in a deficiency of medical employees, a lack of modern technology, and other factors that have a direct impact on the performance of these services.

Public healthcare systems attempt to satisfy the health needs of communities by delivering services that fulfill people's fundamental right to health. They help to maintain and restore good health and enable people to live independently by offering social care services (Pereno and Eriksson, 2020). There are several forms of public healthcare systems around the world, but they are all confronting significant changes and common issues. To begin, the healthcare sector is fragmenting as a result of expanding and developing financial cuts to deal with enormous budget deficits in government spending. This is causing independent hospitals to merge in order to increase cost efficiency and capitalize on economies of scale while providing larger services (Deloitte, 2016).

2. Literature review

The efficiency and effectiveness of the health system are the key components of national development, as population health directly influences labour productivity. A developing country is one in which every citizen has access to high-quality medical care. The fact that healthcare is one of the most complicated industries, enhancing its quality and performance is quite a challenge.

Health and well-being are important aspects of social and economic growth, as well as an essential concern in the lives of all individuals, families, and communities. Poor health, on the other hand, causes a loss of labor potential, dispersing resources over all sectors. Individually, health status can be considered an important component of human capital, allowing people to carry out their professional, domestic, and recreational activities, achieve their goals, and pursue what they want, at a social level, health is a critical component of human capital, contributing to good development. Health is currently causing increasing concern, both inside countries and across the regions (Tomaziu-Todosia, 2019).

Medical services, in comparison to other services, are accessed, required, and vital for anyone, implying a high expense for healthcare (Tomaziu-Todosia et al., 2020). The medical services provided by hospitals, clinics, family doctors, and healthcare establishments are known to as the health and the health services sector. This type of service is categorized, employs specialists based on the specifics of the problems and the volume of requests, and provides human and financial resources through which specialized institutions aim to reduce, prevent, remove, and limit the negative effects of situations caused by a poor state of health. The available financial resources and their administration make an important contribution in this regard (Tomaziu-Todosia et al., 2020).

Since the 1970s, when several studies began to underline the necessity for financial resources to support the population's health, the financing of the healthcare sector, as well as its performance, have proven to be crucial concerns. According to Walburg (Walburg et al., 2006), concepts of health

performance were created in the early 1980s, referring to the use of indicators to measure and enhance employee, team, and organizational performance.

In a globalized society, healthcare has become an increasingly complex concern of the political, social, and economic context. Today's healthcare systems have significantly greater demands (financial, demographic, and technological) to provide high-quality care to patients than in the past (Burcea et al., 2014).

At the same time with the evolution of the world, the growth of principles, and the economy, the foundations for the development and diversification of methods for disease prevention and treatment, as well as care for sufferers, were laid, with an emphasis on the importance of financial resources and the educational background of workers dealing with this domain. Thus, in the modern era, health services and healthcare represent a group of specialized activities developed and carried out within various specialized institutions or organizations belonging to a community, with the goal of solving various categories of problems that affect the personal and social lives of various groups of people, either directly or indirectly.

Healthcare in economies that are developing has a number of issues, the most pressing of which is a serious lack of healthcare professionals as well as inadequate healthcare facilities. In these countries, a sustainable healthcare service system model based on the development and improvement of both human resources and healthcare service quality is required (Ahmed and Shirahada, 2017). Global interest in sustainable healthcare has grown in recent years, and the move toward environmentally, fiscally, and socially viable health systems is seen as inevitable and important (Pereno and Eriksson, 2020). Because the quality of our environment influences public health, sustainability and healthcare are inextricably linked (Mehra and Sharma, 2021). Sustainability in healthcare is a multidisciplinary topic with origins in medical research, operations management, and the concept of sustainability itself.

In the context of healthcare, social sustainability refers to a healthcare system's ability to improve a community's quality of life and well-being (Mehra and Sharma, 2021). Occupational sustainability in healthcare services entails addressing the demands of evolving healthcare operations without compromising healthcare workers' health and well-being (Balka et al., 2006). A number of studies have contributed to the investigation of indicators of healthcare sustainability, including: patient satisfaction (Faezipour et al., 2011; Marimuthu et al., 2016; AlJaberi et al., 2017) promoting patient safety, security, and comfort (Jameton et al., 2002; Turcu et al., 2013; Celdran et al., 2018), quality of services (Lifvergren et al., 2009; Turcu et al., 2013; Celdran et al., 2018; Al Hammadi et al., 2018), confidence in the services (Smith et al., 2015); employee satisfaction (Pinzone et al., 2019; AlJaberi et al., 2017; Balka et al., 2006) covering workers education and training (Pinzone et al., 2019) as well as accessibility (Palozzi et al., 2020; Turcu et al., 2013; Celdran et al., 2018), service accessibility and affordability (Jameton et al., 2002; Shaw, 2017; Turcu et al., 2013; Celdran et al., 2018).

