Impact of economic indicators of sustainable development of Slovak spas

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Abstract: The natural healing waters of the Slovak Republic are known for their uniqueness and rich content of healing mineral compounds. The aim of the article is to identify and apply indicators of sustainable tourism to the development of spa tourism using selected statistical methods. The data will be analyzed and synthesized based on the available annual reports of spa companies in Slovakia. The result of the article is to determine, through correlation and regression, the dependence of selected indicators of sustainable tourism on the gross added value of tourism focused on spa tourism. Based on the results, we found that the selected indicators of the sustainable development of spa tourism have statistical significance depending on the GDP of Slovakia. Overnight stays in spa establishments in the Slovak Republic have the greatest impact on GDP.

Keywords: tourism, suitable, spa

JEL Classification codes: Q01, Z32

INTRODUCTION

Slovak spas are a cultural and historical phenomenon in the Central European area. The issue of spa tourism, as one of the oldest and most important types of tourism, is increasingly discussed among leading experts and is a subject of interest in the field of healthcare. Spa tourism contributes significantly to overall tourism; therefore, it is important to study this area. The importance of tourism is evident in several areas. Its share in the countries' GDP is not negligible, in some cases it even constitutes the main part of the country's income. Sustainable development is important for spa tourism in Slovakia from the point of view of tourism because of its benefits and increasing the share of Slovakia's gross domestic product. It is therefore important to find out the sustainability of the spa industry to be able to better orientate on the improvement of the provision of spa services and its increase in visits and overnight stays. Economic indicators of sustainable development are a suitable tool for examining the state of spa tourism in Slovakia. There are not enough authors who would deal with the sustainability of spa tourism in Slovakia and its analysis. In the current literature are not adequate authors or researchers deal with effect the economic indicators of sustainable indicators for spa tourism to GDP of Slovak Republic. The Slovak spa industry contributes to the creation of GDP with a value of 61,777 Euros in 2021 (The Statistical Office of the Slovak Republic, 2022). We would like to identify properly economic indicators and measure their impact to GDP and find out their impact at GDP. The purpose of the article is to identify economic indicators of sustainable development applicable to spa tourism and to determine their dependence on Slovakia's GDP. The value of GDP of spa tourism in Slovakia we can find in The Tourism Satellite Account in Slovakia Statistical Office, where is not possible find exactly which economics indicator of sustainable development important for GDP.

1 LITERATURE REVIEW

Spa tourism has a high potential to attract visitors to destinations. It is not given much attention in the literature, despite this essential reason, such as quantifying the benefits and costs of investing in spa/balneo centers, offering multipliers that can be used to evaluate and make investment decisions (Torres-Pruñonosa, 2022). Indicators of sustainable development applied to spa tourism were mentioned and measured by Slovak authors only marginally. The author Mačiš, M. (2018) summarized all the indicators that are measured within the entire tourism industry. Some of them can also be applied to the spa tourism, but they are not specifically stated. Štefko R. et al. (2020) dealt with economic indicators applied to spa tourism within the financial and economic situation. The measurement and evaluation of indicators of sustainable development is studied in all areas (in economics, demography, healthcare, environment, etc.). When assessing the sustainable development of spa tourism, indicators are most often used - indicators divided according to the environmental dimension, the economic dimension, and the social dimension (Guerreiro & Seguro, 2018; Štefko et al., 2020). The most well-known set of indicators applied to the sustainability of the development of spa tourism are the indicators issued by the UN. In the European Union, sustainable development indicators are used mainly in connection with the development of the Sustainable Development Strategy for the European Union (European Commission, 2016). Indicators are evaluated over a certain period and refer to a specific spatial unit such as a country, region, municipality. Indicators of the sustainable development of spa tourism are divided into certain groups of indicators that provide information to determine the relationships between the impacts of tourism on cultural and natural resources. Tourism depends on these relationships (UNWTO, 2013). Indicators of sustainable development of spa tourism are used for multidimensional assessment of the sustainability of destinations. It is necessary to point out that the indicators serve only as a proposal for examining the impact of tourism on sustainable development. Among the most frequently used economic indicators of the sustainable development of spa tourism are indicators such as the number of overnight stays of guests in spa facilities, the proportion of direct employment in spa tourism (Sava, 2013; Szromek, 2021; Krstić, Petrović, Stanišić, 2015). Other main indicators what are mostly used in research are: number of overnight guests, share of direct employment, average guests spend, average capacity utilization, the level of unemployment in the region, average number of overnight guests.

