Tourism Indicators and Their Differentiated Impact on Sustainable Tourism Development

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Abstract
Sustainable tourism is a challenge for current and future generations in an effort to develop it in the spirit of maintaining a balance between its basic pillars: economic, social and environmental. The presented contribution aims to identify the differences of significant social, economic, and environmental indicators with the tourism indicator. The analysis was carried out at the level of NUTS 1 - the Slovak Republic and at the level of NUTS 3 - Prešov self-governing region. In the first phase of the research, 6 significant indicators were identified at the level of the Slovak Republic and at the level of the Prešov self-governing region 5 significant indicators with tourism indicators. Comparison of significant indicators was carried out using torque characteristics of shape, position, variability and through a set of tests - Mann Whitney test, Levene test, and Kolmogorov-Smirnov test. The differences between the indicators at the national and regional level were shown to be significant every time, regardless of whether the indicator was identified as significant, primarily in relation to the number of overnight stays at the national or regional level. The documented results point to the heterogeneity of the quality, and also the quantity of social, economic, and environmental indicators with the tourism indicator at the national and regional levels. It can be concluded that the sustainable development of tourism at different levels is conditioned by different indicators. This fact should be considered by the state economic policymakers and other tourism industry entities.

1. Introduction

Tourism has become a phenomenon that has entered the daily life of almost a third of the planet's population. At the beginning of the 21st century, tourism ranked third in terms of income among the leading sectors of the world economy Saayman, 2018). Šambronská (2019) characterizes tourism as an extremely adaptable and flexible industry whose economic importance is currently recognized by most states. In Slovakia, thanks to its natural and cultural potential, tourism has the

prospect of reaching an important place in the national economy The strategic goal of the state tourism policy is to increase its competitiveness and sustainability, with better use of the potential, with the intention of balancing regional disparities, which would lead to an improvement in the quality of life of residents and economic growth (Alrwajfah, Almeida-García, & Cortés-Macías, 2021; Fu et al., 2019). The effort is, with regard to resource capacities, to support the development of tourism in which the optimization of economic, environmental, social and cultural benefits will ensure the balance and sustainability of the country's development (Potluka, & Svecova, 2019; Plesník et al. 2020; Švedová 2020). Governments can also take initiatives to increase the quality of political (Civelek & Krajčík, 2022), legal and economic institutions to create a more competitive environment (Civelek et al., 2023) that improves the economic conditions of nations (Ključnikov et al., 2022). According to Zhang & Wang (2020), the prerequisite for the development of tourism at the national level is its support at the regional level. Demand for tourism products and services is considered by Zeibote et al. (2019), to be an important factor stimulating the development of the region. In this context, it is necessary to pay attention to the management of sustainable tourism, which minimizes the negative environmental and socio-cultural impacts of tourism by enabling local residents to co-decide on matters related to the development of regional tourism (Agyeiwaah et al., 2017; Wierzbicka 2020).

The Prešov self-governing region shows signs of a stagnant region despite its potential in terms of tourism. The purpose of the research was to investigate the determinants of tourism development regarding its sustainability in an effort to reduce regional disparities. Since the development of tourism requires systematic support that should reflect the specificities of the regions, knowledge of the determinants of development is essential for adopting differentiated measures.

2. Literature review

Modern tourism was considered a separate type of economic activity and a multidisciplinary complex (Gamage &Tajeddini, 2022). Represents activities tied to the place of their origin, i.e. to the region or destination. That is also why it is considered one of the main engines of the economic development of the territory. In order for the economic, social, and cultural importance of tourism in the region to be sustainable or still increasing, it is necessary to pay attention to its planning (Nazmfar et al., 2019). However, this must be based on the knowledge of the factors that influence the development of tourism (Streimikiene et al., 2021; Sofronov, 2018; Mura & Stehlikova, 2023). An important factor in the development of tourism is the demand, which is borne by the visitor. Tourism demand and its performance are also influenced by the quality of the visitor experience, which depends on the attractiveness of the main attractions and the quality of the services offered (Mirčetić et al. 2019; Tothova et al. 2022). Current trends in tourism demand are largely influenced by globalization, which leads to the territorial expansion of tourism on a global scale. The increasing standardization and homogenization of the market results in the unification of preferences, lifestyles, and favorite products (Dogru & Bulut 2018). The need for cooperation between destinations will support the need for strategic flexibility in the tourism sector, which will support the diversity of tourist attractions (Gavurova et al., 2023).

Information on the development of tourism demand is crucial for all tourism actors. They are important for entities that plan the development of tourism, but they are important for everyone who is part of it (Pulido-Fernandez et al, 2020). The reason for the analysis of tourism demand can be the prediction of its direction and the effort to reduce risk in the creation of a tourism strategy, balancing supply with demand in destinations, or a better understanding of the behavior of visitors and the tourism market (Poliak et al. 2021). According to Berlin et al. (2017); Luekveerawattana (2018); Taizeng et al. (2019); Sokhanvar (2019), Lacko et al. (2023), and others, they positively influence the decision to participate in tourism. Bunghez (2016), Pietrzak & Balcerzak, (2021) list as economic factors those

which include gross domestic product (GDP), growth of disposable income, better redistribution of income, wage level of economically active residents, stable monetary situation (Baz et al., 2020). Economic factors that negatively affect the development of tourism include: economic crises, the decline of industrial production accompanied by rising unemployment, stagnation of personnel and wage development, inflation (Tavares et al. 2016). Unemployment is a factor that affects the production potential of tourism, conditioned by the quality of the offered services. An accompanying feature of contemporary society is the growth of the free time fund (Rigelský et al. 2022), which is a basic prerequisite for the implementation of activities within the tourism industry. According to Gúčik (2020); Veiga et al. (2017) participation in tourism grows with the level of education achieved. Technological factors are significantly conditioned by transport infrastructure, information and communication technologies (Reinhold et al. 2018; Fennel 2021; Lojano et al. 2023). New information and communication technologies help to get a concrete picture of the offer of the destination, to provide assistance in making decisions and ordering (Alford & Jones 2020; Pimonenko et al. 2021; Mendoza-Moheno 2021, Androniceanu, 2023). Research shows that the right website also positively affects customer loyalty (Fedorko et al. 2017; Kljucnikov et al. 2020). On technological factors according to the authors Kolobková et al. (2021) primarily includes technological progress and acquired information and knowledge.

The main environmental indicators pointed out by the presented UNWTO guidelines (2017) include: mitigation of climate change, reduction of waste use, use of renewable resources, waste disposal. Doğan et. al. (2020)., Wang & Wang (2020) confirmed that the use of renewable energy is more effective in improving the country's economic growth than the use of non-renewable energy, thereby emphasizing environmental sustainability and the benefits of tourism development for the well-being of the population and the quality of the environment. Tourism, energy consumption, economic growth, environmental footprint, are deeply interconnected and influence each other, so economic policy makers in countries should promote sustainable, environmentally feasible tourism strategies that have an impact on sustainable economic growth (Khan, Hou 2020; Han 2021).

Demand is also determined by political and administrative factors that aim to simplify travel. Religious, ethnic and cultural differences often cause negative moods in international political relations. Terrorist attacks, civil unrest around the world, their severity and frequency threaten global security and influence the decision-making process of visitors when choosing a destination (Skare et al. 2023; Ghaderi et al. 2017). Epidemics and other health risks dampen demand and hamper tourism-related development activities (OECD 2018). A global slump in the tourism sector's performance was recorded as a result of the Covid-19 crisis (SBA, 2020).

Despite the diversity of opinions and numerous factors, the system of sustainable tourism, formed by economic, social and environmental pillars, is considered stable (Gajdošíková 2020; Asmantaite et al., 2021). It is necessary to ensure a balance between the pillars, to find such a level of tourism development, the number of visitors, that their needs are satisfied, economic benefits are generated, and the quality of life is ensured without damaging resources (Nguyen et al. 2022; Alam et al., 2022).

