

PUBLIC RECREATION IS AN ENVIRONMENTAL ASPECT AFFECTING NOT ONLY THE ENVIRONMENT

David Brandejs, Martina Vařechová, Pavel Klika, Vítězslava Hlavinková

Brno University of Technology, Institute of Forensic Engineering, Purkyňova 118, 612 00 Brno, Czech Republic

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Abstract

Optimal recreation should lead to the regeneration of the organism, which is conditioned by a retreat from everyday worries and work responsibilities. The most efficient and reliable way is to travel to places that are almost the opposite of everyday life. The diversity of requirements of individuals who are tired of physical or mental work logically implies the diversity of recreational areas. There are a large number of cultural and natural monuments, mountain resorts, spas and water areas. However, the increased concentration of tourists in these localities may be ambivalent.

A positive economic effect can be the reduction of unemployment and the development of local business in tourist attractions. These aspects lead to longer-term regional stability. The negative impact is mainly environmental pollution by carbon dioxide emissions. In some cases, there is also unwanted noise pollution, light smog and changes in local hydrogeology associated with unplanned development.

With the growing popularity of travel, the demands on the quality and quantity of not only holiday accommodation are growing, which has led to a sharp rise in property prices in this segment. The study maps how the environmental aspect of the attractiveness of a holiday or tourist destination affects the value of residential real estate.

Key words: Environment, tourism, tourist sites, economic impacts

Introduction

A typical tourist attraction of the South Moravian Region is the historic town of Znojmo, in the Czech Republic, where, in addition to publicly accessible monuments, other interesting cultural events take place in a few days. The number of accommodated visitors is recorded in the Czech Statistical Office database. This fact was used to create a statistical model.

Materials and methods

The basic and most important basis for evaluating the research goal are price data on realized sales of real estate with a residential function and statistical data from the public database of the Czech Statistical Office on the development of tourism.

As part of the research project, 5 cadastral areas in South Moravia were examined, which were evaluated as the most visited in terms of tourism. The city of Brno, with its specific market, area and population, was not included in the research. In this paper, only a partial part of the achieved results is presented.

A modern statistical method, dependence analysis, was used to evaluate the environmental aspect described above. The most important tools used in this analysis are correlation and regression analysis. The output of the correlation analysis is a correlation coefficient, which between the two variables indicates the degree of their mutual correlation. Pearson's correlation coefficient was used to evaluate the strength of the correlation.

Regression analysis is one of the most commonly used statistical methods that can examine the relationship between two variables. The output of the regression analysis is, among other things, the so-called P value, which indicates how significant the created statistical model is and the so-called Significance F, which expresses the statistical significance of the entire regression model and the suitability of the selected regression function. A simple linear regression was chosen to evaluate all sites.

Results

One of the localities that was investigated is the town of Znojmo in the South Moravian Region. The subject of the research was real estate with a residential function, specifically family houses and residential buildings. By remote access to the real estate cadastre, databases of all price data from cadastral areas were obtained for all registered periods (2014 - present), from which data on real estate with a residential function were subsequently analysed.

Subsequently, specific price data from the real estate cadastre were requested, which were processed into databases and assigned to the assessed real estate. Based on prices. data, cadastral maps and map portals, the agreed price per m² / year was determined according to the built-up area of buildings, storey of buildings and price data, which were evaluated on average in each year and each cadastral area.

In this way, the agreed price per m² / year of built-up area of each property was determined. Average prices are clearly shown in Table 1. - Development of prices. At the time of the research, some data for 2021 were not yet available, for this reason the time series are only processed until 2020.

Tab. 1: Development of prices (Source: Own processing)

Price development in CZK / m ² 2014–2021								
c.t./ year	2014	2015	2016	2017	2018	2019	2020	2021
Znojmo	10 058	9 899	12 807	13 437	14 726	14 831	16 030	-----

The following graph also Fregular shows the development of prices.



Graph. 1 Development of prices (Source: Own processing)

Statistical data from the public database of the Czech Statistical Office on the development of tourism (number of tourists who visited the site) are processed in the following table and graph.

Tab. 2: Tourism development (Source: Own processing)

Tourism development 2014–2021								
c.t./ year	2014	2015	2016	2017	2018	2019	2020	2021
Znojmo	39 076	43 873	44 706	54 993	57 434	57 911	33 956	-----

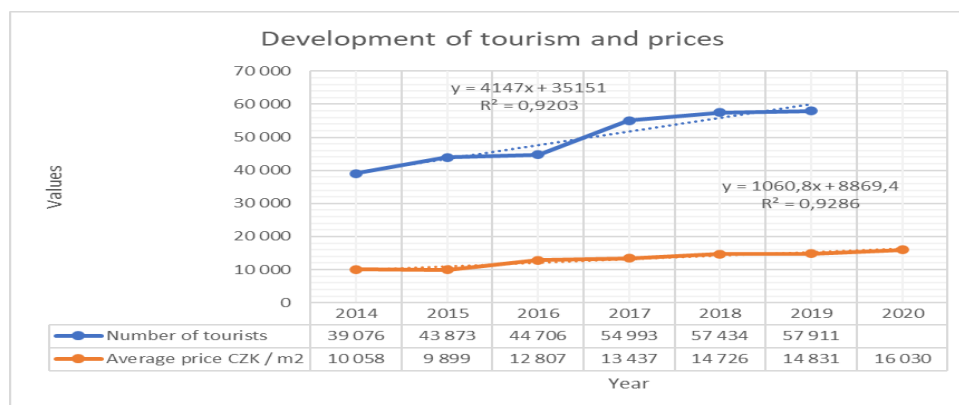
A statistically significant abnormality of the decrease in the number of visitors (tourists) in the years 2020–2021, caused by the covid pandemic, is not suitable for the model from the point of view of statistical assessment and would completely distort the results obtained in the regression analysis. For this reason, the total data were evaluated only in the period 2014–2019, inclusive. After the creation, analysis and processing of basic input data, these databases were tested by the statistical methods described above with the following results.