Within the availability of resources, indicators of the economic dimension are applicable to the spa industry in Slovakia. They are divided into several groups in terms of their seasonality, economic benefits, and employment. They help define the contribution of spa tourism to economic sustainability in a specific destination, tab. 2 (Ramazanova, Bolatbekov, 2018). Latifian, Madahi, Mabhout (2018) state that there is a strong link between spa tourism and economic growth, which leads to an increase in the economic development of the country due to the improvement of the quality and development of the travel activity of the inhabitants. By examining various economic factors, we understand the benefits of spa tourism in the creation of GDP and the overall stability of the economy through an increase in employment in each destination. Job creation can be much higher in the spa tourism industry compared to any other industry because of the spillover effects and reduced impact of tourism activities (Matijová, et al, 2019).

Authors Purwomarwanto, Ramachandran (2015) determined two models for measuring economic indicators of sustainable development on GDP. The first model uses GDP to represent economic growth and the number of international tourist arrivals to represent

tourism growth. The second model uses the hotel occupancy rate, the average length of stay and the number of tourist arrivals as a metric of tourism growth. Based on the obtained results, the authors consider the development of any type of tourism as one of the strategic economic pillars. Another authors Kum, Aslan and Gungor (2015) determines that the various sectors of tourism have significant role in economic, cultural, and social development. They researched that tourism arrivals have impact at GDP of country. Indicators as overnights, number of beds and number of visitors has positive relationship at GDP. Stryzhak, Sayar a Ari (2022) made a study which shows that economics indicators of sustainable development for tourism have nexus among GDP indexes. Also determined that between economic growth of country and various forms of tourism can be explained by various factors as strategic orientation, sharing of tourism revenues in structure of GDP or national system. Many authors in different countries did research about causal relationship between tourism as spa and economic growth among to GDP (Lee, Chang, 2008; Chang, Khamkaev and McAleer, 2010; Mello-Sampayo, Sousa-Vale, 2012). Their researching was applied with suistainable indicators nexus GDP. Results of their work shown that indicators as overnights, number of tourist or number of beds might have a positively connection to increasing of GDP (Çağlayan, Şak, Karymshakov, 2012).

Table 1 Economics indicators of suitable development

Domains	Indicators		
Seasonality	Monthly bednights		
	Percents of jobs which are seasonal		
	Seasonality rate		
	Percent of establishments open during all year		
Economics benefits	Percent of tourism on GDP		
	Number of same-day visitors		
	Number of tourist		
	Establishments using local products		
	Employment / total economy		
Employment	Employment by gender		
	Employment by qualification		

Source: adapted from Guerreiro, S., Seguro, P. (2018), p. 5

The sustainability of spa tourism also faces a lot of importance within the growth model and its compatibility with the quality of life of local communities. It is proposed to stop using models focused on economic growth and rather to focus on the quality of growth and its compatibility with the quality of life of the inhabitants (Băndoi A et al., 2020).

Spa tourism contributes to sustainable development by identifying lifestyle habits, various types of comfort and modernization, and progressing towards sustainability. It also contributes to solving different types of consumer behavior (Lopes, P., Rogiguez-Lopez, 2022).

2 METHODOLOGY

The article is composed of several research methods. To identify and establish measurable indicators of the sustainable development of spa tourism, the methods of deduction, synthesis and comparison of scientific sources were used. Data from the Statistical Office of the Slovak Republic and annual reports for 21 spa companies were used. Spa companies in

Slovakia are included in several groups of NACE 869 and therefore we had to use the collection and synthesis of the required data. Correlation and regression methods were used to determine the dependence of spa economic sustainable development indicators on the GDP of the Slovak Republic. Two methods are commonly used to evaluate the relationship between variables, namely correlation and regression analysis. Both are based on a specific analysis of a set of specific assumptions. Regression analysis quantifies the direction and strength of the relationship between two numerical variables x and y. Unlike correlation, the two variables are not interchangeable, and the key is the correct identification of the result. Lack of data to provide more data to calculate a more comprehensive correlation and regression method were not available and provided by spa companies. GDP was used for the whole of Slovakia. The processed data were for the period 2012-2022. Data on spa companies were ascertained according to their ID number. Due to poorly statistical data about spas, we choose only visible and available data for our research.

Two hypotheses are established:

Hypothesis 0: Selected economic indicators of the sustainable development of Slovak spas have not positively impact at the GDP of the Slovak Republic,

Hypothesis 1: Economics indicators of the sustainable development of Slovak spas has positively impact at the GDP of the Slovak Republic.

The formula for calculating a simple linear regression will be as follows:

$$Y = \beta 0 + \beta 1 X + \varepsilon (1)$$

Y - dependent variable,

X - independent variable,

B0 - parameter of the model, the so-called a locating constant that expresses what value the dependent variable Y will acquire if the independent variable X has a value of 0.

 $\beta 1$ - parameter of the so-called model regression coefficient, which expresses the slope of the regression line. It indicates how many units Y changes on average if X changes by 1 unit, $\beta 1 > 0$ - direct linear dependence - positive dependence, $\beta 1 < 0$ - indirect linear dependence - negative dependence.