However, in order to change traditional healthcare into sustainable healthcare, an analysis of interconnections among sustainability indicators can be applied to determine the priority of actions to be followed. Concurrently, determining the leading indicators of sustainability is critical for effective healthcare policymaking (Marimuthu et al., 2016).

3. Methodology

This study analyzes Romania's public healthcare system, focusing on sustainability and financing, using data from 8 development regions for optimal allocation.

3.1. Study area

Romania is the eighth largest country in the European Union (EU), situated in the south-east of Central Europe, north of the Balkan Peninsula. Romania is represented in the study area through 8 development regions: 1. North-East Development Region, 2. South-East Development Region, 3. South-Muntenia Development Region, 4. South-West Oltenia Development Region, 5. West Development

Region, 6. North-West Development Region, 7. Center Development Region, and 8. Bucharest-Ilfov Development Region (Figure 1), which were statistically analyzed.

Figure 1: Study area localization - Romania

Source: https://www.naturalearthdata.com/

3.2. Statistical analysis
A traditional statistical study of the data distribution for eight development regions was carried out.

Table 1. The number of doctors per 100,000 people per development region
(number of doctors from public healthcare system)

YEAR / REGION	R1 - North-East Development Region	R2 - South-East Development Region	R3 - South-Muntenia Development Region	R4 - South-West Oltenia Development Region	R5 - West Development Region	R6 - North-West Development Region	R7 - Center Development Region	R8 - Bucharest-Ilfov Development Region
2021	174.75	133.14	75.25	179.7	258.28	243.08	232.5	397.24
2020	165.57	121.44	70.69	209.53	322.01	228.76	215.03	359.66
2019	165.97	108.7	71.67	163.82	227.34	219.89	204.43	333.85
2018	143.71	97.08	69.28	154.31	218.59	206.29	195	287.83
2017	137.51	92.78	65.46	147.46	205.33	192.59	182.13	291.79
2016	128.97	90.31	64.41	144.32	194.19	189.07	175.15	276.56
2015	123.67	89.65	64.32	137.4	184.66	183.04	165.28	277.02
2014	121.93	86.63	64.34	129.58	184.64	180.32	165.8	269.65

Source: Tempo online database of the National Institute of Statistics, 2023

3.2.1. Analysis of the trend for the number of doctors per 100,000 people per development region

The Holt-Winters exponential flattening method (without seasonal effects) was used to determine the trend. The Holt-Winters method involves a forecast equation (specific to the exponential method of flattening) and three flattening equations - one for the trend, one for the level and one for the seasonal component, with parameters \alpha, \beta and \gamma. If only trend determination is desired and only the first parameter is used (Chatfiels, 1988; Holt, 1957; Winters, 1960).

This statistical method is known to be unsuitable for prediction if there are specific cyclicities (which can be determined through spectral analysis).

DEVELOPMENT REGION	PREDICTED VALUE
THE TREND FOR R1 - NORTH-EAST DEVELOPMENT REGION	121.9301
THE TREND FOR R2 - SOUTH-EAST DEVELOPMENT REGION	86.63018
THE TREND FOR R3 - SOUTH-MUNTENIA DEVELOPMENT REGION	64.34
THE TREND FOR R4 - SOUTH-WEST OLTENIA DEVELOPMENT REGION	131.8318
THE TREND FOR R5 - WEST DEVELOPMENT REGION	186.6667
THE TREND FOR R6 - NORTH-WEST DEVELOPMENT REGION	180.3202
THE TREND FOR R7 - CENTER DEVELOPMENT REGION	165.8
THE TREND FOR R8 - BUCHAREST-ILFOV DEVELOPMENT REGION	269.6505

Source: Computed by author using database of the National Institute of Statistics, 2023

3.2.2. Time evolution analysis using the ARIMA method for the number of doctors per 100,000 people per region

The autoregressive integrated moving average (ARIMA) approach was used to analyze the data series (Negrea, 2006). The filtering method for non-stationary series was proposed by Box and Jenkins (Box and Jenkins, 1970) involves determining an autoregressive relation of order p for the differenced series of ordinal by and as a function of q noise values, denoted ARIMA(p,d,q):

$$\Delta_d X_n = \sum_{i=1}^p a_i X_{n-i} + \sum_{j=1}^q e_{n-j}$$

where:

$$\Delta_1 X_n = X_n - X_{n-1}$$

and

$$\Delta_d X_n = \Delta_{d-1} X_n - \Delta_{d-1} X_{n-1}$$

The parameters p,d,q are determined by different statistical methods, the most used is based on Akaike's Information Criterion - AIC (Akaike, 1974):

$$AIC(p,d,q) = -2 Log(L) + 2(p + d + q + 1)$$

Where L is the likelihood function, in fact, for white-gaussian noises, it reduces to N Log(\sigma), N - the number of observations and \sigma, the standard deviation of the noise. The optimal ARIMA(p,d,q) model is obtained for the smallest value of AIC, for p,d,q taking positive (finite) integer values. In addition to these parameters, model coefficients will be determined by the method of least squares or various algorithms, for example Durbin's algorithm or methods based on the Yule-Walker equations (Negrea, 2006).

