

## Article

# Concern or Opportunity: Implementation of the TBL Criterion in the Healthcare System

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**Abstract:** This study systematically investigated the extent and application of sustainability practices in the healthcare system by thoroughly examining existing research conducted on healthcare-related issues within the framework of sustainability. The review primarily focuses on three key conceptual aspects: the social, economic, and ecological dimensions of sustainability. PLS-SEM (partial least squares structural equation modeling) and MGA (multigroup analysis) for private and state healthcare organizations were applied in the study. The results show that there exists a robust positive relationship between the environmental dimension and the social dimension of health organizations' outcomes, and the environmental dimension of the sustainability of healthcare organizations achieves a positive relationship with the economic dimension, while this relatedness is absent in the case of private healthcare organizations, for two perspectives: internal processes and learning. Moreover, the social dimension is identified as a factor that strengthens the impact of the environmental dimension on the economic dimension of health organizations' outcomes. The results can be used in the development of policies and regulations, and for defining the strategies of healthcare organizations.

**Keywords:** healthcare system; healthcare organization; TBL; environmental; social; economic



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## 1. Introduction

Considering the significant environmental, social, and economic challenges, coupled with the increasing body of evidence highlighting practical solutions and the growing momentum towards sustainability, the timing is opportune to initiate a comprehensive discussion on establishing and sustaining environmentally responsible healthcare facilities. According to Høgevoid and Svensson [1], “sustainability should be viewed as a journey and not a fixed destination”. The concept of sustainability is indeed central to current environmental thinking, and it encompasses a range of perspectives and interpretations [2]. The term “sustainability” generally refers to the ability to meet present needs without compromising the ability of future generations to meet their own needs. It involves finding a balance between environmental, social, and economic factors to ensure long-term well-being and the preservation of natural resources. Elkington [3] initially proposed the important conceptualization of sustainability in contemporary conditions, suggesting that economic prosperity, environmental quality, and social justice constitute three main value-creating dimensions, and labeled them the triple bottom line (TBL) of 21st century business. This diversity of understanding is both a challenge and an opportunity. The current challenges to achieving sustainability are analyzed by delving into a diverse range

of interdisciplinary topics. These subjects explore the intricate relationships between economic, social, and environmental systems, thereby contributing to the existing uncertainties surrounding sustainability [4].

Healthcare systems worldwide are undergoing significant transformations in public policies aimed at improving the quality of healthcare services for their populations. However, many of these systems face challenges that limit inclusivity and result in discrepancies that directly impact those who rely on them [5]. Unsustainability is a major issue affecting healthcare systems in terms of their environmental, social, and economic impacts. Consequently, there is a pressing need to explore more sustainable approaches to enhance healthcare systems globally, which are confronted with the dual challenges of increasing demands and diminishing resources. To ensure the sustainability of healthcare systems, four key physical system conditions must be met: the extraction, accumulation, or depletion of materials should not exceed their management capacity, and the system should fundamentally meet human needs [6]. Further, healthcare is an open system that must be adaptable to changes in order to sustain itself effectively. The advent of the green economy and sustainable development theory has brought the topic of “green” to the forefront.

Sustainability is of primary importance to organizations [7]. Srebro et al. [8] emphasized that numerous research studies have been conducted on the sustainability performance and the financial performance of large corporations. Tornjanski and Čudanov [9] underlined the perspective of organizational empowerment of the sustainable future in their study. Mirčetić et al. [10] emphasized that uncertainty is the only certainty in the modern business environment.

This paper aims to reveal the scope and application of sustainability practices in the healthcare system, predominantly focusing on three key conceptual aspects: sustainability’s social, economic, and ecological dimensions. The objective of the paper is to thoroughly analyze the relationship between study’s the variables applied to healthcare-related issues within the framework of sustainability using PLS-SEM (partial least squares structural equation modeling) and MGA (multigroup analysis) for private and state healthcare organizations.

This paper is structured as follows. First, a literature review is presented. The research method and research design are described. The empirical findings are presented. Implications of the economic, social, and environmental categories and constituents of business sustainability are discussed. Research conclusions, recommendations for future research, and limitations are presented.

## 2. Literature Review

While the primary goal of healthcare systems is to protect and improve public health, it is essential to consider the unintended consequences that can arise from their operations. Healthcare systems are socially and environmentally impactful structures that can cause negative side effects on people’s health and the context [11]. The healthcare industry’s contribution to pollution and greenhouse gas (GHG) emissions, as well as its consumption of natural resources, is a significant concern and has been recognized as a challenge in the context of sustainability and climate change. For example, the health sectors of the United States, Australia, England, and Canada are estimated to emit a combined 748 million metric tons of carbon dioxide equivalents annually [12].

There has been a significant shift in healthcare needs from primarily treating acute conditions to primarily treating chronic conditions [13]. This shift reflects changes in demographics, lifestyle patterns, and advances in medical knowledge and technology [13]. The current literature highlights a clear and pressing need for in-depth exploration and analysis of service innovations in healthcare [14]. A sustainable health service is characterized by an organizational system that possesses the long-term capacity to mobilize and allocate adequate resources to meet the needs of individuals or the public in terms of healthcare activities [15]. The increasing consumer awareness of the importance of health and quality of life has led to a growing demand for high-quality healthcare services [16]. As service

organizations, such as those in the healthcare sector, experience growth, they encounter various challenges that have the potential to limit their progress; these include the growing cost of operations, stricter environmental regulation and legislation, and growing competition [17].