Slovakia, like other countries, faces the challenge of strengthening and improving the development of tourism to ensure the long-term competitiveness of this industry (Štefko et al. 2020). Domestic tourism can be seen as a generator of sustainable growth in the regions of Slovakia and an important factor in the quality of life of residents in the least developed regions (Onuferová et al. 2020).

The trend is the sustainable nature of tourism, which takes into account the impact of the activity on the environment. Part of it is the responsible use of natural resources, the effort to transition to renewable energies, but also the sustainability of the jobs created and ensuring economic growth. Authors Jašková (2019), Šenková et al. (2020) state that the sustainable development of tourism is only possible in the context of knowing the specifics, respecting different approaches to forms of support

and assistance in individual regions, and cooperation of all actors of the tourism industry, considering social, economic and environmental aspects.

Similar study focused to monitoring of indicators of sustainable tourism development at regional level was performed at the example of Istria region in Croatia. The authors (Brsic et al. 2021) evaluated the indicators of sustainability, in concrete economic, social and cultural. Environmental indicator was not observed. Burghelea, Uzlău, Ene (2016) in the conditions of Romania aimed to highlight the existence of complexity of the tourism systems, thanks to which there are an infinite number of indicators that can quantify sustainable tourism development. They analysed economic indicators towards to seasonality of tourism: % visits in full season (3months); ratio between nights and tourist beds and coefficient of local multiplication. Social indicators were evaluated in the context of the participation of tourism in local net product and % of tourist arrivals without services of tour-operators. Cultural indicators focused to ratio between tourist's beds and local population and Intensity of tourism: Number of nights (000)/Number of local residents. Ecological indicators were evaluated with % of land on which tourist building is allowed, but not realized; Using and occupation of land: % of changes in the extent of building area within 5 years and % tourist visits realized without using a private car. Another more global study in European context (Font et al., 2021) brought detailed insight to the evaluation of the impact of sustainable tourism indicators on destination competitiveness with reference to the European Tourism Indicator System (ETIS), a scheme funded by the European Commission to address the evidence gap in tourism policy making. From the findings they pointed out, that European Commission had unrealistic expectations that DMOs, or their policies, would be transformed as a result of the use of indicators, or that indicators would be exploited to improve tourism sustainability and competitiveness. Other research from Croatian conditions in authorship of Krce Miočić, Klarin and Vidić (2018) pointed out that currently only quantitative indicators play dominant role as a measure of development and success of a tourism destination and they often become the primary goal, while their growth represents a necessity of survival and the performance of a particular tourism destination. Their aim was to analyse the application of sustainable tourism indicators in tourism destination through the 62 tourist boards in Croatia. They identified the indicators that tourist boards use for sustainable destination development. They concluded unsatisfactory level of the usage of tourism indicators needed for destination management and the necessity to evaluated development in more concrete and deeper way, using appropriate wider scale of indicators for the development of tourism in a certain destination, to create valuable sustainable tourism indicator system.

3. Methods

The goal of the presented paper is to identify the differences of significant social, economic and environmental indicators with the tourism indicator at the level of the Slovak Republic and the Prešov self-governing region.

In order to fulfil the main goal, partial goals were set and defined in the chronological sequence of the individual steps of the research.

Partial goal 1: Identify the relationship between the tourism indicator and selected social, economic and environmental indicators at the level of the Prešov self-governing region and Slovak Republic.

Partial goal 2: Identify differences in significant social, economic and environmental indicators at the level of the Prešov self-governing region and Slovak Republic.

In accordance with the above-defined main goal and individual partial goals (PG1, PG2), the research questions (RQ) - were specified together with the research hypotheses (H) based on them:

Research question 1: Is there a significant relationship between the selected social, economic, environmental indicators and the tourism indicator?

H1: We assume a statistically significant relationship between the selected social, economic and environmental indicators and the tourism indicator at the level of the Prešov self-governing region and Slovak Republic.

Research question 2**:** Are there differences in the structure of significant indicators identified at the level of the Slovak Republic and the Prešov self-governing region?

H2: We assume statistically significant differences in the structure of significant social, economic and environmental indicators between the Prešov self-governing region and the Slovak Republic**.**

Research sample

For the needs of monitoring and comparison of economic, social, environmental indicators and the tourism indicator, analysis work with territorial units NUTS 1 and NUTS 3. The research sample of the presented work is the Slovak Republic (hereinafter referred to as "SR") - NUTS 1 at the first level of research and at the second level of research Prešov Self-Governing Region (hereinafter referred to as "PSK") - NUTS 3. Data of the period 2001-2019 were included in the analyses.

The indicators that were the subject of research were divided into three groups:

- social indicators
- economic indicators
- environmental indicators.

According to OECD (2020), the availability of individual travel has enabled its mass. Some localities have thus become overcrowded, which has negative consequences for nature, cultural and historical sights, monuments, but also for the local population. The division of indicators into 3 groups corresponds to the guidelines of the World Tourism Council, which perceives the sustainable development of tourism as a balance of three pillars: economic, social, environmental.

The choice of indicators was conditioned by the availability of data for both research samples - the Slovak Republic "SK" and the Prešov Self-Governing Region "PSK".

Social indicator

Within the group of social indicators, it is possible to find a wide range of indicators reflecting the amount of the population, education, incapacity for work or crime. For the needs of this research, the following social indicators were determined:

- Number of permanent residents until 30.6. („PERMRES"),
- Natural population increase („POPINC"),
- Migration balance („MIGBAL"),
- Economically active population with basic education and without education („EAO-BE"),
- Economically active population with lower secondary education („EAO - LSE"),
- Economically active population with complete secondary education („EAO - CSE"),
- Economically active population with university education („EAO – UE"),
- Number of students („STU"),
- Number of pensioners (old age, disabled) („PENS"),
- Number of persons on parental leave („PARLEA"),
- Number of days of the average duration of 1 case of incapacity for work („WORINC"),
- Number of crimes („CRIM").

Economic indicators

The second group of evaluated indicators is focused on economic aspects, which can represent a significant factor affecting tourism both at the national and regional level. These indicators focus on the country as a whole, the standard of living of the population or the amount of expenditure in specific areas. For research purposes, the following economic indicators were considered and used:

- Gross domestic product at current prices/inhabitant in billion EUR („GDP"),
- Number of employed inhabitants („EMPL"),
- Number of unemployed („UNEMPL"),
- Rate of registered unemployment („UNEMRAT"),
- Economically inactive population from 15 years of age („EINPO-15"),
- Average monthly nominal salary of the employee („MONSAL"),
- Average monthly nominal salary of an employee in accommodation and catering services („TOURMOSA"),
- Net monetary income in EUR per person per month („MONINC"),
- Net monetary expenses in euros per person per month („MONEXP"),
- Net monetary expenditure on recreation and culture per person per month („REC-EXP"),
- Net monetary expenses for hotels, cafes and restaurants per person per month („TOUR-EXP").

Environmental indicators

The third group of evaluated indicators is represented by those that can be covered by the environmental pillar of sustainable development. Indicators from this area, which are used in further processing, focus on energy consumption or waste production. The list of environmental indicators used is as follows:

- Amount of municipal waste in billion tons ("MUNICIPAL WASTE "),
- Natural gas consumption in 1000 m^3 („NATURAL GAS"),
- Coal consumption in tons („COAL"),
- Electricity consumption in MWh („ELEKTRICITY"),
- Mineral oil consumption in tons („MINERAL OIL"),
- Amount of wastewater discharged IN 1000 m^3 („WASTE WATER").

Tourism indicator

For research purposes, evaluated indicator of tourism was:
- Number of overnight stays in all accommodation facilities („ ACCOM").