The statistical correlation will be carried out in the statistical program Gretl based on selected economic indicators of sustainable development, namely: the number of overnight stays, the number of visitors, the number of beds and the GDP of the Slovak Republic.

3 RESULTS AND DISCUSSION

Spa tourism has an impact on the economic status of the Slovak Republic, especially due to its history and attractiveness. From the point of view of tourism, it has a significant impact on attendance even in non-seasonal periods. Finding out key economic indicators helps to increase the interest of the state. Spa tourism in Slovakia is positively associated to economic development, monetary gains, generation of employment opportunities, infrastructure improvements and reduction of poverty. The economic impact is needs to be analyzed and do more research with economic indicators or values which can define how sustainable the spas are. In our research we used the data which were available.

3.1 Economic indicators of sustainable development of spa tourism

As part of the monitoring of spa tourism for economic sustainability in the destination, appropriate indicators of economic value must be chosen. There are several indicators (indicators) that are created based on defined criteria such as the flow of spa tourism in the destination, the performance of the spa companies, the quality and quantity of employment, safety and health protection and the supply chain in the field of tourism (European Union, 2013). Selected economic indicators of the sustainable development of spa tourism are presented in figure no. 1. We selected the economics indicators based on available data of all spa establishments in Slovakia. These data are from The Statistical Office of the Slovak Republic and are visible for all researchers or public. The economics indicators as overnights, number of beds and number of visitors are the main indicators which can show us value of sustainable development of spas and their impact at GDP or economy of Slovakia. Development of selected economic indicators according in the years from 2012-2021 showed us that the number of overnight stays in spa establishments was the most significant in 2019 when total number of overnight stays was 2,924,573. The lowest decrease in the number of overnight stays was in 2020 and 2021 due to anti-pandemic measures, up to 64% on average compared to 2019. The number of beds in spa establishments was not significantly different in period from 2012-2021. The lowest number of beds was in 2012, when 11,841 beds were available.

3.2 Economic indicators of the sustainable development of spa tourism and their dependence on the Slovak GDP

Selected economic indicators where applicated to Gretl program for showing us OLS model and results if the research has statistical significance. Since the model testing results indicate that inflation cannot be considered statistically significant for the model, we created another model using the two significant variables of the previous model. We estimate the second model as:

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y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 (2), where
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y= gross domestic product SR

 x_1 = attendance of spa companies in the Slovak Republic

 x_2 = number of overnight stays in spa establishments in the Slovak Republic

 x_3 = number of beds in spa establishments in the Slovak Republic

b0 = population capture

 b_1 , b_2 = population slope (least squares estimates).

Correlation analysis (tab. 2) showed us the dependence of individual indicators. Staying overnight at the spa has a clear effect on spa attendance at a value of 0.97, which is closest to the value of 1. Subsequently, the number of beds and the effect on the attendance of spa companies are also pointed out. The value dropped to 0.34, which means that it does not have such a close influence on the visitation of spa establishments. The relationship between GDP and spa visitation is -0.15, which means that there is no significant dependence. It only means that it is not clear to demonstrate the direct influence of the indicator on the applicability of spa companies, due to the lack of data suitable for overall correlation.

Tab 2 Correlation analysis of suitable indicators of SPA tourism in Slovakia

	attendance at spa establishments	overnight stays in spa establishments	number of beds in spa establishments	GDP
Attendance of spa establishments	1			
Overnight stays in spa establishments	0,970028263	1		
Number of beds in spa establishments	0,340554844	0,243565	1	
Slovakia GDP	-0,158181737	-0,33445	-0,24581	1

Source: own processing in the Gretl program

The multiple R is the value of the correlation coefficient, which indicates a positive correlation between the variables. More important for research are the adjusted R2 values, which represent the coefficient of determination that explains the intensity of variation in the dependent variable caused by the independent variables in the model. The adjusted R2 value is 0.78 (Table 4), indicating that 78% of the variation in y values around the mean is explained by the regressors x1, x2, or 78% of the values fit the model. From the results, we can conclude that there is a significant connection between the selected indicators of the gross domestic product of the Slovak Republic and the selected economic indicators of the sustainable development of the spa tourism.

Tab 3 Regression analysis

Regression Statistics					
Multiple R	0,925858412				
R Square	0,857213799				
Adjusted R Square	0,785820698				
Standard Error	4131512,592				
Observations	21				

Source: own calculations

Data from Table 3 are used to determine the regression coefficients. From the calculated values, the model can be interpreted using the following equation:

$$y = 250939265,3+860,25+98,32x2-13492,78x3$$
 (3)

Confirmation of the validity of the regression output can also be verified by comparing the p-value with the a confidence level. If p < a, then Ho will be rejected, and it can be concluded that the selected variables are statistically significant for the model. Another way to test the validity of the model is to calculate the t statistic. The critical t value is calculated using the MS Excel formula for a two-tailed distribution with n-k = degrees of freedom and a = 0.05 confidence level, where n = 21 (number of observations) and k = 4 (number of regressors). If |t| > t21, H0 is rejected. The t21 value was calculated to be 5.435. Regression is shown in

table 4 below. As we can see, the variables overnights and number of beds in spas have not highly meaning for our research and impact at GDP of Slovakia. Based on P-value less than a = 0.05 we still use it and doing more calculations.

