PUBLIC RECREATION AND TOURISM ARE ASPECTS THAT AFFECT NOT ONLY THE ENVIRONMENT

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Abstract
In most cases, recreation is a short-term hobby that is often associated with travel (tourism) to nearby, but also more distant and remote locations. It is often associated with rest from everyday worries and work duties, in the form of spa and beach stays, but also with active activities. Active activities can include, for example, sports activities, getting to know new territories, villages and cities, visits to various cultural and natural monuments, including mountain resorts, spa areas and water reservoirs. The increased concentration of tourists in these locations brings with it both positive and negative effects. The positive influence is mainly the economic impacts, the development of local business and the economic growth of the given locality. The negative impact of tourism is very often associated especially with pollution, i.e., the impact on the environment. The study evaluates this environmental aspect. That is, how the attractiveness of a tourist destination or the attractiveness of a vacation affects the value of residential real estate.

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

Introduction

The town of Vizovice, which is in the Zlín district in the Zlín region, is an important location sought after by tourists. The town of Vizovice is located 14 km east of Zlín in the foothills of the Vizovice Hills. 4,857 inhabitants live here. In terms of tourism, the Vizovice state castle, built in the middle of the 18th century, in the French Baroque style, and the Roman Catholic church of St. Lawrence from 1792. The city is famous for the annual Trnkobrani cultural festival and the annual Masters of Rock festival, which are attended by many visitors not only from the country but also from abroad. The number of visitors accommodated, not only at these festivals, is recorded by the Czech Statistical Office. Not only this database was used to create statistical modelling.

Materials and methods

The basic and most important basis for the evaluation of the research objective is the price data of realized sales of housing units 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 territories in South Moravia and 5 cadastral territories in the Zlín region were examined, which were evaluated as the most visited from the point of view of tourism. The district cities, the city of Brno and the city of Zlín, with their specific market, area, and population, were not included in the research, as they require a separate study. In this contribution, only a partial part of the achieved results is presented, namely the cadastral territory of Vizovice.

A modern statistical method, dependency analysis, was used to evaluate the environmental aspect described above. The most important tools of this analysis that were used are correlation and regression analysis. The output of the correlation analysis is the correlation coefficient, which between two variables indicates the degree of their mutual correlation, positive or negative. The Pearson correlation coefficient was used to evaluate the strength of the correlation. Regression analysis is one of the most used statistical methods that can investigate the relationship between two variables. Anova results, e.g., T-test, are also used to verify the results. This simple T-test is used to determine the statistical significance of individual regression parameters and the F-test, which is used to determine the statistical significance of the entire regression model.

The basis and source of the compiled databases in each cadastral territory that were analysed, in the years 2014–2022, was the data of price data from sales that took place, i.e., realized sales prices. These prices were evaluated in each year, based on the floor area of the housing unit, as an average per m2 and subsequently tested together with data on the development of tourism in a specific location. The statistically significant abnormality of the decrease in the number of visitors (tourists) in 2020-2021, caused by the SARS-CoV-2 virus pandemic, is not suitable for statistical assessment in the model and would completely distort the results achieved in the regression and correlation analysis. For this reason, total data was evaluated only in the period from 2014 to 2019, inclusive.