For the purposes of research, a tourism accommodation facility is understood as a facility that regularly (or occasionally) provides temporary accommodation to visitors for the purpose of tourism. A visitor in a tourism accommodation facility is a person (except for the staff and the owner) who uses the services of the facility for temporary accommodation, regardless of the country of permanent residence. Visitors to the accommodation facility do not include domestic and foreign workers employed in Slovakia, who use the facility temporarily as a dormitory (ŠÚSR 2022).

According to Litavcová (2019), the number of overnight stays is one of the variables that best expresses effective demand. A similar statement is offered by the Slovak Business Agency (SBA), which claims that the number of overnight stays by tourists in the country is an important indicator from the point of view of evaluating the performance of the tourism industry. Overnight stays reflect the performance and popularity of a given country (SBA 2020).

In order to process this information, the Shapiro-Wilk test was used, the purpose of which is to confirm or rejection of the normal distribution of evaluated variables. In this case it was monitored indicators:

$$SW = \frac{(\sum u_i x_i)^2}{\sum u_i^2 \sum(x_i - \bar{x})^2} \qquad (1)$$

where: u_i - constant

x_i - value of the ith statistical unit

$\bar{x}$ - average value of the variable

Since this assumption was not confirmed in the case of individual variables, the linear order relationship was verified using Kendall's order correlation coefficient ("Kendall's coefficient"):

$$r_K = \frac{n_c - n_d}{n(n-1)/2} \qquad (2)$$

where: n - number of observations of a pair of variables

n_c - number of matching pairs of the pair

n_d - number of discrepant pairs of a pair.

The comparison of the national and regional level of individual indicators was carried out through a trio of tests, with the help of which the conformity of the mean value, dispersion and distribution function was assessed by:

- Mann-Whitney test

$$W' = n_y n_x \frac{n_y(n_y+1)}{2} - R_y, \text{ while } W = n_y n_x - U' \qquad (3)$$

where: n_x - number of observations, or range of the xth set

n_y - number of observations, or range of the yth set

R_y - rank sum of the yth set

W, W´ - test statistics

Evaluated hypotheses in the case of the Mann-Whitney test were:

H_0: The values of the variable are symmetrically distributed around the median $(P(X > \text{med}(Y)) = P(X < \text{med}(Y)) = 0,5)$.

H_1: The values of the variable are symmetrically distributed around the distinct value $(P(X > \text{med}(Y)) > 0,5, \text{ resp. } P(X < \text{med}(Y)) > 0,5)$.

- Levene test

$$LE = \frac{(N-k)}{(k-1)} \frac{\sum_{i=1}^{k} N_i (Z_i - Z_{..})^2}{\sum_{i=1}^{k} \sum_{j=1}^{N_i} (Z_{ij} - Z_{i.})^2}, \qquad (4)$$

where $Z_{ij} = \begin{cases} |Y_{ij} - \bar{Y}_{i.}| \\ |Y_{ij} - \tilde{Y}_i| \end{cases}, Z_{..} = \frac{1}{N} \sum_{i=1}^{k} \sum_{j=1}^{N_i} Z_{ij}, Z_{i.} = \frac{1}{N} \sum_{j=1}^{N_i} Z_{ij}$

where: k - the number of values of the observed categorical variable

N - number of observations, or set range

N_i - number of observations in the ith group

Y_{ij} - measured value of the jth unit of the ith group

$\bar{Y}_i$ - average value of the ith group

$\tilde{Y}_i$ - median of the ith group

$Z_{..}$ - average of the groups Z_{ij}

$Z_{i.}$ – mean of Z_{ij} for the ith group.

Evaluated hypotheses in the case of the Levene test were:

H0: There is no statistically significant difference between the variances of random samples: $\sigma_1^2 = \sigma_2^2 = \cdots = \sigma_n^2$.

H1: At least one pair of random sample variances differs from each other.

- Kolmogorov-Smirnov test

$$K - S_{n_1,n_2} = sup\left|F_{1,n_1}(x) - F_{2,n_2}(x)\right|, \qquad (5)$$
$$-\infty < x < \infty$$

where: $F_{1,n_1}(x)$ - empirical distribution function of the first sample

$F_{2,n_2}(x)$ - empirical distribution function of the second sample

Evaluated hypotheses in the case of the Kolmogorov-Smirnov test were:

H0: Two univariate random variables come from the same probability distribution.

H1: Two univariate random variables do not come from the same probability distribution.

The research analyses selected indicators commonly available from the public database of the Statistical Office of the Slovak Republic – DATAcube, STATdat and from the website of the Ministry of Transport and Construction of the Slovak Republic (2022). Due to the incompleteness of the data for the Prešov self-governing region, these additional data were obtained from the databases of the Prešov self-governing region, the Department of Strategic Development of the self-governing region and the Regional Organization of Tourism in Prešov. All analyses and evaluations are carried out using MS Office Excel, Statgraphics XVIII and Statistica 13.4 programs.

4. Results

Since the Shapiro-Wilk test (1) did not confirm the normal distribution of the monitored indicators, the linear ordinal relationship was verified using Kendall's ordinal correlation coefficient "r_K" (2). The relationship of selected social, economic and environmental indicators with the tourism indicator was quantified on the national (SR) and regional level (PSK). The basic indicator of tourism performance for the needs of the research was the number of overnight stays (ACCOM) in all accommodation facilities at the national and regional level.

4.1 Identification of significant indicators

At the national level (Table 1), it is possible to note a significant connection between the ACCOM tourism indicator (the number of overnight stays by visitors in accommodation facilities) and 3 social indicators: the number of students (STU), the number of pensioners (PENS), the number of crimes (CRIM) and 3 economic indicators: the number of employed inhabitants (EMPL), the number of unemployed inhabitants (UNEMPL) and the rate of registered unemployment (UNEMRAT). None of the environmental indicators is linearly correlated with the number of overnight stays. The positive development of the tourism indicator is progressively influenced by the number of pensioners (PENS), the number of workers (EMPL). The number of students (STU), the number of crimes (CRIM), the number of unemployed (UNEMPL) and the registered unemployment rate (UNEMRAT) have a degressive effect on the development of the tourism indicator.

Table 1. **Ordinal correlation of monitored indicators with the tourism indicator in Slovak Republic**

Social indicators		Economic indicators		Environmental indicators	
Indicator	r_K	Indicator	r_K	Indicator	r_K
PERMRES	0,1765	GDP	0,281	MUNICIPAL WASTE	0,2697
POPINC	-0,1503	EMPL	0,341*	NATURAL GAS	-0,0588
MIGBAL	0,1111	UNEMPL	-0,3725*	COAL	-0,2288
EAO-BE	-0,0787	UNEMRAT	-0,3595*	ELEKTRICITY	0,2157
EAO - LSE	-0,2026	EINPO-15	-0,281	MINERAL OIL	0,2885
EAO-CSE	0,1765	MONSAL	0,2549	WASTE WATER	-0,2288
EAO–UE	0,2549	TOURMOSA	0,3203		
STU	-0,5686*	MONINC	0,2941		
PENS	0,3595*	MONEXP	0,3203		
PARLEA	0,1836	REC-EXP	0,2361		
WORINC	-0,1634	TOUR-EXP	0,2941		
CRIM	-0,3856*				

* note: significant at the significance level α = 0,05
Source: own evaluation

In the case of the Prešov self-governing region (Table 2), a significant connection with the number of overnight stays (ACCOM) is established with 3 social indicators: economically active population with basic education or without education (EAO-BE); number of students (STU) and number of persons on parental leave (PARLEA) and with 1 economic indicator: net monetary expenditure on recreation and culture per person and month (EXPENDITURES-HCR) and 1 environmental indicator: electricity consumption (ELECTRICITY).