Magill and Prybil [18] called for organizational transparency in the communities served by healthcare organizations. The caliber of governance in healthcare organizations is under intense examination [19]. There is an acknowledgement of the need for research-based findings to support actionable knowledge that will enhance governance in hospitals and health systems. Boards of directors and executives of hospitals and health systems need to be more accountable in a manner that is evident to the populations they serve [20]. The goal should be to nurture public trust in healthcare organizations [21]. Boards of directors with their institutional management teams have complex responsibilities, as they are responsible for overseeing a complex array of structures, processes, outcomes, and external regulations [18]. Magill and Prybil [18] point out that healthcare must be resilient in the face of so many challenges. One example was the recognition of the need to identify and nurture the careers of high-performing women in healthcare, which led to the recommendation of a strategic approach to talent that included assessing the leadership pipeline and focusing on development and retention [22]. There is a growing awareness among boards and CEOs of nonprofit healthcare systems of the need for a consistent approach to governance ethics [18]. A survey of 1000 board chairs indicated that less than half rated oversight of patient care quality as a top priority, with only a minority of board members having any formal training in this area [23]. The level of clinical services in hospitals and health systems needs to be improved, especially from the perspectives of monitoring and improving clinical services [24–26]. Healthcare providers must respond accordingly to ensure appropriate care is delivered, with quality of care being foremost [27]. The connection between patient care quality and patient safety has been acknowledged for a long time [28]. The significance of patient safety is now well established in medical care [29]. A variety of approaches emerged to prevent errors in healthcare generally [30]. There will be no health service without a health workforce [31]. There are issues arising during this phase that are common across healthcare disciplines, and “the comprehensive orientation process offers contributions to newly hired nurses’ and physicians’ transition into the practice environment” [32]. Health service human resources are key determinants of health service performance [33].

Indeed, approaching sustainability in healthcare from multiple perspectives is crucial. Sustainability in healthcare should consider the social, economic, environmental, and health-related dimensions [34]. Traditionally, healthcare administrators and facility managers have not placed a high priority on implementing eco-effective sustainability practices [35]. Sustainability is quickly becoming a business megatrend that organizations must prioritize to maintain their competitive edge. Sustainability aims to achieve a harmonious and optimized approach to environmental, social, and financial concerns [36]. The importance of implementing socially responsible practices in the healthcare industry is of utmost importance. The concern for the health of the Earth’s ecosystems highlights the need for healthcare institutions and practitioners to re-evaluate their practices, and mitigate or eliminate any harmful effects they may have. However, they also face the challenge of balancing their environmental responsibilities with their primary obligation to meet the immediate healthcare needs of patients [37]. The rise of industrialization has brought sustainability to the forefront as a critical concern in the global market. Neglecting sustainability issues within any organization can result in significant financial losses and damage to its market reputation. The healthcare sector needs to embark on a transformative journey to chart a new course that guarantees sustainable intergenerational health equity [38].

According to Jednak and Kragulj [39], “The concept of sustainable development is recognized as a prerequisite for the progress of humanity” (p. 5). The influence of sustainability practices on fostering business growth, particularly concerning the environment and the society, is a question that is increasingly attracting academic attention [8]. The question

of economic growth is inseparable from the consideration of renewable energy consumption [40]. The findings of Stamenović [41] indicate that the balanced activities of social value creation and commercialization of effects are the perception of the sustainability strategy of academics and management for the evaluation of business viability, and it is important to observe the structure of the board of directors according to various criteria [42].

According to this report, economic sustainability is identified as the most challenging aspect of the TBL approach (i.e., establishing three fundamental and most important factors instead of one), which recognizes sustainability accounting as a combination of environmental, social, and economic performance [43]. Enhancing social and economic sustainability within an organization has a direct correlation with fostering employee trust, which, in turn, results in heightened job satisfaction and various benefits for employees [44]. It is noteworthy that accounting standards of financial reporting include activities and methods that recognize, value, present, and disclose economic, social, and environmental impacts on the sustainability of a business entity [45].

In recent years, there has been a growing recognition of the social dimension, also known as “social sustainability”, as a crucial element of sustainable development. Previous research on sustainability has predominantly focused on environmental and economic aspects, with limited attention given to social considerations [46]. The simultaneous pursuit of economic, ecological, and social goals has emerged as a crucial necessity for firms operating in various industries and countries, as they strive to enhance sustainability in their practices [47]. In the last decade, social sustainability has gradually gained prominence within metropolitan politics, as it forms an integral part of the broader sustainability agenda [48]. According to Vallance [49], social sustainability encompasses three key components. The first component, known as “development social sustainability”, entails meeting fundamental needs, promoting equity among generations, and addressing other related aspects. The second component, referred to as “bridge sustainability”, concentrates on modifying behaviors to achieve environmental objectives in terms of the biophysical aspects. The third component, known as “maintenance sustainability”, pertains to social acceptance and determining what can be sustained in social terms. The foundation of organizational sustainability and effectiveness lies in social sustainability, and its significance becomes even more critical for healthcare organizations due to its labor-intensive nature [50]. In addition to financial performance, companies strive to improve their environmental performance as well as their relationship with the community [8,10]. The integration of the “social” aspect into discussions on sustainable development occurred relatively late, as indicated by the existing literature [51].