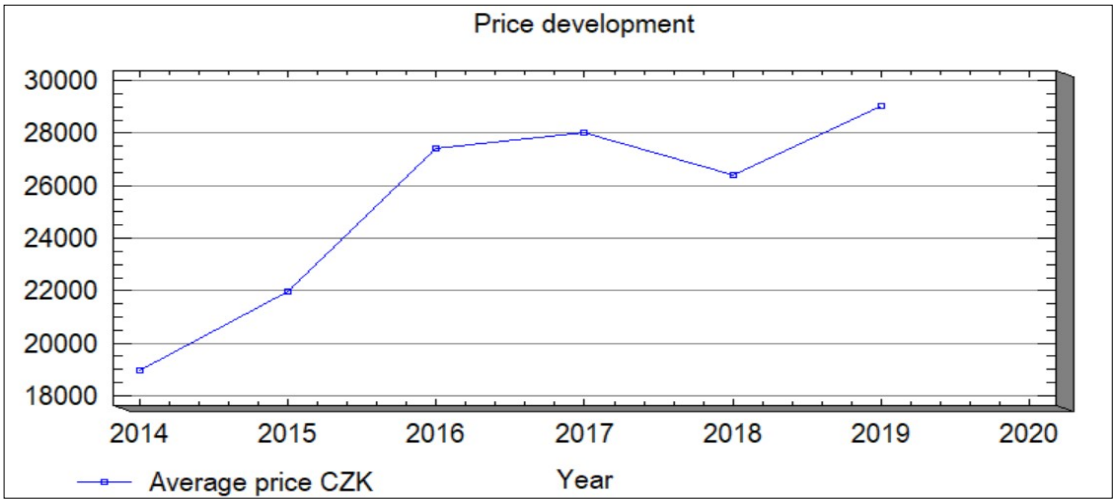
Results

Land Survey and Cadastre Office, on realized sales of housing units, a separate database was created that contained data on each housing unit. In particular: deposit number, date of deposit, price information, apartment unit number, address where the apartment unit is located, size of the apartment unit and any transferable co-ownership share. Data on the development of tourism were subsequently taken from the database of the Czech Statistical Office. The following table shows the results of the created databases.

Tab. 1: Data analysis results (Source: Own processing)

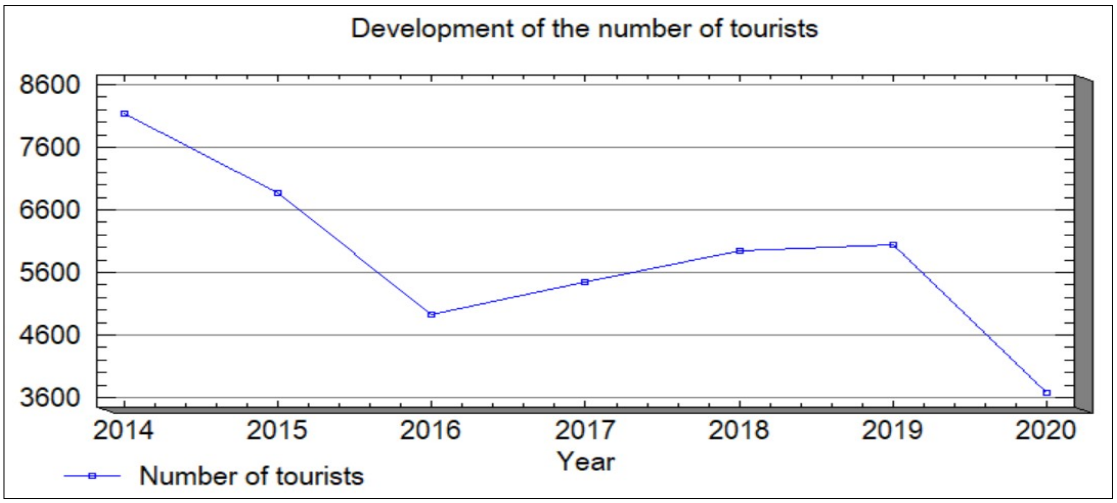
Results for testing - cadastral territory of Vizovice							
Values/year	2014	2015	2016	2017	2018	2019	2020
Total guests	8 131	6 861	4 932	5 444	5 951	6 045	3 678
Price CZK/m^2	18 948	21 992	27 420	28 000	26 393	29 009	-----

The development of the average realized (market) price of housing units (CZK/m^2) in a time series is illustrated by the graph.



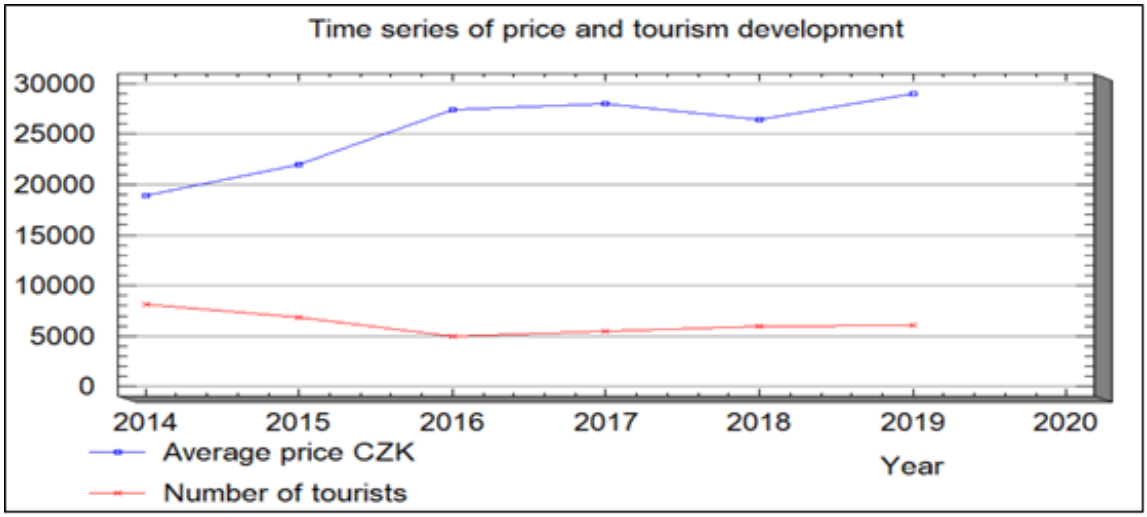
Graph 1: Development of the market price of housing units in the assessed years (Source: Own processing)