Table 2. **Ordinal correlation of monitored indicators with the tourism indicator in PSK**

Social indicators		Economic indicators		Environmental indicators	
Indicator	r_K	Indicator	r_K	Indicator	r_K
PERMRES	-0,0327	GDP	-0,0196	MUNICIPAL WASTE	0
POPINC	-0,1765	EMPL	-0,098	NATURAL GAS	0,2418
MIGBAL	-0,0588	UNEMPL	0,1049	COAL	-0,0065
EAO-BE	-0,4641*	UNEMRAT	0,0719	ELECTRICITY	0,3595*
EAO - LSE	-0,085	EINPO-15	-0,2288	MINERAL OIL	-0,2418
EAO - CSE	0,0787	MONSAL	-0,0327	WASTE WATER	0,098
EAO–UE	-0,0458	TOURMOSA	0,0196		
STU	-0,6601*	MONINC	-0,0327		
PENS	0,1443	MONEXP	-0,0458		
PARLEA	0,0331	REC-EXP	-0,2288		
WORINC	-0,5163*	TOUR-EXP	-0,341*		
CRIM	-0,1111				

* note: significant at the significance level α = 0,05
Source: own evaluation

Electricity consumption (ELECTRICITY) is progressively affecting the development of the tourism indicator. Degressively, the development of the tourism indicator is influenced by the number

of economically active population with or without basic education (EAO-BE), the number of students (STU), the average duration of 1 case of incapacity for work (WORINC) and net monetary expenditure on hotels, cafes and restaurants (EXPENDITURES -HCR).

It can be concluded that due to the heterogeneity of the territory from the point of view of all the investigated indicators, different determinants were identified in connection with the number of overnight stays of tourism visitors at the level of the Slovak Republic and the Prešov self-governing region. From the point of view of the quantity as well as the quality of these indicators, the obtained results point to the difference in functioning and status at the national (NUTS 1) and regional level (NUTS 3).

Based on the documented results of hypothesis *H1* in which:
"We assume a statistically significant relationship between the selected social, economic and environmental indicators and the tourism indicator at the level of the Prešov self-governing region and Slovakia" - the hypothesis can be accepted.

Statistical verification of this hypothesis was carried out based on Kendall's rank correlation coefficient r_K, which quantified the relationship of social, economic and environmental indicators with the tourism indicator. The rank correlation results (Table 1, Table 2) were confirmed at the chosen significance level of $\alpha = 0.05$.

Based on the presented results, to fulfil the goal of the presented contribution, the research continued by comparing the indicators for which a significant relationship was established with the tourism indicator - the number of overnight stays.

4.2 Comparison of significant indicators at the national and regional level

The comparison of significant indicators was carried out based on whether the indicator was identified as significant at the national level - Slovak Republic (SR) or at the regional level - Prešov self-governing region (PSK). For the purposes of this comparison, the individual values were converted per inhabitant of both nomenclature units, except for net monetary expenditure on hotels, restaurants and cafes and the average duration of 1 case of incapacity for work, for which this was not necessary for the purposes of comparison. In addition to the comparison of basic torque characteristics, homoscedasticity, agreement of the mean value or distribution functions of pairs of indicators is tested using the apparatus of mathematical and statistical methods.

4. 2. 1 Comparison of the level and structure of significant indicators at the national level and the regional level

In the first group (NUTS 1) of indicators for which a significant relationship with the number of overnight stays has been confirmed, attention is paid to the number of students (STU), the number of pensioners (PENS), the number of crimes (CRIM), the number of employed inhabitants (EMPL), the number of unemployed inhabitants (UNEMPL) and registered unemployment rate (UNEMRAT).

The results of the torque characteristics of the compared indicators are presented in Table 3. The number of students (STU) is the only indicator that has proven to be significant both at the national and regional level and is therefore the first subject of their mutual comparison. In the Prešov self-governing region, slightly higher values of the torque characteristics of the position were observed: slightly higher mean and median. Based on the preserved level of standard deviation ($s_{STU-N} = s_{STU-R} = 0,10$), however, a similar variability of the results can be assumed.

The number of pensioners (PENS) proved to be a significant factor in relation to the tourism indicator at the national level. From the point of view of the results for the individual years of the monitored period, it is possible to perceive the dominance of the indicator at the national level (assessed by comparing the average value and the median value). These absolute differences at the same standard deviation ($s_{DOCH-N} = s_{DOCH-R} = 0,0088$) caused a slightly higher variability measured by the

coefficient of variation in the case of the PENS indicator at the regional level (v_{DOCH-N} = 4,43%; v_{DOCH-R} = 4,99%).

In the case of the number of crimes (CRIM), the comparison identified differences primarily from the point of view of the location of the results of both indicators, in concrete when comparing average values, measured maximum or minimum values. From the point of view of the number of crimes, the Prešov self-governing region has lower values ($\widetilde{TC_R}$ = 0,0127; $\overline{TC_R}$ = 0,0129) by about 25% compared to the values at the national level. The regional results were also lower from the point of view of the maximum value, the minimum value, or the lower and upper quartile. From the point of view of variability, both indicators are similar.

Table 3. **Comparison of current characteristics of STU, PENS, NC, PRAC indicators at the national and regional level, calculated per 1 inhabitant in the period 2001 – 2019**

Torque characteristic	STU		PENS		NC		EMPL	
	SR	PSK	SR	PSK	SR	PSK	SR	PSK
Mean	0,087	0,097	0,199	0,177	0,017	0,012	0,433	0,387
Median	0,091	0,096	0,195	0,175	0,017	0,012	0,430	0,386
Std. Deviation	0,010	0,010	0,008	0,008	0,003	0,002	0,024	0,023
Coeff. of variation	11,530	10,909	4,432	4,998	22,847	23,149	5,678	6,160
Minimum	0,070	0,078	0,189	0,166	0,010	0,008	0,393	0,353
Maximum	0,100	0,116	0,215	0,197	0,024	0,019	0,474	0,436
Variation range	0,030	0,037	0,026	0,031	0,013	0,010	0,081	0,082
Lower quartile(Q3)	0,079	0,091	0,191	0,170	0,013	0,009	0,411	0,362
Upper quartile (Q1)	0,096	0,106	0,208	0,182	0,020	0,014	0,450	0,403
Skewness	-0,532	0,132	0,549	0,979	-0,110	0,381	0,015	0,206
Kurtosis	-1,054	-0,867	-1,247	0,447	-0,862	-0,211	-0,748	-0,626

Source: own evaluation

The number of employed inhabitants (EMPL) - the range of variation of both indicators is highly balanced (RN = 0.081; RR = 0.082), just in the case of the Prešov self-governing region it is lower from the point of view of each moment characteristic of the location, so from the point of view of the average, median, maximum and minimum values. The high similarity of the variability of the number of employed inhabitants per inhabitant of the state and the Prešov self-governing region can also be indicated in the uniformity of the standard deviation or coefficient of variation (S_{EMPL-N} = 0,024; S_{EMPL-R} = 0,023). In both cases, it is possible to observe negative kurtosis and thus the concentration around the mean values is relatively low (compared to a normal distribution).

Other indicators for which a significant relationship with the number of overnight stays at the national level was confirmed were the number of unemployed inhabitants (UNEMPL) and the rate of registered unemployment (UNEMRAT). Table 4 offers the torque characteristics of the compared indicators.

The number of unemployed (UNEMPL) had, from the point of view of absolute values, a significantly higher level than the mean values observed in the Prešov self-governing region ($\overline{UNEMPL_N}$ = 0,064, $\overline{UNEMPL_R}$ = 0,083. On average, these values were higher by 29.45% comparing the regional level of this indicator. The differences in the measured maximum and minimum values were lower, while the results of the variation range of the Prešov self-governing region can be characterized as more homogeneous (R_R = 0,056, R_N = 0,064), which also documents a significant difference in the case of the coefficient of variation (v_R = 18,77%, v_N = 29,36%).