An optimization of the ARIMA model was performed using Akaike's informational reader, for integer values between 0 and 4 (for 8 values no values greater than 4 are recommended). The graph shows the rhomb's approximate projected integer value written below its position.

DEVELOPMENT REGION	OPTIMAL MODEL	PREDICTED VALUE	EQUATION FOR THE MODEL:
PREDICTION FOR R1 - NORTH-EAST DEVELOPMENT REGION	ARIMA(2,1,0)	175.6864	$\Delta X_n = 0.1248 X_{n-1} + X_{n-2} 0.5236$
PREDICTION FOR R2 - SOUTH-EAST DEVELOPMENT REGION	ARIMA(2,0,1)	144.6234	$X_n = 2 X_{n-1} + 2 X_{n-2} + 0.238 e_{n-1} -53.5994$
PREDICTION FOR R3 - SOUTH-MUNTENIA DEVELOPMENT REGION	ARIMA(1,1,0)	76.27382	$\Delta X_n = 0.2245 X_{n-1}$
PREDICTION FOR R4 - SOUTH-WEST OLTENIA DEVELOPMENT REGION	ARIMA(1,1,1)	192.143	$\Delta X_n = -0.6030 X_{n-1} + 0.3176 e_{n-1}$
PREDICTION FOR R5 - WEST DEVELOPMENT REGION	ARIMA(4,0,0)	285.3987	$X_n = 0.8325 X_{n-1} -0.0040 X_{n-2} + 0.8275 X_{n-3} -0.9973 X_{n-4} + 220.2382$
PREDICTION FOR R6 - NORTH-WEST DEVELOPMENT REGION	ARIMA(1,1,0)	252.8411	$\Delta X_n = -0.4255 X_{n-1}$
PREDICTION FOR R7 - CENTER DEVELOPMENT REGION	ARIMA(3,0,2)	240.9924	$X_{n} = 1.3175 X_{n-1} + 0.2638 X_{n-2} -0.6442 X_{n-3} -1.7941 e_{n-1} + 0.9999 e_{n-2} + 226.5951$
PREDICTION FOR R8 - BUCHAREST-ILFOV DEVELOPMENT REGION	ARIMA(2,2,1)	430.4775	$\Delta\Delta X_n = 0.3003 X_{n-1} + 0.6726 X_{n-2} -0.9339 e_{n-1}$

Source: Computed by author using database of the National Institute of Statistics, 2023

4. Results and discussions

Improving public health and promoting social equity in health begin with assuring equal access to health services for all members of society. This sector must be available in both urban and rural locations. Hospital quality and performance must be consistent across the country, as well as meet European standards.
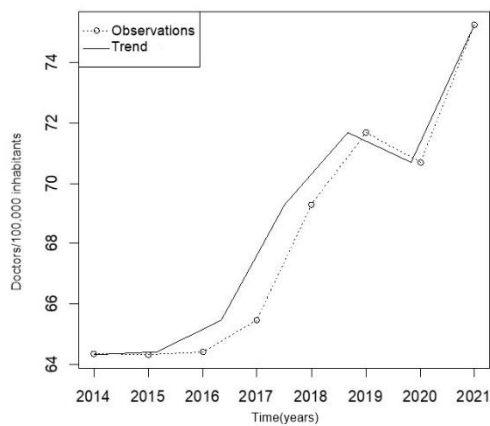
Figure 2: Trend analysis per development region in Romania
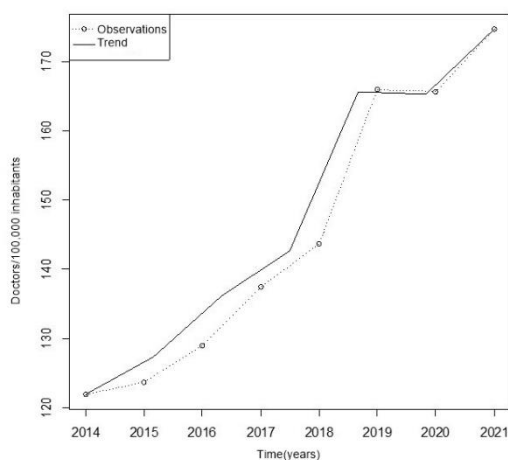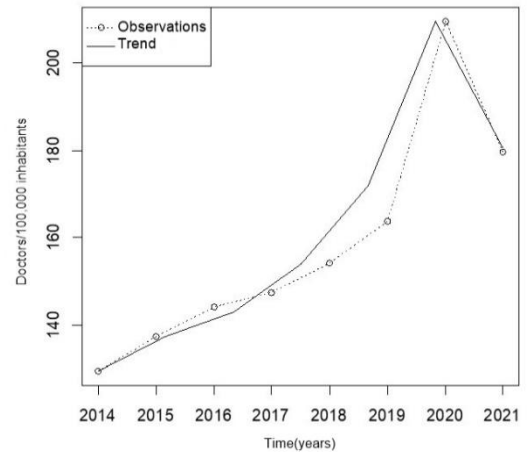