Although a considerable amount of research has been carried out in the past, there are still gaps in the current body of literature related to the TBL criterion in the healthcare system. Previous studies of the healthcare system have already been concerned with the direct and particular relationship between the environmental dimension and the economic dimension of sustainability, as well as the association between the social dimension of sustainability and economic performance. The social dimension is mostly present in previous research through the analysis of specific human resource management practices and is viewed as an independent variable. Economic performance is integrally observed and acts as the dependent variable. In our study, the environmental dimension of sustainability was considered as the driver of the development of the social dimension of sustainability and economic performance, while the social dimension simultaneously emerged as a mediating variable. Additionally, the economic aspect of sustainability was assessed using four constructs that adhere to the balanced scorecard’s conceptual framework. To the best of our knowledge, the integrated view of the defined variables has not been presented in the existing studies, particularly concerning the national healthcare system.

## 2. Methodology

### 2.1. Participants and Procedure

The study was designed to focus on public and private healthcare organizations. Healthcare professionals in those healthcare organizations were identified as key informants for the observation of the constructs contained in the study. The sampling process was carried out using the convenience sampling method. The study involved healthcare professionals who are employed in healthcare organizations in Central Serbia, including Belgrade, the capital city. The survey was carried out between June and August of 2023. To prevent ethical concerns, we used informed written consent, which was placed on the first page of the electronic questionnaire. Potential respondents were first informed about the academic purpose of the research and were assured anonymity, which was additionally supported through an online approach to collecting responses. Furthermore, all participants were assured that their demographic data would be used exclusively for statistical analysis and would be strictly protected from access by any third party. The questionnaire did not contain questions related to highly sensitive personal data, which further protected the respondents. Respondents were politely asked to fill in the questionnaire, but completely voluntarily and according to their available time.

The invitation to participate in the research was distributed electronically to potential participants and contained a link leading to the first page of the electronic questionnaire. To increase the response rate, we followed a procedure that included two additional follow-up reminders that were also distributed electronically [52]. The first was sent two weeks after the initial invitation, and the second followed four weeks after the initial invitation to participate in the study. The sampling procedure was concluded with 290 completed questionnaires, of which 282 were included in the study as valid.

The analysis of the structure of the sample showed that healthcare professionals from private healthcare organizations as respondents represented 41.8%, while the rest (58.2%) were healthcare professionals from public healthcare organizations. Medical doctors, both generalist and specialist practitioners, nursing professionals, and pharmacists participated in the study. The questionnaire did not contain a question for the classification of their roles due to the assured anonymity and reliability, but education can provide clue of indication. An examination of descriptive statistics indicated that 69.5% of the respondents were female, whereas 30.5% were male. The structure of the sample according to age is classified as individuals under 30 years old, from 31 to 40 years old, from 41 to 50 years old, and over 50 years old, with the participation of 32.2%, 24.8%, 24.9%, and 18.1%, respectively. Respondents who hold a PhD account for 3.9%, followed by respondents with a Master's degree (16.7%), while respondents with a Bachelor's degree account for 33.4% of the sample, followed by respondents with a high school degree (16.3%), and respondents with a high school diploma (29.7%). The examination of the sample's structure revealed substantial diversification, indicating that it is feasible to proceed with sophisticated statistical analyses, and that the resulting outcomes will offer the necessary level of generality. This conclusion is well supported by the similarity with the structure of the total population of healthcare professionals in the healthcare system, which comprises 68% females and 32% males, while the participation of individuals under 35 years old, from 35 to 55 years old, and over 55 years old is 18.4%, 53.1%, and 28.5%, respectively [53].

### 2.2. Measurements

A structured questionnaire was employed to gather data related to the variables under study. The first part of the questionnaire contained statements related to independent variables. In the second section of the questionnaire, constructs comprising the dependent variables were assessed through statements. The two sections of the questionnaire were divided into two columns. Statements were listed in one column, and a measurement scale was presented in the second column. Respondents could rank all statements on a five-point Likert scale from "strongly disagree" (indicated by 1) to "strongly agree"

(indicated by 5). The third part of the questionnaire included questions related to the demographic characteristics of the respondents.

In developing the questionnaire, we followed the approach suggested by Amankwaa et al. [54], who argue the advantages of using variables and statements from previous studies. Relying on that approach, we started developing the questionnaire through a two-fold procedure. The first step included the analysis of previous research and measurement scales that were used to measure the variables we included in our study. We did not identify studies containing measurement scales with application to the healthcare industry; hence, we approached the adaptation of statements from other industries. In this way, we aimed to provide a good initial basis for the predictability of statements that would be used in the questionnaire. The second step was to translate the statement into the Serbian language and test the measurement scale in Serbian. For this purpose, a pilot study was conducted that included 30 respondents. Preliminary results showed that the measurement scales achieve good internal consistency, and that no additional rewording is necessary. The following measurement scales are included in the study:

**Environmental Dimension.** This variable was measured with seven statements originally developed by Hourneaux et al. [55] and Martens and Carvalho [56], and then additionally modified according to the specificity of the healthcare industry. This section includes statements such as “The consumption of sanitary materials, hygiene products and other materials in our healthcare organization is rational and controlled”, “The consumption of electricity in our health facility is rational with the application of energy-efficient solutions”, and “Our healthcare organization is involved in waste sorting and recycling programs”.