Tab 4 Regression of selected economic indicators of sustainable development of Slovaks spas

	Standard			
	Coefficients	Error	t Stat	P-value
Intercept the number of visitors to the	250939265,3	46171845,77	5,43489785	0,00161
spas	860,2495752	156,7621346	5,487610751	0,001532
staying overnight in the spas	-98,36051415	17,06603795	-5,763523696	0,00119
number of beds in spas	-13492,78187	3952,853059	-3,413428647	0,014258

Source: own calculations

As can be seen from the model results, even a very small increase in GDP per capita will have a highly positive effect on economic well-being. On the other hand, there is a negative relationship between overnight stays in spa establishments and the number of beds. However, we need to test the model to confirm the results.

The level of significance a is set at 0.05. Hypothesis testing can be done using ANOVA to calculate F-value and F-significance or using the t-test statistic to calculate p- and t-values. MS Excel software is used for all calculations. The results of ANOVA are shown in Table 5. The results indicate that <Fsignif (0.006), which is just above the specified limit of a value. We can claim that the model has statistical relevance. This means that the chances that the regression output could have been obtained by chance are very small.

Tab 5 ANOVA results

Α	N	0	٧	Α
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	df	SS	MS	F	Significance F
Regression	3	6,14854E+14	2,04951E+14	12,00696	0,006016713
Residual	6	1,02416E+14	1,70694E+13		
Total	9	7,17271E+14			

Source: own calculations and processing

Based on the processed correlation and regression analysis, the results are as follows:

The spa attendance coefficient has an estimated standard error of 156.76, a t-statistic of 5.48, and a p-value of 0.0015. Using the p-value approach, the null hypothesis can be rejected, and the variable is shown to be statistically insignificant at the $\alpha=0.05$ level of significance as p>0.05. The t-value approach indicates that |t|<121, which means that H0 can be rejected, and indicates that the visitation of spa establishments is statistically insignificant for the model.

The coefficient number of overnight stays in spa establishments has an estimated reference error of 17.066, a t-statistic of -5.76 and a p-value of 0.00119. Using the p-value approach, the null hypothesis will be rejected, and the variable will be shown to be statistically significant at the α =0.05 level of significance as p<0.05. The t-value approach indicates that |t|>t21, which means it will be rejected, and indicates that the variable is statistically significant for the model.

The coefficient number of beds in spa establishments has an estimated reference error of 3952.853059, a t-statistic of 3.41 and a p-value of 0.014. Using the p-value approach, H0 is rejected and shows that the variable is statistically significant at the α =0.05 level of significance as p<0.05. The t-value approach indicates that |t|>t21, which means that H0 will be rejected, and indicates that the variable is statistically significant for the model.

After testing this model, selected economic indicators which has highest impact at GDP of Slovakia is the number of visitors of spa.

CONCLUSION

Based on calculations, we proved that selected economic indicators of sustainable development applied in spa tourism have an impact on the GDP of the Slovak Republic. The null hypothesis was rejected. It turned out that the most important factor in the creation and increase of the GDP of the Slovak Republic is the attendance of spa enterprises in the Slovak Republic. By performing a quantitative analysis using a multiple regression model, the relationship between selected economic indicators of sustainable development (visits to spa establishments, number of beds in spa establishments and number of overnight stays) and GDP of the Slovak Republic was investigated. The GDP of the Slovak Republic was taken as a dependent variable. In conclusion, we can state that there is a significant connection between them. Selected economic indicators of sustainable development applied to spa tourism showed that it is necessary to focus on the development of spa industry in Slovakia and monitor its output data. We can agree with researchers in literature review, that indicators such as number of visitors or overnight stays have positive impact of GDP. Given that spa tourism is not subject to seasonality, further analyses should be developed within the framework of participation in Slovakia's economy. For this research it is important do more future development with other indicators in longer timeline. We have been limited by inadequately data from Slovak Statistics Office due to reason, that spa companies include hotels and restaurants and they are not categorized only as spa companies. This research shown us, that is important and significant to focus on economic impact of spa tourism in Slovakia for increase of development tourism. From our point of view, spa companies should be more participate with Slovak government and provide more data about their operations. We recommend continue with research focused on impact of spas companies at economic of Slovakia.

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