Graph. 2 Tourism development (Source: Own processing)

Location Znojmo

Znojmo is a city in the South Moravian Region, 65 km southwest of Brno and 80 km northwest of Vienna. 34,000 inhabitants live here. From the point of view of tourism, Znojmo Castle, Loucký Monastery and other former monasteries, Znojmo churches and town houses are especially sought after. Some monuments are also entered in the lists of cultural monuments of the Czech Republic. The following chart shows the development of tourism together with the price of real estate in the period under review (excluding the number of tourists 2020).



Graph. 3 Development of tourism and prices (Source: Own processing)

In the next step, a function for regression analysis was sought. The linear function was evaluated as the most suitable. The linear dependence of the price on tourism is clearly shown in the graph.

R^2 indicates the degree of explanation of the influence of tourism on the price of real estate = 83.43%. Subsequently, a correlation analysis was performed. Pearson's correlation coefficient was chosen for evaluation.

correlation coefficient (Reliability setpoint R) = 0.792 also indicates a strong, positive linear correlation. *Significance F* = 0.0109 is lower than the significance level 0.05, the linear function is appropriate, and the overall model is statistically significant.

The value of P = 0.01092 is lower than the value of *tStat* and the chosen level of significance α = 0.05 and proves the dependence of the price on tourism.

The coefficient of determination (Reliability value R) = 0.8343 indicates that the influence of tourism on the price of real estate is explained by the rate of 83.43%.

The standardized residues are less than 2 and their sum is equal to 0. *The value of P* is statistically significant.

At the level of significance $\alpha = 5\%$ and the level of reliability 95%, the influence of tourism (number of tourists) on real estate prices in the cadastral area of Znojmo is proven.



Graph. 4 Price dependence on tourism (Source: Own processing)

Pearson correlation coefficient

	Total tourists	Average price
Total tourists	1	
Average price	0,9134	1

Fig. 1 Pearson correlation coefficient (Source: Own processing)

Error! Not a valid link. Regression statistics capture the results of correlation and regression analysis.

Regression statistics

Multiple R	0,913402904
Reliability value R	0,834304866
Reliability setpoint R	0,792881082
Mean value error	997,0047955
Observation	6

ANOVA

	Difference	SS	MS	F	Significance F
Regression	1	20020250,48	20020250,48	20,14072094	0,010923887
Residues	4	3976074,249	994018,5623		
Total	5	23996324,72			

	Coefficients	Mean value error	t Stat	P value	Lower 95%	Top 95%	Lower 95.0%	Top 95.0%
Border	337,3270123	2768,337135	0,121851854	0,908892706	-7348,809075	8023,463	-7348,81	8023,463
Tourists	0,247432084	0,055133874	4,487841457	0,010923887	0,09435591	0,400508	0,094356	0,400508

Fig. 2 Regression statistics (Source: Own processing)

The following table shows the residues and probabilities.

RESIDUES

PROBABILITY

Observation	Expected Average price CZK / m ²	Residues	Expected Average price CZK / m ²	Percentile	Average price CZK / m ²
1	10005,98312	51,58127114	0,057842866	8,333333333	9898,616914
2	11192,91482	1294,297907	-1,45141634	25	10057,56439
3	11399,02575	1408,0171	1,578940224	41,66666667	12807,04285
4	13944,35959	507,1286153	0,568690373	58,33333333	13437,23098
5	14548,34131	177,6860887	0,199255899	75	14726,0274
6	14666,36641	164,1420621	0,184067725	91,66666667	14830,50847
Sum of residues:		0,00	0,00		

Fig. 3 Regression statistics - Residues (Source: Own processing)

A correlation coefficient (Multiple R) = 0.913 indicates a strong, positive linear correlation. An adjusted

Discussion

The expected assumption of the influence of tourism on the price of real estate in Znojmo was confirmed, however, for a correct evaluation and generalization it would be more conclusive long-term research. If it would be possible to include tourists not captured in the database of staying guests in the research, the dependence would probably be even more significant. Refinement would be possible using geolocation data from mobile operators, but this is only available to the public administration.

Conclusion

The benefits of local tourism are clear but rising residential property prices may also make housing less affordable for local residents. The fact is that since 2020, property prices have been rising steeply almost all over the Czech Republic, so it is important to thoroughly investigate the causes of the price rises and correctly demonstrate that they are caused by the tourist attraction of the location.

References

Czech Statistical Office, available from: <https://www.czso.cz/>,

Czech Surveying and Cadastre Office, available from: <https://cuzk.cz/Uvod.aspx>

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Souhrn

Studie mapuje, jak environmentální aspekt atraktivity rekreační či turistické destinace ovlivňuje nejen životní prostředí, ale i hodnotu rezidenčních nemovitostí (nejen rekreačních objektů), což dokládá statistické vyhodnocení za období let 2014 až 2019. Pozitivním ekonomickým vlivem mohou být v turisticky atraktivní lokalitě snížená nezaměstnanost a rozvoj místního podnikání. Nesledovaným aspektem je horší cenová dostupnost rezidenčních nemovitostí pro místní obyvatele.

Contact

Ing. David Brandejs

E-mail: david.brandejs@usi.vutbr.cz

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