**Social Dimension.** This variable was observed with eleven statements such as “Our organization engages in philanthropic activities”, “Our healthcare organization does not deny any rights and privileges to employees because of their age, sex, race, community, religion, or nationality”, “Employees in our healthcare organization have opportunities to learn and improve their competencies”, and “Our organization adheres to clearly established anti-corruption rules”. The above statements were initially developed by Yasin et al. [57] and Hourneaux et al. [55], and have been used in sustainability studies in various industries.

**Economic Dimension.** The variable consists of four constructs that follow the conceptual framework of the balanced scorecard [58]. The construct related to the customer perspective consists of seven statements such as “Our healthcare organization provides on-time delivery service”, “The quality of services provided in our healthcare organization is better than in other institutions”, and “The implementation of new services/protocols are better than in other healthcare organizations”. The above statements were originally present in the studies conducted by Hourneaux et al. [55] and Lee et al. [59]. The construct related to the financial perspective includes statements that were initially developed by Hourneaux et al. [55] and Ling and Jaw [60]. Four statements were included in the measurement of this variable, such as “Our healthcare organization has strong cash flow” and “Our organization can reduce the cost of providing healthcare services”. The research conducted by Hourneaux et al. [55] and Lee et al. [59] set statements for the internal perspective. This construct consists of three statements, such as “Problems that arise are quickly resolved in our healthcare organization”. Finally, the learning perspective was measured using four statements [55], such as “Employees in our organization attend training and seminars for new treatment methods” and “Our healthcare organization rapidly adapts to changes in technology and innovation in healthcare”.

### 3. Results and Analysis

The partial least squares approach to structural equation modeling (PLS-SEM) was used to test the significance of the relationships between the variables included in the study. PLS-SEM is a method that utilizes a variance-based approach, unlike covariance-based SEM. It allows estimation of relationships in path models with latent variables and revelation of complex cause-effect association [61]. We chose this approach for at least two reasons. First, PLS-SEM showed excellent performance in working with non-normally distributed data,

as well as complex models [62]. Second, the implicit characteristics of the variables used in our study are strongly associated with the human resource management (HRM) discipline and management concept. Both these areas of research are excellently supported through the PLS-SEM approach [63,64], which was confirmed by numerous studies published in the previous period. Before starting the calculation procedure related to the PLS-SEM method, data preparation was undertaken. Excel tables were first used for this, and then SPSS version 23. The complex data set was then processed using SmartPLS 4.0 software, in which structural equation modeling was performed.

### 3.1. Measurement Model Assessment

Assessment of the measurement model began with confirmatory factor analysis to verify the required values for internal consistency reliability and convergent validity. The results of the confirmatory factor analysis for the proposed model are shown in Table 1. The values of Cronbach's alpha coefficient for all latent variables contained in the model are higher than the acceptable threshold [65]. Hair et al. [66] proposed a restraint value of 0.7 for composite reliability (CR), and all the constructs in the study exceeded this threshold. The observed indications imply that the measuring model used in this research has considerable internal consistency. Convergent validity is assessed through consideration of the Average Variance Extracted (AVE), which should be greater than 0.5 to indicate that the construct in the model accounts for over 50% of the variance exhibited by its items [67,68]. The AVE for all constructs falls within the range of 0.590 to 0.779, thus meeting the requirements. The collinearity statistics, as evaluated by the variance inflation factor (VIF), reveal that all items have values above 5. This suggests that there is no issue of multicollinearity in the measurement model.

**Table 1.** Measurement model and constructs.

Construct and Item Description	Convergent Validity	VIF	Composite Reliability	$\alpha$	AVE
EN: Environmental Dimension			0.922	0.921	0.678
EN01: The consumption of sanitary materials, hygiene products and other materials in our healthcare organization is rational and controlled.	0.811	2.741			
EN02: The consumption and usage of water in our healthcare organization is rational and controlled.	0.804	2.819			
EN03: The consumption of electricity in our health facility is rational with the application of energy-efficient solutions.	0.850	3.025			
EN04: The usage of air pollutants (e.g., vehicles, heating systems, etc.) is rational and controlled.	0.872	3.142			
EN05: Our healthcare organization is involved in waste sorting and recycling programs.	0.775	2.471			
EN06: Our healthcare organization has a policy of environmental sustainability when providing health services.	0.815	2.973			
EN07: Our healthcare organization applies sustainability committed to the welfare of its environment.	0.831	3.193			
S: Social Dimension			0.930	0.932	0.590
S01: My organization has a strict policy for the prohibition of child and forced labor.	0.719	2.006			
S02: Our organization engages in philanthropic activities.	0.744	2.091			
S03: Our organization collaborates actively with society in conducting health camps and awareness programs.	0.760	2.237			

Table 1. Cont.