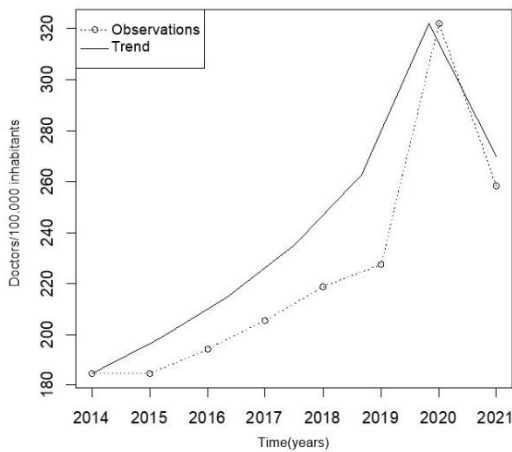The trend for Development Region 1 - North-East Development Region
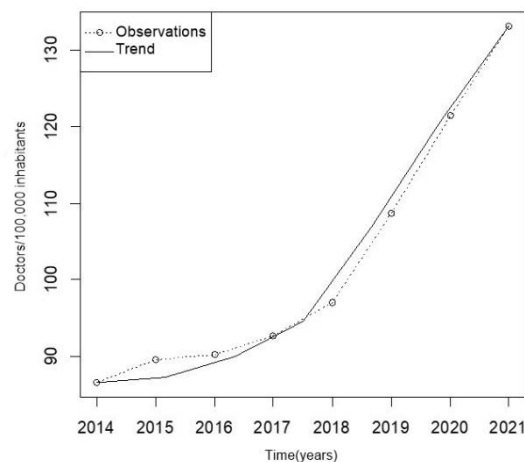
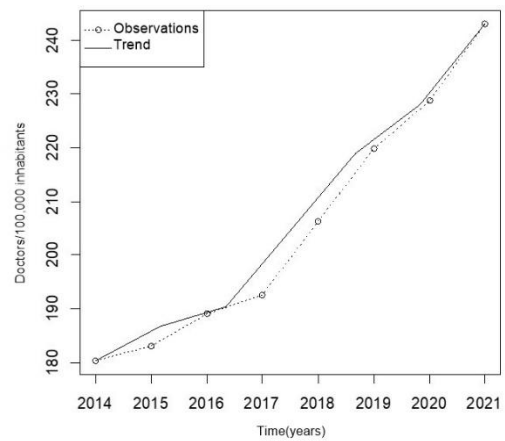The trend for Development Region 2 - South-East Development Region

The trend for Development Region 3 - South-Muntenia Development Region
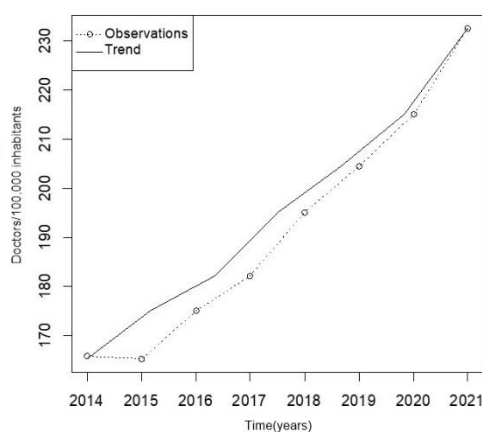

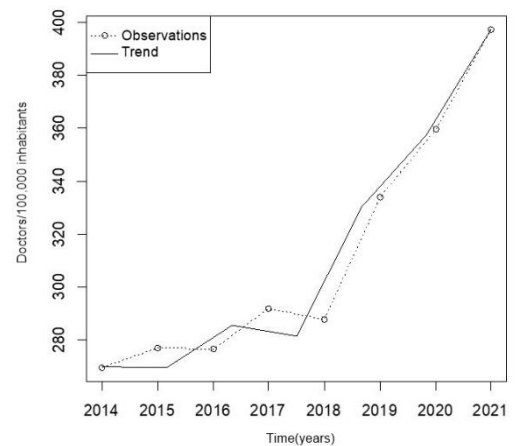The trend for Development Region 4 - South-West Oltenia Development Region