Table 4. **Comparison of the current characteristics of the NEZ and MEN indicator at the national and regional level, calculated per 1 inhabitant in the period 2001 - 2019**

	UNEMPL		UNEMRAT	
Torque characteristic	**SR**	**PSK**	**SR**	**PSK**
Mean	0,064	0,083	12,973	17,694
Median	0,066	0,084	13,3	18,1
Std. Deviation	0,018	0,015	3,912	3,539
Coeff. of variation	29,367	18,775	30,155	20,00
Minimum	0,029	0,050	5,8	10,4
Maximum	0,094	0,107	19,2	22,9
Variation range	0,064	0,056	13,4	12,5
Lower quartile(Q3)	0,049	0,071	9,7	14,8
Upper quartile (Q1)	0,079	0,093	16,2	20,4
Skewness	-0,212	-0,422	-0,163	-0,346
Kurtosis	-0,656	-0,396	-0,673	-0,512

Source: own evaluation

Significant differences at the national and regional level of the registered unemployment rate indicator (UNEMRAT) can be seen in their position and variability, while the shape of the results observed by skewness and kurtosis is very similar. The median regional level for the entire monitored period of 2001-2019 is 36.09% higher than in the case of the registered unemployment rate in Slovakia. Differences can also be observed in the case of the minimum and maximum value achieved, which was reflected in the relative differences quantified through the coefficient of variation ($v_N = 30,15\%$, $v_R = 20,00\%$), however a little less in the absolute ones ($s_N = 3,912.$, $s_R = 3,539$).

The comparison of the national and regional level of individual indicators was carried out through three tests:

- Mann-Whitney test „W´"   (3)
- Levene test "LE"   (4)
- Kolmogorov-Smirnov test "K-S"   (5)

Table 5. **Comparison of significant indicators at national and regional level**

indicator SR/indicator PSK	W	LE	K-S
Number of students (STU)*	263 (p = 0,016)	0,012 (p = 0,9110)	0,368 (p = 0,151)
Number of pensioners (PENS)	19 (p<0,01)	0,329 (p=0,569)	0,894 (p<0,01)
Number of crimes (NC)	71 (p<0,01)	1,899 (p = 0,176)	0,578 (p<0,01)
Number of employed inhabitants (EMPL)	34 (p<0,01)	0,0001 (p=0,995)	0,684 (p<0,01)
Number of unemployed inhabitants (UNEMPL)	277 (p<0,01)	0,828 (p=0,368)	0,526 (p=0,01)
Registered unemployment rate (UNEMRAT)	290 (p<0,01)	0,238 (p=0,628)	0,526 p=0,01

Source: own evaluation

Number of students (STU) was the only indicator significantly identified at both levels

Number of students - a slight shift in the mean values is evident in the case of the indicator at the regional level, which can be described as statistically significant (W = 263; p = 0.016). The range of variation has increased minimally and thus the variance can be described as the same (LE = 0.012; p = 0.911). A similar conclusion can also be stated when comparing the distribution functions of the STU indicator in the Slovak Republic and the Prešov self-governing region (K-S = 0.368; p = 0.151), that is, the distribution functions are without statistically significant differences.

The number of pensioners - absolute differences in the mean value (median) were shown to be statistically significant by means of the Mann-Whitney test. The differences in the range of variation and variability of the results measured at the national and regional level can be characterized as minimal and statistically insignificant (LE = 0,329; p = 0,569). The differences in the distribution functions proved to be statistically significant. The distribution function of the PENS indicator at the regional and national level can be considered different (K-S = 0.894; p < 0.01).

Number of crimes (NC) - the outlined differences in the absolute level of the median proved to be statistically significant (W = 71; p < 0.01) with the dominance of the national indicator of NC. The variability can be described as consistent (LE = 1.899; p = 0.176). Statistically significant differences were also confirmed when comparing the distribution functions of the number of crimes calculated per 1 inhabitant of the state and region (K-S = 0,578; p < 0,01).

The number of employed inhabitants (EMPL) - the difference in the mean value of the indicator at the national and regional level proved to be statistically significant (W = 34; p < 0.01) with the dominance of the recalculated number of employed inhabitants in Slovakia. Levene's test confirmed the already outlined homoscedasticity: agreement of the variance of the measured values (LE = 0.0001; p = 0.995). Significant differences were also demonstrated in the case of comparison of distribution functions (K-S = 0,684; p < 0,01).

The number of unemployed inhabitants (UNEMPL) - despite these identified relative differences in the variability of results at the national and regional level, it can be stated in the case of the number of unemployed its homoscedasticity (LE = 0.828; p = 0.368): agreement of variance. However, from the point of view of the location of the obtained results, these differences are significant (W = 277; p < 0.01), which means that the regional level of the number of unemployed is significantly higher. Statistically significant differences were also demonstrated in the case of comparing the distribution functions of this indicator (K-S=0,526; p = 0,010).

The rate of registered unemployment - the differences outlined above were reflected in the rejection of the hypothesis of the coincidence of mean values (W = 290; p < 0.01) and distribution functions (K-S = 0.526; p = 0.01). The results of the Prešov self-governing region are therefore statistically significantly higher and at the same time distributed differently. However, the variance in both cases can be described as the same (LE = 0.238; p = 0.628).

Table 6. **Results of the comparison of indicators at the national and regional level, calculated per 1 inhabitant in the period 2001-2019 - group of national indicators**

	STU	PENS	NC	EMPL	UNEMPL	UNEMRAT
mean value match	No	No	No	No	No	No
homoscedasticity	Yes	Yes	Yes	Yes	Yes	Yes
distribution function matching	Yes	No	No	No	No	No
dominance	PSK	SR	SR	SR	PSK	PSK

Source: own evaluation

In the case of each of the 6 evaluated indicators, a statistically significant difference in the mean value between the national and regional levels of this indicator was demonstrated. In the case of the number of students, the number of unemployed and the rate of registered unemployment, significantly

higher values were measured at the regional level in the Prešov self-governing region. In the case of the second half of the indicators, specifically in the case of the number of pensioners, the number of crimes and the number of employed inhabitants, this is the case at the national level. Except for the number of students, the distribution function is also different, so it is possible to state in 5 cases completely different characteristics of the indicator at the national and regional level.

4. 2. 2. Comparison of the level and structure of significant indicators at the regional and national level

In the second group of indicators (PSK - regional level), attention was paid to the economically active population with or without primary education (EAO-BE), the average duration of 1 case of incapacity for work (WORINC), net monetary expenditure on hotels, cafes and restaurants (EXPENDITURES -HCR) and electricity consumption (ELECTRICITY). The indicator number of students, which was significant at both levels, was compared in the previous section.

For the purposes of this comparison, the individual values were converted per inhabitant of both nomenclature units, with the exception of net monetary expenditures on hotels, restaurants and cafes (EXPENDITURES-HCR), and the average duration of 1 case of incapacity for work, in which case this was not necessary for the purposes of comparison.

The results of the comparative torque characteristics of the level and structure of significant indicators at the regional level with the national level are offered in Table 7. The economically active population with primary education and without education (EAO-BE) is the first of the group of indicators that was confirmed as significant at the regional level. When comparing the mean values, it is possible to observe minimal differences in absolute terms, which, however, when looking at the relative values, are at the level of 20% - 31% in favour of the Prešov self-governing region. The maximum as well as the minimum value in both cases was also recorded at the regional level, which was reflected in an almost doubled range of variation. From the point of view of the torque characteristics of the shape, we can state the same attribute, i.e. j. positive skew.