Construct and Item Description	Convergent Validity	VIF	Composite Reliability	$\alpha$	AVE
S04: Our healthcare organization promotes every employee equally based on merit.	0.770	2.606			
S05: Our healthcare organization does not deny any rights and privileges to employees because of their age, sex, race, community, religion, or nationality.	0.790	2.372			
S06: Our organization avoids sub-standard materials and medicines in healthcare.	0.825	2.750			
S07: Our healthcare organization restricts the usage of hazardous materials.	0.735	2.037			
S08: Relations between management and employees are good in the organization.	0.794	2.926			
S09: Employees in our healthcare organization have opportunities to learn and improve their competencies.	0.803	2.638			
S10: Our organization adheres to clearly established anti-corruption rules.	0.788	2.282			
S11: Our organization provides health services by prescribed protocols.	0.717	1.958			
E-C: Economic Dimension—Customer Perspective			0.917	0.915	0.665
E-C01: Customer response time in our organization is adequate.	0.796	2.175			
E-C02: Our healthcare organization provides on-time delivery service.	0.856	2.895			
E-C03: The number of customer complaints is minor	0.828	2.782			
E-C04: Customers are satisfied with the services provided in our healthcare organization.	0.873	3.332			
E-C05: The quality of services provided in our healthcare organization is better than in other institutions.	0.768	2.061			
E-C06: The implementation of new services/protocols is better than in other healthcare organizations.	0.764	2.007			
E-C07: Our healthcare organization has a good reputation.	0.817	2.241			
E-F: Economic Dimension—Finance Perspective			0.810	0.805	0.631
E-F01: Our healthcare organization has a strong cash flow.	0.802	1.659			
E-F02: Our organization's revenue growth/stability is better than other healthcare organizations.	0.842	2.040			
E-F03: Our organization can reduce the cost of providing healthcare services.	0.757	1.547			
E-F04: The productivity in our organization is better than in other healthcare institutions.	0.774	1.579			
E-I: Economic Dimension—Internal Perspective			0.754	0.746	0.665
E-I01: In our healthcare organization, all materials and medicines are stored using specified conditions and within authorized rooms.	0.756	1.298			
E-I02: The workload is equal for all employees in our organization.	0.799	1.799			
E-I03: Problems that arise are quickly resolved in our healthcare organization.	0.886	2.065			

Table 1. Cont.

Construct and Item Description	Convergent Validity	VIF	Composite Reliability	$\alpha$	AVE
E-L: Economic Dimension—Learning Perspective			0.911	0.906	0.779
E-L01: Employees in our organization attend training and seminars for new treatment methods.	0.870	2.665			
E-L02: Our healthcare organization offers employees the opportunity to receive training on the operation and usage of new equipment.	0.904	3.445			
E-L03: Employees in our organization are satisfied with the opportunities for learning and training.	0.894	2.987			
E-L04: Our healthcare organization rapidly adapts to changes in technology and innovation in healthcare.	0.861	2.117			

Source: Authors.

The discriminant validity was confirmed using the heterotrait-monotrait (HTMT<sub>0.90</sub>) criterion suggested by Henseler et al. [69]. The results displayed in Table 2 indicate that all the values are below the maximum value of 0.90, so confirming that our measurement model has good discriminant validity.

Table 2. Discriminant validity (HTMT<sub>0.90</sub> criterion).

Constructs	1	2	3	4	5	6
1. E-C: Customer Perspective	–					
2. E-F: Finance Perspective	0.862					
3. E-I: Internal Perspective	0.891	0.882				
4. E-L: Learning Perspective	0.702	0.708	0.868			
5. EN: Environmental Dimension	0.695	0.707	0.814	0.656		
6. S: Social Dimension	0.786	0.828	0.892	0.745	0.764	–

Source: Authors.

### 3.2. Structural Model Assessment

The first step of structural model assessment was the analysis of the value of the SRMR (standardized root mean square residual) coefficient. The recommended value of the specified coefficient should be below 0.08 to mitigate the risk of model mis-specification [70]. In our research model, the value of the SRMR coefficient is 0.065 and is significantly below the recommended limit. The second step in testing the structural model was the calculation of GOF (Goodness-of-Fit) values for all dependent and intermediate variables of the model. The Stone–Geisser  $Q^2$  index (cross-validated redundancy index) was first calculated for these variables. The values of  $Q^2$  were calculated as 0.405, 0.375, 0.456, 0.356, and 0.499 for the customer perspective, finance perspective, internal perspective, learning perspective, and social dimension, respectively. The acceptability of the structural model was shown by the presence of positive values of  $Q^2$ , indicating excellent quality [71,72]. Then, the value of the coefficient of determination explaining variance ( $R^2$ ) was calculated for the mentioned constructs. Values of  $R^2$  suggested a high level of the model's explanatory power, noting that 56.1% of customer perspective, 54.2% of finance perspective, 60.4% of internal perspective, 50.1% of learning perspective, and 50.2% of social dimension present values greater than 50%. Finally, the GOF was calculated manually for all dependent and intermediate variables as root squares of multiplication of commonality and  $R^2$ , indicating it was in the acceptable range of 0–1.

The standard PLS-SEM bootstrapping procedure was initiated to ascertain the significance and magnitude of the path coefficients. To evaluate direct and indirect effects and compute two-sided bias-corrected 95% confidence intervals (CIs) for each relationship

identified in the research model, bootstrapping was utilized. The results of testing of direct effects are reported in Table 3. A partial least squares approach to structural equation modeling revealed the environmental dimension (EN) has a strong positive relationship to the social dimension (S) ( $\beta = 0.710, p < 0.001$ ). Additionally, results indicated the environmental dimension (EN) is also positively associated with all economic dimensions, namely customer perspective (E-C) ( $\beta = 0.250, p < 0.05$ ), financial perspective (E-F) ( $\beta = 0.211, p < 0.001$ ), internal perspective (E-I) ( $\beta = 0.299, p < 0.001$ ), and learning perspective (E-L) ( $\beta = 0.230, p < 0.001$ ). The results of statistical analysis showed that the one-point improvement in the social dimension would increase customer perspective by 0.552 points, financial perspective of healthcare organization by 0.572 points, internal perspective by 0.537 points, and learning perspective by 0.529 points. The above results indicate a strong predictive influence of the social dimension on the economic dimensions of healthcare organizations, and the environmental dimension records a strong predictive influence on the social dimension of healthcare organizations. Two-sided bias-corrected 95% confidence intervals (CIs) for each direct relationship record positive values and do not cross the zero value, thus confirming the validity of established relationships.