The trend for Development Region 5 - West Development Region

The trend for Development Region 6 - North-West Development Region

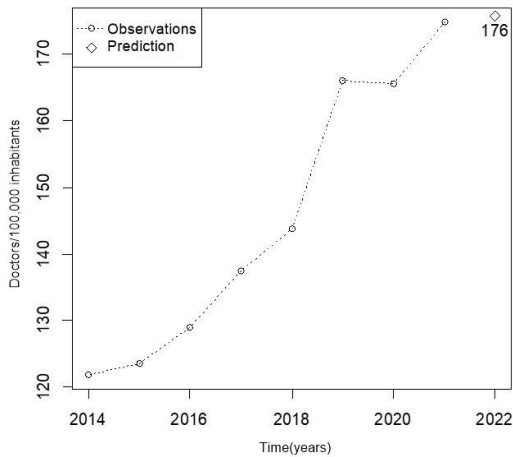The trend for Development Region 7 - Center Development Region

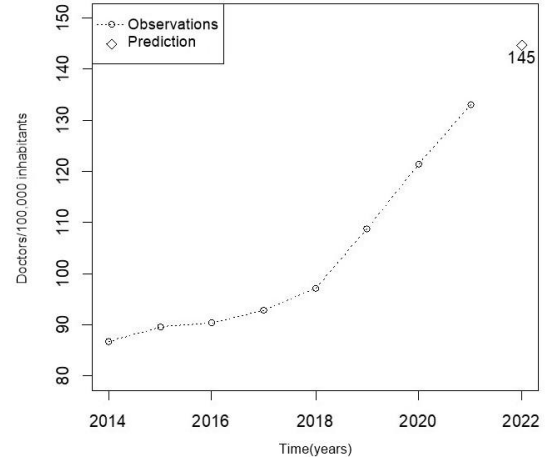The trend for Development Region 8 - Bucharest-Ilfov Development Region

Source: Computed by author using database of the National Institute of Statistics, 2023

Roughly speaking, we have an ascending trend for all regions, with mentioning that Region 4 - South-West Oltenia Development Region and Region 5 - West Development Region register a descending trend since 2020.
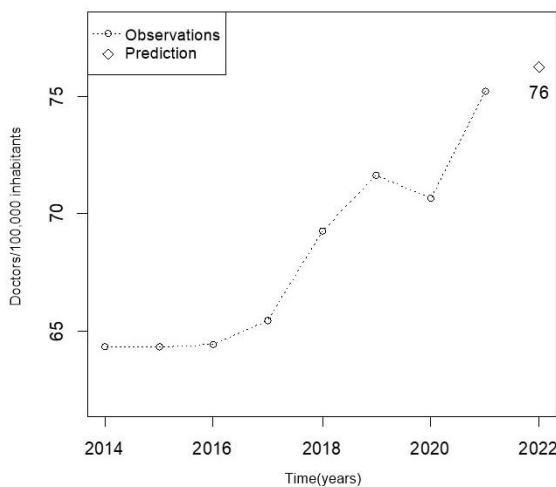
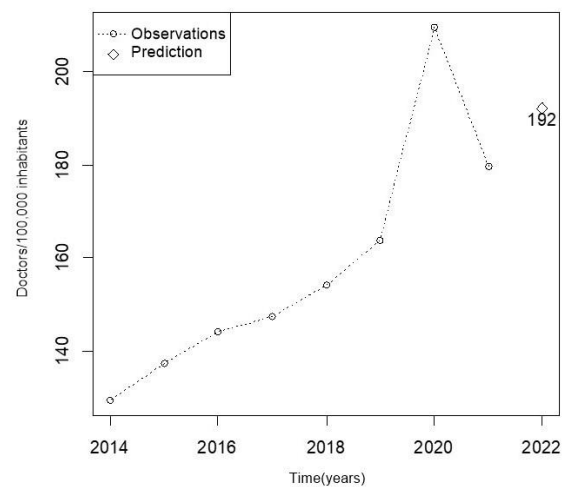**Figure 3: Prediction analysis per development region in Romania**

The prediction for Region 1 - North-East Development Region
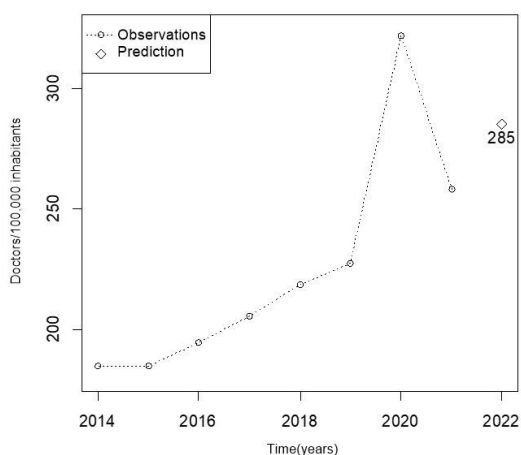