Table 7. **Comparison of significant indicators at national and regional level**

indicator SR/indicator PSK	W	LE	K-S
Number of students (STU)*	263 (p = 0,016)	0,012 (p = 0,9110)	0,368 (p = 0,151)
Number of pensioners (PENS)	19 (p<0,01)	0,329 (p=0,569)	0,894 (p<0,01)
Number of crimes (NC)	71 (p<0,01)	1,899 (p = 0,176)	0,578 (p<0,01)
Number of employed inhabitants (EMPL)	34 (p<0,01)	0,0001 (p=0,995)	0,684 (p<0,01)
Number of unemployed inhabitants (UNEMPL)	277 (p<0,01)	0,828 (p=0,368)	0,526 (p=0,01)
Registered unemployment rate (UNEMRAT)	290 (p<0,01)	0,238 (p=0,628)	0,526 p=0,01

Source: own evaluation
Number of students (STU) was the only indicator significantly identified at both levels

The comparison of the national and regional level of individual indicators was carried out through three tests:

- Mann-Whitney test „W´"   (3)
- Levene test "LE"   (4)
- Kolmogorov-Smirnov test "K-S"   (5)

Number of students - a slight shift in the mean values is evident in the case of the indicator at the regional level, which can be described as statistically significant (W = 263; p = 0.016). The range of variation has increased minimally and thus the variance can be described as the same (LE = 0.012; p = 0.911). A similar conclusion can also be stated when comparing the distribution functions of the STU indicator in the Slovak Republic and the Prešov self-governing region (K-S = 0.368; p = 0.151), that is, the distribution functions are without statistically significant differences.

The number of pensioners - absolute differences in the mean value (median) were shown to be statistically significant by means of the Mann-Whitney test. The differences in the range of variation and variability of the results measured at the national and regional level can be characterized as minimal and statistically insignificant (LE = 0,329; p = 0,569). The differences in the distribution functions proved to be statistically significant. The distribution function of the PENS indicator at the regional and national level can be considered different (K-S = 0.894; p < 0.01).

Number of crimes (NC) - the outlined differences in the absolute level of the median proved to be statistically significant (W = 71; p < 0.01) with the dominance of the national indicator of NC. The variability can be described as consistent (LE = 1.899; p = 0.176). Statistically significant differences were also confirmed when comparing the distribution functions of the number of crimes calculated per 1 inhabitant of the state and region (K-S = 0,578; p < 0,01).

The number of employed inhabitants (EMPL) - the difference in the mean value of the indicator at the national and regional level proved to be statistically significant (W = 34; p < 0.01) with the dominance of the recalculated number of employed inhabitants in Slovakia. Levene's test confirmed the already outlined homoscedasticity: agreement of the variance of the measured values (LE = 0.0001; p = 0.995). Significant differences were also demonstrated in the case of comparison of distribution functions (K-S = 0,684; p < 0,01).

The number of unemployed inhabitants (UNEMPL) - despite these identified relative differences in the variability of results at the national and regional level, it can be stated in the case of the number of unemployed its homoscedasticity (LE = 0.828; p = 0.368): agreement of variance. However, from the point of view of the location of the obtained results, these differences are significant (W = 277; p < 0.01), which means that the regional level of the number of unemployed is significantly higher. Statistically significant differences were also demonstrated in the case of comparing the distribution functions of this indicator (K-S=0,526; p = 0,010).

The rate of registered unemployment - the differences outlined above were reflected in the rejection of the hypothesis of the coincidence of mean values (W = 290; p < 0.01) and distribution functions (K-S = 0.526; p = 0.01). The results of the Prešov self-governing region are therefore statistically significantly higher and at the same time distributed differently. However, the variance in both cases can be described as the same (LE = 0.238; p = 0.628).

Table 8. **Results of the comparison of indicators at the national and regional level, calculated per 1 inhabitant in the period 2001-2019 - group of national indicators**

	STU	PENS	NC	EMPL	UNEMPL	UNEMRAT
mean value match	No	No	No	No	No	No
homoscedasticity	Yes	Yes	Yes	Yes	Yes	Yes
distribution function matching	Yes	No	No	No	No	No
dominance	PSK	SR	SR	SR	PSK	PSK

Source: own evaluation

In the case of each of the 6 evaluated indicators, a statistically significant difference in the mean value between the national and regional levels of this indicator was demonstrated. In the case of the number of students, the number of unemployed and the rate of registered unemployment, significantly higher values were measured at the regional level in the Prešov self-governing region. In the case of the second half of the indicators, specifically in the case of the number of pensioners, the number of crimes and the number of employed inhabitants, this is the case at the national level. Except for the number of students, the distribution function is also different, so it is possible to state in 5 cases completely different characteristics of the indicator at the national and regional level.

4. 2. 2. Comparison of the level and structure of significant indicators at the regional and national level

In the second group of indicators (PSK - regional level), attention was paid to the economically active population with or without primary education (EAO-BE), the average duration of 1 case of incapacity for work (WORINC), net monetary expenditure on hotels, cafes and restaurants (EXPENDITURES -HCR) and electricity consumption (ELECTRICITY). The indicator number of students, which was significant at both levels, was compared in the previous section.

For the purposes of this comparison, the individual values were converted per inhabitant of both nomenclature units, with the exception of net monetary expenditures on hotels, restaurants and cafes (EXPENDITURES-HCR), and the average duration of 1 case of incapacity for work, in which case this was not necessary for the purposes of comparison.

The results of the comparative torque characteristics of the level and structure of significant indicators at the regional level with the national level are offered in Table 7. The economically active population with primary education and without education (EAO-BE) is the first of the group of indicators that was confirmed as significant at the regional level. When comparing the mean values, it is possible to observe minimal differences in absolute terms, which, however, when looking at the relative values, are at the level of 20% - 31% in favour of the Prešov self-governing region. The maximum as well as the minimum value in both cases was also recorded at the regional level, which was reflected in an almost doubled range of variation. From the point of view of the torque characteristics of the shape, we can state the same attribute, i.e. j. positive skew.

Table 9. **Comparison of torque characteristics of EAO-ZV, PN, EXPENDITURE-HCR, ELECTRICITY indicators at national and regional level**

Torque characteristic	EAO-ZV		PN		EXPENDITURES-HCR		ELECTRICITY	
	SR	PSK	SR	PSK	SR	PSK	SR	PSK
Mean	0,033	0,040	42,53	49,24	15,434	16,440	3,146	0,878
Median	0,030	0,039	7,463	10,901	16,43	16,43	3,166	0,865
Std. Deviation	0,005	0,007	18,935	23,415	3,083	2,678	0,109	0,118
Coeff. of variation	17,085	17,849	26,74	28,47	19,978	16,289	3,474	13,44
Minimum	0,027	0,026	50,48	65,79	9,53	10,92	2,933	0,698
Maximum	0,043	0,057	23,74	37,32	20,45	20,77	3,309	1,129
Variation range	0,016	0,030	33,96	38,51	10,92	9,85	0,375	0,431
Lower quartile(Q3)	0,029	0,036	45,43	56,32	12,95	14,87	3,060	0,785
Upper quartile (Q1)	0,040	0,043	-0,461	-0,223	17,47	18,65	3,237	0,976
Skewness	0,67	0,906	-1,191	-0,887	-0,395	-0,341	-0,379	0,390
Kurtosis	-1,337	1,3146	42,53	49,24	-0,762	-0,394	-0,676	-0,718

Source: own evaluation

The average duration of 1 case of incapacity for work (WORINC) - a significant indicator at the regional level, for which it was not necessary to recalculate the values per 1 inhabitant of the given nomenclature unit for the purpose of comparison with the national level. The values of the torque characteristics of the position of the indicator at the regional level are higher by about 16% compared to the national one. Higher differences in variability are caused by significantly higher maximum values for the entire observed period of 2001-2019 (maxR = 37.32, maxN = 23.74), which were subsequently reflected in higher values of the standard deviation, variation range or variation coefficient. Despite these differences, the nature of the data remains the same at the regional and national level, i.e. j. negatively skewed with a low concentration around the mean value.