**Table 3.** Results of testing direct effects.

Relationship	Path Coefficient	t-Value	95% CIs (Bias-Corrected)	Results
EN → S	0.710 ***	23.348	[0.647, 0.765]	Supported
EN → E-C	0.250 **	3.354	[0.098, 0.395]	Supported
EN → E-F	0.211 ***	3.507	[0.097, 0.333]	Supported
EN → E-I	0.299 ***	4.016	[0.151, 0.440]	Supported
EN → E-L	0.230 **	3.418	[0.096, 0.362]	Supported
S → E-C	0.552 ***	8.203	[0.411, 0.675]	Supported
S → E-F	0.572 ***	9.766	[0.445, 0.678]	Supported
S → E-I	0.537 ***	7.867	[0.401, 0.665]	Supported
S → E-L	0.529 ***	7.749	[0.382, 0.649]	Supported

Notes: \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ , Source: Authors.

The bootstrapping procedure was applied to test the mediating role of the social dimension in our study model. Results of the indirect effects that confirm the mediating effect of the social dimension on the relationship between the environmental dimension and economic dimension of healthcare organizations are presented in Table 4. A statistically significant indirect effect and positive relationship between the environmental dimension and economic dimension via the social dimension of healthcare organizations were confirmed. The mediating effect of the social dimension was identified for all aspects of the relationship between the environmental dimension and economic dimension, namely for internal perspective (E-I) ( $\beta = 0.381, t = 7.309, p < 0.001$ ), customer perspective (E-C) ( $\beta = 0.392, t = 7.565, p < 0.001$ ), learning perspective (E-L) ( $\beta = 0.375, t = 7.284, p < 0.001$ ), and finance perspective (E-F) ( $\beta = 0.406, t = 9.108, p < 0.001$ ). By comparing the values of  $\beta$  coefficients in direct relations between the environmental dimension and economic dimension, and indirect relations between the environmental dimension and economic dimension via the social dimension of healthcare organizations, it is possible to conclude that the values of  $\beta$  coefficients are higher in indirect relations, which confirms the importance of the social dimension of healthcare organizations as a mediator. Additionally, in all the mentioned indirect relationships, the  $p$ -value is less than 0.001, while in the direct relationships between the environmental dimension and customer perspective, and the environmental dimension and learning perspective, the  $p$ -value is less than 0.05.

**Table 4.** Results of testing indirect effects.

Relationship	Path Coefficient	t-Value	95% CIs (Bias Corrected)	Results
EN → S → E-I	0.381 ***	7.309	[0.284, 0.485]	Supported
EN → S → E-C	0.392 ***	7.565	[0.290, 0.492]	Supported
EN → S → E-L	0.375 ***	7.284	[0.273, 0.475]	Supported
EN → S → E-F	0.406 ***	9.108	[0.317, 0.492]	Supported
	Stoner–Geisser Q <sup>2</sup>	R <sup>2</sup>	GOF	
E-C: Customer Perspective	0.405	0.561	0.477	
E-F: Finance Perspective	0.375	0.542	0.451	
E-I: Internal Perspective	0.456	0.604	0.525	
E-L: Learning Perspective	0.356	0.501	0.422	
S: Social Dimension	0.499	0.502	0.500	
SRMR	0.065			

Notes: \*\*\*  $p < 0.001$ , Source: Authors.

Using a multigroup partial least squares path modeling procedure, the proposed relationships between public and private healthcare organizations were compared. The findings of the analysis are presented in Table 5 and elicit a certain level of unexpectedness. Statistical significance for public healthcare organizations was confirmed for all direct and indirect relationships included in the model. Despite expectations, such an outcome was not recorded for private healthcare organizations. The direct path between the environmental dimension and customer perspective of the economic dimension, as well as the direct path between the environmental dimension and the internal perspective of the economic dimension, did not show statistical significance.

**Table 5.** Results of testing direct effects: multigroup partial least squares path modeling.

Relationship	Path Coefficient	p-Value	Path Coefficient	p-Value	Invariant
	Public	Public	Private	Private	
EN → S	0.654	0.000 ***	0.738	0.000 ***	Yes
EN → E-C	0.259	0.003 **	0.185	0.065	No
EN → E-F	0.193	0.005 **	0.195	0.044 *	Yes
EN → E-I	0.377	0.000 ***	0.120	0.163	No
EN → E-L	0.245	0.002 **	0.237	0.012 *	Yes
S → E-C	0.537	0.000 ***	0.590	0.000 ***	Yes
S → E-F	0.573	0.000 ***	0.577	0.000 ***	Yes
S → E-I	0.491	0.000 ***	0.645	0.000 ***	Yes
S → E-L	0.536	0.000 ***	0.504	0.000 ***	Yes

Notes: \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ , Source: Authors.