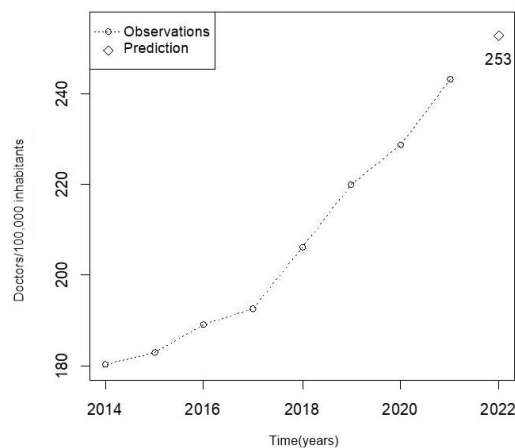The prediction for Region 2 - South-East Development Region

The prediction for Region 3 - South-Muntenia Development Region
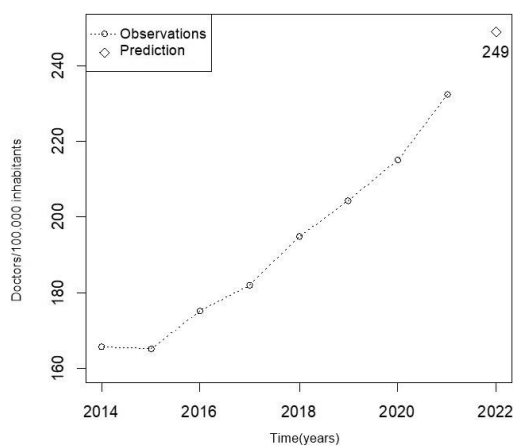

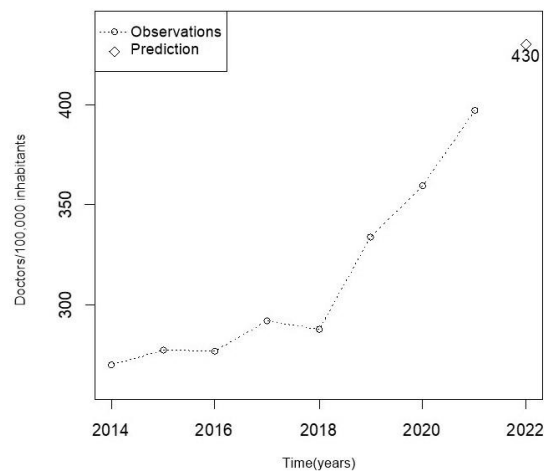The prediction for Region 4 - South-West Oltenia Development Region

The prediction for Region 5 - West Development Region

The prediction for Region 6 - North-West Development Region

The prediction for Region 7 - Center Development Region

The prediction for Region 8 - Bucharest-Ilfov Development Region

Source: Computed by author using database of the National Institute of Statistics, 2023

It can be seen that the same conclusions apply as in the previous section.

Public expenditure on healthcare and long-term care is expected to rise as a result of high levels of public spending and debt in most nations, demographic pressures, and technological developments. Today, policymakers at the EU and national levels have acknowledged the need to make public health systems more effective, accessible, and resilient.

One of the key objectives of health policy is to achieve a high level of population health through equitable distribution of healthcare services (Wilkinson and Marmot, 2003). This is essential because health conditions employment, which contributes to a state's economic growth. Health policies influence health at both the individual and community levels. The state intervenes in people's economic and social activity through public policies, changing the identified reality in a direction dictated by civil society's requirements.

The performance of the public health sector as a whole, as well as the funding and administration of its resources, are of general interest, as these characteristics are reflected in the health of the people.

Sustainable healthcare is taking concrete form, though in a fragmented manner, in local and international policies that aim to encourage greater sustainability of healthcare systems (Jamieson, Wicks and Boulding, 2015; Richardson et al., 2014; Walker and Brammer, 2009), as well as in the numerous organizations that promote a sustainable approach to the sector. At the European level, healthcare systems are attempting to ensure that economic constraints do not compromise universal coverage, equal access, and finance (Thomson, Foubister and Mossialos, 2009).

As a result, the European focus on sustainable healthcare is founded on an economic paradigm, beginning with a new concept of health system resilience that aims to respond to contemporary challenges while also ensuring high-quality care in the future (European Steering Group on Sustainable Healthcare, 2015).

5. Conclusions

The performance level of the Romanian healthcare system contributes significantly to the overall health of the people, and compliance with European legislation is required. Because the level of spending for this sector is reflected in performance, a larger GDP proportion devoted to health is required. The functioning of the health sector as an entire entity, as well as the funding and administration of its resources, are of general interest, as these features are reflected in the population's health status.