The development of tourism is also shown in the following graph. The sharp drop in the number of tourists after 2019 reflects the incoming pandemic of the SARS-CoV-2 virus.



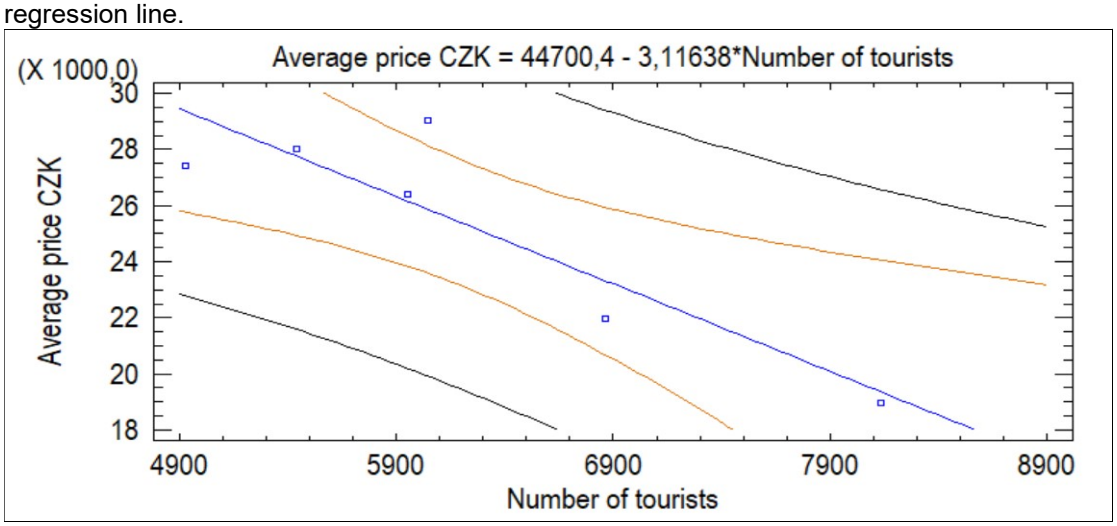
Graph 2: Tourism development (Source: Own processing)

The tools of statistical analysis of dependence, i.e. correlation and regression analysis, were used for the evaluation. The overall evaluation is done in the statistical program Statgraphics. The time series of the development of tourism as well as the realized (market) prices of housing units are shown in the next graph.



Graph 3: Time series (excluding guests in total in 2020) (Source: Own processing)

A certain correlation between the investigated variables is visually evident from the above graph. While the number of tourists decreases in 2015-2016, the price of real estate increases. In the years 2016-2018, on the contrary, the number of tourists increases and with the increasing number of tourists the price stagnates and in 2018 it decreases. On the contrary, with the decrease in the number of tourists in 2019, the price rises again. The Pearson correlation coefficient is used to determine the strength of correlation (strength of dependence). The dependence of the average market price on the number of tourists is illustrated by the next graph, together with the equation of the regression line.



Graph 4: The dependence of the average price on the number of tourists (Source: Own processing)

The graph also shows that as the number of tourists decreases, the price of housing units rises, and vice versa, if the number of tourists increases, the price decreases. A simple regression analysis is used for further evaluation. The results of regression statistics and residuals are shown in the following tables. The most important values are highlighted in bold.