According to the results of the direct effects and indirect effects, we concluded that our study supports the mediating role of the social dimension between the environmental dimension and economic dimension of the TBL criterion of healthcare organizations, such as the internal perspective, customer perspective, learning perspective, and finance perspective.

#### 4. Discussion

The research model incorporated in this study aligns with triple bottom line theory, which emphasizes the significance of integrating and harmonizing approaches to financial, social, and environmental concerns [73]. The relationships established in the study

analyze the effects of the environmental dimension and social dimension on the economic dimension of outcomes of healthcare organizations, as well as the mediating role of the social dimension on the relationship between the environmental dimension and economic dimension, which contains four perspectives, namely the customer perspective, finance perspective, internal perspective, and learning perspective. Additionally, the research model includes an analysis of the relationship between the economic dimension and the social dimension. The research possesses substantial practical and scientific merit, owing to the inclusion of healthcare organizations in the sample, which should also prioritize health-related sustainability in addition to social, economic, and environmental dimensions [36].

The research results show that the environmental dimension has a strong positive effect on the social dimension of the sustainability of healthcare organizations. This conclusion is indicated by noting that a one-point change in the environmental dimension leads to a change in the environmental dimension of 0.710 points. Adapting to the requirements for environmental protection creates significant prerequisites for the constitution of healthcare organizations in which the social dimension of sustainability will achieve additional development. By adopting criteria for the environmental dimension of sustainability, a spillover effect is created that is directly and effectively transferred to the well-being of employees in healthcare organizations. The research model includes the social dimension, which in earlier studies was often neglected and not included in any consideration [46]. Healthcare organizations face several challenges [18], especially in the area of motivation [74], as well as attracting, recruiting, and selecting employees, with a distinct deficit in most countries. This further indicates the importance of the social dimension for the sustainability of healthcare organizations, which comprises very significant aspects related to people in the organization [49]. On the other hand, following examination of the relationships between the social dimension and the four perspectives that constitute the economic dimension of the outcome of health organizations, it can be concluded that the improvement of the social dimension can lead to an improvement in economic performance, with a probability greater than 50% for each of the observed perspectives of the economic dimension. In addition, the results confirmed that the social dimension has a mediating effect on the relationship between the environmental dimension and the economic dimension of the sustainability of healthcare organizations. In this way, the results bring to light an additional benefit by strengthening the influence of the environmental dimension on the economic dimension. This is especially important if one takes into account various challenges, notably the growth of operating costs, increasing rigidity of laws, and increased competitive pressure [17].

The results of our study show relevant coherence with previous studies analyzing the application of the TBL criterion in the healthcare system. A feasibility study by Vergunst et al. [75] found that the application of the TBL approach has a strong conceptual basis for application in the healthcare system. Unlike our study, which is based on primary data, the mentioned authors confirmed the importance of the triple bottom line of sustainability in the healthcare context using secondary data and concluded that the application of this criterion is feasible and necessary in the evaluation of the quality of the provided healthcare service. An empirical study on triple bottom line assessment of vitamin D testing in Australia confirmed that low-value care significantly increases financial costs and avoidable CO<sub>2</sub> emissions [76]. The aforementioned study confirmed the importance of the practical application of economic and environmental dimensions in the evaluation of specific healthcare activities, with the conclusion that the environmental dimension is a dependent variable, while in our study it is an independent variable. A study based on probabilistic modeling using secondary data analysis showed that the application of the TBL approach can positively contribute to the effectiveness of healthcare services with the optimization of human resources and the lowest carbon footprint [77]. Both of the aforementioned studies focus on specific aspects of the health service and verify the relevance of the TBL criterion for assessing sustainable performance. Our research is predicated on the premise that the TBL approach is insufficiently applied throughout the healthcare system and that, prior to advocating for its widespread implementation,

its beneficial effects must be evaluated via a cross-sectional study. The results of our study revealed that environmental issues do not necessarily create concern for managers in the healthcare system but offer an opportunity to improve the social component and better economic performance. This follows similar studies in other fields that confirm clear conceptual correctness and purpose [55,56]. By adopting this approach, our study advances sustainability research within the healthcare sector, which is consistent with Alim and Sulley's [78] recommendations that emphasize the need to further promote the implementation of the TBL approach and develop evaluation criteria. In consideration of the conclusions of a study of the sustainability of public hospitals in Portugal [79], which, by employing the DEA method, demonstrated that solely one healthcare organization is entirely sustainable via environmental, social, and economic perspectives, our findings acquire further significance in conjunction with all prior research.