A public health system can become efficient in difficult situations by integrating into developed-country health systems, understanding the phenomenon that determines difficult situations, and threats that lead to a regression of public medical services, and taking decisive actions in selecting a high-performance system, which must be developed through medium or long-term programs and projects. The priorities of the public health system can be found in defined government programs, in pursuing an increase in the population's accessibility to medical services, ensuring the quality of the medical act, medical safety, developing health policies aimed at revising the financing system, exercising strict control over health expenses, implementing transparent projects in the decision-making management of health units, and operation.

The observance of the principles of solidarity in the first place and subsidiarity in the second place, for the collection of the necessary funds, as well as the free choice of each insured person of the family doctor or specialist, of the health center, of the unit hospital, is the foundation of a sustainable public health system. The change from a centralized to a decentralized health system was a reason for understanding the transparent health system, which was legally constituted for the benefit of the community (Toma, 2022).

The health of the population is the foundation for societal development. Thus, approaches to factors impacting health are numerous, beginning with existing health problems and progressing to the state of the environment, socioeconomic development, or political governance. To provide health protection, governments around the world use public policy to incorporate health into development projects.

Health policies that are built on the ideas of participation and empowerment of all stakeholders generate tangible advantages. These include establishing better conditions for health, enhancing health care, promoting independent living, and encouraging healthier lifestyle choices.

Healthcare systems around the world must respond to issues, and healthcare stakeholders must work together to meet these new societal demands and transition to more sustainable systems. Expenses and patient numbers will inevitably rise, and healthcare must strive to be more effective, efficient, and equitable for all people by controlling spending, improving and implementing available technology, and engaging patients in prevention and self-care.

Global interest in sustainable healthcare is expanding, and the transition to economically, socially, and environmentally sustainable health systems is seen as essential.

References

- Ahmed, T., Shirahada, K. (2017). Toward a sustainable healthcare service system in a limited resource context: Case study of Bangladesh rural advancement committee's healthcare system. *International Journal of Healthcare Management* https://doi.org/10.1080/20479700.2017.1389512
- Akaike, H. (1974). A new look at the statistical model identification. *IEEE Transactions on Automatic Control*, *19*(6), 716-723.
- Al Hammadi, F., Hussain, M Sustainable organizational performance: a study of health-care organizations in the United Arab Emirates. (2018). *International Journal of Organizational Analysis*.
- AlJaberi, O.A., Hussain, M., Drake, P.R. (2017). A framework for measuring sustainability in healthcare systems. *International Journal of Healthcare Management*.
- Balka, E., Messing, K., Armstrong, P. (2006). Indicators for all: including occupational health in indicators for a Sustainable healthcare. *System. Policy Practice Health Safety*, *491*, 46-61.
- Box, G.P., Jenkins, G. (1970). Time Series Analysis: Forecasting and Control. San Francisco: Holden-Day.
- Burcea, M., Toma, S.G., Papuc, R.M. (1970). Patients' satisfaction with the health care system in the age of globalization: the case of Romania. *Transylvanian Review of Administrative Sciences* Special Issue, 5-20.
- Celdran, A.H., Perez, M.G., Clemente, F.J.G., Perez, G.M. (2018). Sustainable securing of medical cyber-physical systems for the healthcare of the future. *Sustainable Computing: Informatics and Systems*, *234*, 1-28.
- Chatfiels, C., Yar, M. (1988). Holt-Winters forecasting: some practical issues. *The Statistician*, *37*, 129-140.
- Deloitte Report (2016). *Global health care outlook. Battling costs while improving care*. Available at https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Life-Sciences-Health-Care/gx-lshc-2016-health-care-outlook.pdf, last accessed 2023/06/02.
- Diaconu, D.C., Andronache, I., Pintilii, R.D.; Brețcan, P., Simion, A.G., Drăghici, C.C.; Gruia, A.K., Grecu, A., Marin, M., Peptenatu, D. (2019). Using fractal fragmentation and compaction index in analysis of the deforestation process in Bucegi Mountains Group. *Romania. Carpathian Journal of Earth and Environmental Sciences*, *14*, 431-438. https://doi.org/.26471/cjees/2019/014/092
- Dumitrache, L., Nae, M., Dumbrăveanu, D., Simion, G., Suditu, B. (2016). Contrasting Clustering in Health Care Provision in Romania: Spatial and Aspatial Limitations, *International Conference – Environment at a Crossroads: SMART approaches for a sustainable future, Procedia Environmental Sciences*, *32*, 290-299.
- European Steering Group on Sustainable Healthcare. (2015). Acting together: A roadmap for sustainable healthcare.
- Faezipour, M., Ferreira, S. (2011). Applying systems thinking to assess sustainability in healthcare system of systems. *International Journal of System of Systems Engineering*, *2*(4), 290-308.
- Holt, C.C. (1957). Forecasting Trends and Seasonals by Exponentially Weighted Averages, Carnegie Institute of Technology, *Pittsburgh Office of Naval Research Memorandum*, *52*.
- Iacob, A.I., Cristache, S.E., Ungureanu, D. (2015). The analysis of the main macroeconomic indicators which characterize the Romanian health system, 4th World Conference on Business, Economics and Management, WCBEM, *Procedia Economics and Finance*, *26*, 522-527. https://doi.org/10.1016/S2212-5671(15)00882-5