Net monetary expenditure on hotels, cafes and restaurants (EXPENDITURES-HCR) is the second of the significant indicators at the regional level, for which it was not necessary to recalculate the values per 1 inhabitant of the given nomenclature unit for the purpose of comparison with the national level. From the point of view of the state as well as the region, in the case of this indicator, it can be stated that the median is completely balanced ($\widetilde{x_N} = \widetilde{x_R} = 16{,}43$) and only a slightly higher average in favor of the Prešov self-governing region. It is the values in the region that show smaller differences in both absolute and relative terms, i.e. using the range of variation, standard deviation or coefficient of variation. A similar balance was also confirmed in the case of the comparison of the shape of the data, where we can see a slight negative skew.

Electricity consumption - the differences between the national and regional level are already apparent when comparing the average values, which in the case of Slovak Republic represented more than 3 times the values measured in the Prešov self-governing region. In the case of the national level, it is possible to talk about significant balance of the indicator across the entire evaluated period of 2001-2019 ($v_N = 3{,}47\%$). In the case of the regional level of this indicator, similar values of the range of variation were observed, which, however, in the context of absolute differences in the measured values, also means almost 4 times higher variability expressed by the coefficient of variation ($v_R = 13.44\%$).

The comparison of the regional and national level of individual indicators was also carried out through three tests:

- Mann-Whitney test „W´"   (3)
- Levene test "LE"   (4)
- Kolmogorov-Smirnov test "K-S"   (5)

Electricity consumption - the differences between the national and regional level are already apparent when comparing the average values, which in the case of Slovak Republic represented more than 3 times the values measured in the Prešov self-governing region. In the case of the national level, it is possible to talk about significant balance of the indicator across the entire evaluated period of 2001-2019 ($v_N = 3,47\%$). In the case of the regional level of this indicator, similar values of the range of variation were observed, which, however, in the context of absolute differences in the measured values, also means almost 4 times higher variability expressed by the coefficient of variation ($v_R = 13.44\%$).

The comparison of the regional and national level of individual indicators was also carried out through three tests:

- Mann-Whitney test „W´"   (3)
- Levene test "LE"   (4)
- Kolmogorov-Smirnov test "K-S"   (5)

Table 10. **Comparison of significant indicators at the regional level and national level**

Significant indicator PSK/indicator SR	W	LE	K-S
Economically active population with basic education or without education (EAO-ZV)	269 (p=0,01)	0,001 (p=0,971)	0,578 (p<0,01)
Average duration of 1 case of incapacity for work (PN)	255 (p=0,030)	3,266 (p=0,079)	0,526 (p<0,05)
Net cash spending on hotels, cafes and restaurants (EXPENDITURES-HCR)	210,5 (p=0,389)	0,787 (p=0,380)	0,210 (p=0,793)
Electricity consumption (ELECTICITY)	0 (p<0,01)	0,290 (p=0,626)	1 (p<0,01)

Source: own evaluation

Economically active population with basic education or without education (EAO-BE) - for this indicator, a statistically significant difference was confirmed in the case of average values at the national and regional level, in favour of the Prešov self-governing region (W = 269; p = 0.01). However, their dispersion can be described as identical, homoscedasticity was confirmed using Levene's test (LE = 0.001; p = 0.971). When comparing the distribution functions, it is possible to identify significant differences, which were also proven to be statistically significant (K-S = 0.578; p < 0.01).

The average duration of 1 case of incapacity for work (WORINC) - the indicator at the regional level has a significantly higher mean value (W = 255; p = 0.030). However, absolute differences in variability were not found to be statistically significant when Levene's test (LE = 3.266; p = 0.079) confirmed the assumption of equal variance. Statistically significant differences can also be seen when comparing distribution functions (K-S = 0.526; p < 0.05).

Net monetary expenses for hotels, cafes and restaurants (EXPENDITURES-HCR) - due to the coincidence of the absolute values of the median, it is not possible to state their statistically significant differences (W = 210.5, p = 0.389). The conformity was also confirmed in the case of comparison of variance (LE = 0.787, p = 0.380) as well as distribution functions (K-S = 0.210, p = 0.793). Electricity consumption (ELECTRICITY) - in the case of such significant absolute differences between the level of the indicator at the regional and national level, it is not surprising to reject the assumption of the same mean value (W = 0, p < 0.01) or distribution functions (K-S = 1, p < 0.01). In the case of variance comparison, the identified differences did not prove to be so significant. Levene's test confirmed their homoscedasticity (LE = 0,240, p = 0,626).

Table 11. **Results of the comparison of indicators at the national and regional level, calculated per 1 inhabitant in the period 2001-2019 - group of national indicators**

	EAO-BE	WORINC*	EXPENDITURES - HCR*	ELECTRICITY
mean value match	No	No	Yes	No
homoscedasticity	Yes	Yes	Yes	Yes
distribution function matching	No	No	Yes	No
dominance	PSK	PSK	PSK**	SR

* not calculated per 1 inhabitant
** partial dominance not lasting during the entire monitored period of 2001 - 2019
Source: own evaluation

The results of the comparison are summarized in Table 9. The only indicator that can be characterized as having no difference from the point of view of the mean value, dispersion and distribution function at the national and regional level is spending on hotels, cafes and restaurants. In the case of the other 3 indicators (EAO-BE, WORINC, ELECTRICITY), the properties of the evaluated indicators are significantly different at the national and regional level. The only attribute in which conformity was observed across indicators is the variability of the indicator (expressed by dispersion), which can be attributed to the interconnectedness of the evaluated nomenclature units. During the entire evaluated period of 2001-2019, a similar development accompanied by a change of dominance was observed.

Based on the results of the hypothesis H2, based on which:

"*We assume statistically significant differences in the structure of significant social, economic and environmental indicators between the Prešov self-governing region and the Slovak Republic*" – hypothesis was accepted.

In order to compare these indicators at the national and regional level, three tests were used: Mann-Whitney test (W´), Levene test (LE) and Kolmogorov-Smirnov test (K-S). Differences at the national and regional levels were shown to be significant each time, regardless of whether the indicator was identified as significant at the national or regional level. Differences are noted for individual indicators in mean values and distribution functions.

5. Discussion

The global phenomenon of today is the low birth rate and the aging of the population. This problem has an alarming effect not only in Slovak Republic, but across the European continent. Demographic factors are usually decisive in all areas of tourism participation (Ilakovac et al 2020). Studies point to the purchasing power that the senior segment often uses for travel in developed countries. Seniors are expected to spend the most money on travel among all other segments.

The number of pensioners, whose values in the observed period at the level of Slovakia show continuous growth, progressively affects the number of overnight stays. In 2019, there were a total of 1.17 million pensioners in Slovakia and a growing trend is expected in the coming years as well. Despite the growing number of pensioners, the limiting factor in their demand for tourism services is the amount of the pension, the rising cost of living in connection with inflation and the declining standard of living of pensioners in Slovakia. It is therefore questionable whether this potential of pensioners will be able to be used in Slovakia in connection with the number of overnight stays and the consumption of tourism products to a sufficient extent. This fact represents a challenge for entities in the field of tourism and creates pressure for innovation, or for expanding the range of products that take into

account their preferences (spa, medical tourism, pilgrimage tourism, cultural-exploratory tourism), which will also reflect their economic possibilities.

The impact of age in emerging economies has been investigated recently by several scholars (Rao & Shukla 2022). Changes in the structure of families, the decreasing number of children typical of this period, affect the number of overnight stays and the offer of products. The future demographic development in the territory of Slovakia or in Prešov self-governing region is also related to the lower birth rate, which will significantly affect the functioning of the tourism industry and the national economy in the future. While students - young people (16 to 25 years old) with lower income or no income - do not have sufficient funds for travel (Veiga et al. 2017), despite their ability to organize their own trips, use travel websites, social networks, blogs and reviews (Reinhold et al. 2018), travel to a limited extent, or with a small number of overnight stays. Slovakia, as well as Prešov self-governing region, has considerable potential related to the number of students, which significantly affects the number of overnight stays. Tourism service providers should increase the potential of this segment through targeted advertising, advantageous student discounts, and attractive products. We see this as a possibility that, despite the insufficient income of students, would cause a reduction in the number of one-day trips in favour of overnight stays.