Notwithstanding the extensive body of research that endorses the implementation of the TBL criterion in the healthcare system, there are a number of instances in the available literature that highlight particular weaknesses of the proposed sustainability concept. In the academic context, Isil and Hernke [80] noted a dominant positive sentiment regarding TBL, with an absence of a critical review of the concept. The theoretical basis of the concept labeled "three pillars of sustainability" is far from refined precision because it contains mixed views resulting from different initial premises, but at the same time maintains a significant similarity shaped by reasoned criticisms over time [81]. Sridhar and Jones [82] present three main criticisms for the application of the TBL criterion. The first refers to a very complex system utilized for measuring and monitoring TBL performance, which is also difficult to quantify in certain domains, especially in the realm of social dimension. The authors further point to the unsystematic approach and compliance mechanism as significant weaknesses of the integrated TBL system, emphasizing its rigidity in a rapidly changing environment. A study of sustainable manufacturing, which employed the text mining method to analyze scientific literature over a thirty-year period, unveiled an unbalanced TBL with an emphasis on the economic and environmental dimensions, while the social dimension received reduced attention [83]. A similar study that focused on the healthcare industry pointed to the multidimensional impact of this industry on the environment, but it was also noted that the measurement of that impact is unbalanced and fragmented [84]. Lock and Araujo [85], in their study using automated content analysis of the most profitable European corporations' websites in the domain of applying the triple bottom line concept, came to the conclusion that there is a clear dominance of the economic dimension and profit orientation, while a greater interest was recorded in environmentally sensitive industries for the social dimension compared to other industries. An additional support for the application of the TBL criterion is given by the results of the study by Nogueira et al. [86], who revealed that the social dimension is positively related to economic development, while the environmental dimension negatively affects it and the economic dimension has conflicting synergies. The practical implementation has validated deficiencies that were identified throughout the theoretical development and scientific study of the concept. Recognizing this specific reality, Elkington [87] arrived at the conclusion that there exists an important detachment from his original idea, meaning it is unsuitable and requires resetting. Imbalance in the TBL criterion application and dominance of one dimension, profit and loss, were identified as key shortcomings, while essential transformation and system thinking were proposed as measures for change, as well as responsible leadership, among both businessmen and politicians [88].

Parts of the study's results associated with the multigroup analysis between public and private healthcare organizations were unexpected. The relationship between the environmental dimension and the economic dimension, which refers to the customer perspective and internal perspective, is not statistically significant in private healthcare organizations. Contrary to expectations, this effect occurred in private rather than public healthcare organizations. Further examination of the outcomes of the multigroup analysis is imperative to elucidate this finding. It is possible to register a stronger direct effect

of the environmental dimension on the social dimension in private compared to public health organizations. Additionally, the social dimension of sustainability creates a stronger impact on most perspectives of the economic dimension in private healthcare organizations compared to public ones. According to the above analysis, it is possible to conclude that private healthcare organizations invest in social capital and pay significant attention to the social dimension of sustainability, but still fail to direct employees to focus their engagement on customer care and the development of internal processes. On the other hand, the strong relationship between the social dimension and the economic dimension of sustainability that has been realized in private healthcare organizations emphasizes the importance of social sustainability for the overall sustainability agenda [48].

Our study confirms the direct and indirect relatedness between the environmental dimension, the social dimension, and the economic dimension of the sustainability of healthcare organizations. By simultaneously managing all the mentioned aspects of sustainability, the potential for creating value and sustainability in the long term is created [47]. This is especially important in the healthcare sector, which is on a transformative journey in most countries [38]. Management practices that follow the sustainability agenda will create preconditions for the sustainable development of healthcare organizations in the future.

### **5. Limitations and Recommendations for Future Research**

Our study has certain limitations, which at the same time provide good guidelines for future research. The first limitation relates to the variable observation approach. All variables were observed through appropriate statements by measuring the perception of employees, including the economic dimension of sustainability. Although the application of this approach has been verified in previous studies, this may be a limitation because it is not based on exact quantitative data. Additionally, an approach based on quantitative indicators could gain additional improvement through time dynamization that would include data from consecutive years. Second, the research model does not contain contextual variables that can contribute to the analysis of factors that have a positive or negative impact on the variables of the research model or a certain effect on the relationships between the variables included in the model. The third limitation is not intrinsically a full-scale limitation but requires consideration, at least, in the context of guiding future research. It is related to the specific requirements of healthcare organizations in the field of providing quality healthcare services to patients. Some of the dimensions of sustainability may conflict with this requirement, and therefore it is necessary to include a variable related to patient care in future research.

### **6. Conclusions**

Sustainability has become one of the key determinants for organizations in dynamic environmental conditions. Organizations from various industries establish strategic orientations by emphasizing distinct facets of sustainability, with the ultimate goal of generating value for different stakeholders. The existing criteria for success are necessarily supplemented and harmonized with criteria related to three dimensions: environmental, social, and economic. Triple bottom line theory, which supports an integrated approach to organizational success, points to the importance of well-being for employees, through the social dimension, and caring for the environment and the economy in a wider context. Relying on the postulates of TBL theory, our study establishes relationships among the environmental dimension, the social dimension, and the economic dimension of the outcomes of healthcare organizations. There exists a robust positive relationship between the environmental dimension and the social dimension of health organizations' outcomes. Thus, the notion that the incorporation of environmental preservation measures into healthcare organizations positively impacts the development of the social aspect of sustainability for such organizations was validated. Additionally, the environmental dimension of the sustainability of healthcare organizations achieves a positive relationship with the economic dimension, while this relatedness is absent in the case of private healthcare organizations,

in terms of two perspectives: internal processes and learning. The social dimension of the sustainability of healthcare organizations realizes a mediating role in the relationship between the environmental dimension and the economic dimension. In addition to achieving a positive relationship with the economic dimension, the social dimension strengthens the effect of the environmental dimension on the economic dimension of the outcomes of health organizations. In general, the obtained results are derived through triple bottom line theory but, at the same time, they indicate that adapting to changes in a way that respects the care of the environment achieves a positive effect on the social and economic dimensions. The obtained results confirm the importance of managerial actions that contribute to the preservation of the environment. Considering that the environmental component is designated as an independent variable in our model, an additional practical implication emerges, indicating that the change initiates with a paradigm shift in terms of providing advances to various facets of the environment.

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