- Jameton, A., McGuire, C. (2002). Toward sustainable health-care services: principles, challenges, and a process. *International Journal of Sustainability in Higher Education* 3(2), 113-127.
- Jamieson, M., Wicks, A., Boulding, T. (2015). Becoming environmentally sustainable in healthcare: An overview. *Australian Health Review*, *39*(4), 417-424.
- Lifvergren, S., Huzzard, T., Docherty, P. A. (2009). Development Coalition for Sustainability in Health Care. In P. Docherty, M. Kira, & A. B. R. Shani (Eds.), Creating Sustainable Work Systems: Developing Social Sustainability Routledge.
- Mehra, R., Sharma, M.K. (2021). Measures of Sustainability in Healthcare. *Sustainability Analytics and Modeling*, *1*, 100001. https://doi.org/10.1016/j.samod.2021.100001
- Negrea, R. (2006). Modelare statistica si stochastica. Aplicatii in inginerie si economie, Ed. Politehnica (in Romanian).
- Palozzi, G., Schettini, I., Chirico, A. (2020). Enhancing the sustainable goal of access to healthcare: findings from a literature review on telemedicine employment in rural areas. *Sustainability*, *12*(8), 3318.
- Păunică, M., Pitulice, I.C., Ștefănescu, A. (2017). International Migration from Public Health Systems. Case of Romania. *Amfiteatru Economic*, *19*(46), 742-756.
- Pereno, A., Eriksson, D. (2020). A multi-stakeholder perspective on sustainable healthcare: From 2030 onwards. *Futures*, *122*, 10260. https://doi.org/10.1016/j.futures.2020.102605
- Pinzone, M., Guerci, M., Lettieri, E., Huisingh, D. (2019). Effects of green training on pro-environmental behaviours and job satisfaction: evidence from the Italian healthcare sector. *Journal of Cleaner Production*, *226*, 221-232.
- Richardson, J., Grose, J., Doman, M., Kelsey, J. (2014). The use of evidence-informed sustainability scenarios in the nursing curriculum: Development and evaluation of teaching methods. *Nurse Education Today*, *34*(4), 490-493.
- Scutariu, M.M., Budală, D.G., Davidescu, A., Romanec, C., Ciupilan, C., Druguș, D. (2022). The performance of the Romanian health system in the European context. *Romanian Journal of Oral Rehabilitation*, *14*(4).
- Shaw, K.M. (2017). Leveraging affordable innovation to tackle India's healthcare challenge. *IIMB Management Review*.
- Smith, H.K., Harper, P.R. (2015). Can you model growth of trust? A Study of the Sustainability of a rural community health centre in North India. *Journal of Simulation*, *9*, 170-181.
- Thomson, S., Foubister, T., Mossialos, E. (2009). Financing health care in the European Union: Challenges and policy responses. *Brussels: European Observatory on Health Systems and Policies*.
- Toma, G. (2022). The resources of the public health system for Romania to be a healthy and stable state. *Annals of the „Constantin Brâncuşi" University of Târgu Jiu*, *Economy Series*, *5*.
- Tomaziu-Todosia, M. (2019). The Importance of Public Health Policies in the Social - Economic Development of Romania. *Postmodern Openings*, *10*(2), 162-172. https://doi.org/10.18662/po/78
- Tomaziu-Todosia, M., Mihalache, I.C., Apetroi, F.C. (2020). Financial resources - an important aspect of increasing the performance of the health care sector in Romania. *CES Working Papers*, *XII*(1).
- Turcu, C.E., Turcu, C.O. (2013). Internet of Things as Key Enabler for Sustainable Healthcare Delivery. *Procedia: Social and Behavioral Sciences*, *73*, 251-256.
- United Nations. (2012). *Rio +20: General Assembly resolution, Health and population*

- Wahlberg J, Vaarala O, Ludvigsson J; (2006). ABIS-study group. Dietary risk factors for the emergence of type 1 diabetes-related autoantibodies in 21/2 year-old Swedish children. *British Journal of Nutrition. Cambridge Core*, *95*(3), 603-8. https://doi.org/10.1079/bjn20051676