Opinions on the level of education achieved and its influence on the number of overnight stays are different. Gúčik (2020) states that the level of education and the number of overnight stays are positively related and participation in tourism grows hand in hand with the level of educational attainment. Our research did not support this conclusion. The number of residents with university education did not significantly affect the number of overnight stays at any level. The research conclusions draw attention to the economically active population with a basic level of education and without education at the level of the region, which negatively affects the number of overnight stays. The level of education conditions the employment status, which largely accounts for differences in incomes and determines the consumption of the population. The education of children and youth from marginalized groups, who either do not receive education or receive basic education, has a regressive effect on participation in overnight stays within the tourism industry. Supporting the education of this population group is the way to the labour market and the possible consumption of services offered within the tourism industry in the region. It is one of the possibilities to contribute to the development of the region and strengthen the position of Prešov self-governing region. The benefits of tourism are manifested in macroeconomic relations, in the economy of many industries connected to it, as well as in the creation of new jobs, especially in regions with high unemployment (Gallo et al., 2019).

The effect of a safe country on the willingness to spend the night is significant. This indicator, expressed by the number of crimes within the Slovak Republic, also declares a decreasing number of overnight stays with an increasing number of crimes. The level of security from a political or health point of view is decisive for tourism as a sector not only in the Slovak Republic, but also on a global scale. The COVID-19 pandemic has had an unprecedented impact on the economy, with a direct impact on tourism.

The COVID-19 pandemic as well as the war in Ukraine have had an unprecedented impact on the economy, with a direct impact on tourism (Grančay, 2021).

The demand for tourism is also increased by rapid changes in lifestyle, requiring increased care for physical as well as mental health. The indicator number of days of the average duration of 1 case of incapacity for work at the regional level was negatively quantified with the number of overnight stays. A high rate of incapacity for work reduces the disposable income of families and at the same time prevents participation in tourism. The physical and mental condition of an individual is a prerequisite for his/her staying in the work process, ensuring income and participating in tourism. It also applies reciprocally, as stated by Jeon et al. (2016) - the sustainable development of tourism plays a significant role in improving the quality of life, in terms of providing services for tourists, such as also considering the quality of life of residents in tourism destinations.

Economic factors and their influence on the development of tourism dominate the research works of several authors: Berlin et al. (2017), Luekveerawattana (2018), Taizeng et al. (2019), Sokhanvar (2019) and others. Bunghez (2016), draws attention to increasing the number of available jobs, which will lead to stimulation of economic growth. According to Ali (2018), policy makers should try to promote tourism in this regard, as it can reduce unemployment. The workforce whose carrier is defined innovatively, and its economic power brings changes and development of global tourist behavior (Cavagnaro et al. 2018). The category of employed inhabitants at the level of the Slovak Republic consists of employees under the age of 65, which is confirmed by the positive effect on the number of overnight stays in connection with the number of employed inhabitants in Slovakia. The overall effect is completed by monitoring the relationship of the tourism indicator with the level of unemployment expressed both in absolute terms and relatively. The number of unemployed inhabitants and the rate of registered unemployment at the national level have a negative effect on the number of overnight stays. This is also documented by Tüzemen (2017), according to which the unemployment rate means a loss of production, a decrease in income and an increase in the public budget deficit and non-participation in tourism.

The importance of environmental indicators in maintaining the sustainability of tourism dominates in the studies of the authors: Lenzen et al. (2018), OECD (2018), Berlin et al. (2017) and others. The tourism sector is associated with activities that deplete natural resources and pollution, but at the same time it has the potential to increase environmental awareness. Authors Alola et al. (2019)., Baz et al. (2020) state that a 1% acceleration in the growth of tourism increases the economic growth of countries by 34%. This growth in the economies of the IEA countries worsens the quality of the environment by 47%. Doğan et. al. (2020), Wang and Wang (2020) document that the use of renewable energy is more effective for improving a country's economic growth. They emphasize environmental sustainability and the benefits of tourism development for the well-being of the population and the quality of the environment. Khan, Hou (2020) direct a call to support the sustainable development of tourism to economic policy makers in individual countries (Androniceanu & Sabie, 2022). The development of tourism expressed by the number of overnight stays is positively related to the growing energy consumption at the level of the region. This trend represents a challenge for tourism actors to invest in renewable energy sources in the pursuit of sustainable tourism development.

By comparing significant indicators at the national level with the regional level, it can be concluded that in the case of each of the 6 evaluated indicators, a statistically significant difference in the mean value between the national and regional levels of this indicator was demonstrated. In the case of the number of students, the number of unemployed inhabitants and the rate of registered unemployment, significantly higher values are measured at the regional level in the Prešov self-governing region. In the case of the second half of the indicators, so in the case of the number of pensioners, the number of crimes and the number of employed inhabitants, this is the case at the national level. With the exception of the number of students, the distribution function is also different, so we note in 5 cases completely different properties of the indicator at the national and regional level.

Differences are also noted based on a comparison of significant indicators at the regional level with the national level. The only indicator that, from the point of view of the mean value, dispersion and distribution function, can be described as undifferentiated at the national and regional level, is the expenditure on hotels, cafes and restaurants. In the case of the other 3 indicators (EAO-ZV, WORINC, ELECTRICITY), the characteristics of the evaluated indicators are significantly different at the national and regional level. The only attribute in which conformity was observed across indicators is the variability of the indicator (expressed by dispersion), which can be attributed to the interconnectedness of the evaluated nomenclature units. During the entire evaluated period of 2001-2019, a similar development accompanied by a change of dominance was observed.

Based on the results of the mentioned research, it can be concluded that tourism and its development regarding sustainability at different levels are influenced by different indicators. Since the

development of sustainable tourism at different levels is conditioned by different indicators, measures to support the development of tourism at the level of individual actors of the tourism industry must be proposed and adopted differently. Only considering the specifics of the regions, knowing the significant indicators affecting the development of sustainable tourism, will make it possible to adopt differentiated and at the same time effective economic policy measures that will produce the desired effects in the region or at the state level.

6. Conclusion

A worldwide trend is the pursuit of a sustainable nature of tourism, which considers the impact of the activity on the environment. Part of it is the responsible use of natural resources, the effort to transition to renewable energies, but also the sustainability of the jobs created and ensuring economic growth. Domestic tourism can be seen as a generator of sustainable growth in the regions of Slovak Republic and an important factor in the quality of life of residents in the least developed regions.

The benefit of the conducted research, the results of which are presented in this contribution, is the identification and subsequent comparison of significant indicators at the national and regional level, confirming their heterogeneous nature. Due to the heterogeneity of the territory from the point of view of all investigated indicators, various determinants were identified in connection with the number of overnight stays of tourism visitors at the level of the Slovak Republic and the Prešov self-governing region. From the point of view of the quantity as well as the quality of these indicators, the obtained results point to the difference in functioning and status at the national (NUTS 1) and regional level (NUTS 3). The differences between the indicators at the national and regional level were shown to be significant every time, regardless of whether the indicator was identified as significant primarily in relation to the number of overnight stays at the national or regional level. In most cases, the indicators in the Prešov self-governing region are higher than the level of indicators in the Slovak Republic.

The obtained results point to the difference in functioning/status at the national (NUTS 1) and regional (NUTS 3) level. The differences confirmed by research at both levels need to be respected and considered when adopting measures and tools in connection with the support of sustainable tourism development.

Limiting factors related to research can be considered the quantitative component of a selected group of determinants reflecting social, economic and environmental areas. The limiting fact was the insufficient amount of data for the Prešov self-governing region. A more realistic view of research on tourism development indicators was also negatively affected by the unavailability of current data on the state and development in the social, economic, environmental and tourism sectors for the period 2020 - 2021, marked by the COVID-19 pandemic. The limits stated by the authors are not fixed and may represent topics for further research.

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