Simple Regression - Average price CZK vs. Number of tourists
Dependent variable: Average price CZK
Independent variable: Number of tourists
Linear model: Y = a + b × X

Tab. 2: Regression analysis coefficients (Source: Own processing)

	Least Squares	*Standard*	*T*	
Parameter	*Estimate*	*Error*	*Statistic*	*P-Value*
Intercept	**44700,4**	4919,64	9,0861	**0,0008**
Slope	**-3,11638**	0,779319	-3,9988	**0,0161**

Tab. 3: Confidence intervals (Source: Own processing)

Confidence intervals			
Lower 95%	Upper 95%	Lower 99%	Upper 99%
31039,54	58360,35	22047,31134	67352,58397
-5,28026	-0,95238	-6,70471947	-0,4720723

Tab. 4: Analysis of Variance (Source: Own processing)

Source	*Sum of Squares*	*Df*	*Mean Square*	*F-Ratio*	*P-Value*
Model	6,24138E7	1	6,24138E7	15,99	**0,0161**
Residual	1,56124E7	4	3,90311E6		
Total (Corr.)	7,80263E7	5			

Correlation Coefficient = **-0,894376**
R-squared = **79,9908** percent
R-squared (adjusted for d.f.) = 74,9885 percent
Standard Error of Est. = **1975,63**
Mean absolute error = **1216,82**
Durbin-Watson statistic = 0,920505
Residual autocorrelation = 0,217089

The output shows the results of fitting a linear model to describe the relationship between the average price in CZK and the number of tourists. The fitted model equation is: Average price in CZK = 44700.4 - 3.11638 × Number of tourists
Since the P-value is lower than 0.05, there is a statistically significant relationship between the average price in CZK and the number of tourists, at a confidence level of 95.0% and a significance level of α= 5%. The R-Squared statistic shows that this model explains 79,9908% of the variability of the average price of CZK in the entire model. The correlation coefficient is equal to -0.894376, indicating a strong negative relationship between the variables. The standard error of the estimate shows a standard deviation of the residuals of 1975.63. This value can be used to construct prediction limits for new observations. The mean absolute error (MAE) of 1216,82 is the average value of the residuals. The Durbin-Watson (DW) statistic tests the residuals to see if there is any significant correlation based on the order in which they occur in the data set.
The P value = 0.0161 is lower than the tStat value, and at the same time it is much lower than the chosen significance level of α = 0.05. At the α = 5% significance level and 95% confidence level, tourism has been shown to have an effect on real estate prices within the set α value. The Slope value (so-called Coefficient B_1) evaluates that with each tourist the price decreases by CZK 3,11/m^2 of the housing unit. Thus, as tourism increases, the price per m^2 of floor space decreases. The upper 95% confidence interval and the lower 95% bound determine the variance. The price per m^2 is decreasing (95% confidence level) in the range of -5,28 to -0,95 CZK. The variance with 99% probability is in the range of -6,70 to -0,47 CZK. In the cadastral territory of Vizovice, the negative influence of tourism (number of tourists) on real estate prices, specifically on housing units, has been proven. Tourism reduces the market prices of housing units in this location. Here, however, it is necessary to emphasize that these results may also be subject to a so-called false correlation and that they relate only to this locality, and this compiled model. Evaluation of databases from other locations may confirm completely different conclusions.

Discussion
For a conclusive evaluation and generalization of the achieved results, a longer-term investigation would be correct, but the expected assumption of the influence of tourism on the price of real estate in Vizovice was confirmed. However, if it were possible to include in the research the number of other tourists, not captured in the database of accommodated guests, it can be argued that the dependence would probably be even more significant. More accurate results could be achieved using geolocation

data, for example from mobile operators, which are unfortunately only available for public administration or self-administration.

Conclusion
The economic benefit of local tourism is clear and proven. However, declining residential property prices may result in better housing affordability for local residents. The fact is, however, that since 2020 real estate prices have been rising steeply in almost the entire Czech Republic and are currently stagnating. In this regard, it is therefore important to consistently investigate the causes of the rise and fall of prices and correctly prove that they are caused by the number of tourists in the locality or the tourist-attractive locality.

References
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Souhrn
Faktor atraktivity turistického či rekreačního cíle zcela jistě ovlivňuje hodnotu nemovitostí v této lokalitě, což je prokázáno statistickým vyhodnocením pro zkoumané období v letech 2014 až 2020. Pozitivním ekonomickým vlivem mohou být v turisticky atraktivní lokalitě rozvoj místního podnikání a s tím spojená snížená nezaměstnanost. Negativním vlivem v této lokalitě je pravděpodobně zvýšený hluk a znečištění životního prostředí, které je zde spojené s cestovním ruchem. Méně sledovaným aspektem je ovšem cenová dostupnost některých typů rezidenčních nemovitostí pro místní populaci.

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