Global Scientific and Academic Research Journal of Economics, Business and Management
ISSN: 2583-5645 (Online)
Frequency: Monthly
Published By GSAR Publishers
Journal Homepage Link- https://gsarpublishers.com/journals-gsarjebm-home/

THE PROBLEMS OF THE EFFICIENCY OF HOTELS AND HOTEL-RECREATION COMPLEXES IN SLOVAKIA

By

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Article History

Received: 15/04/2026
Accepted: 25/04/2026
Published: 27/04/2026

Vol –5 Issue – 4

PP: -38-48

Abstract

Slovakia is a prominent destination for sport and health tourism, combining natural healing resources with diverse active leisure opportunities, particularly in its mountainous regions, specific capacities for wellbeing tourism. Tourism plays an important role in the Slovakian economy; this sector is one of the country's economic development priorities. SMEs in the Slovakian hotel and restaurant sector, representing roughly 4% of total national SMEs, are predominantly family-run or small-scale businesses critical to tourism, rural development, and regional employment. One of the serious problems of many hotels and hotel-restaurant complexes in Slovakia has been their low profitability and inefficiency, which is related to inappropriate marketing strategies, strong competition in the sector, low competitiveness or the lack of a favorable environment. Thus, considering, on the one hand, the rather large potential of various tourist facilities in Slovakia, primarily represented by hotels, hotel and recreational complexes, tourist bases, etc., it is important to analyze the influence of various factors on their performance indicators and key financial results. In this article the influence of various factors on performance indicators and financial results were identified using the example of hotels and hotel-recreational complexes in Slovakia; the specialization and evaluation of the most popular hotels and hotel-recreational complexes in various regions of Slovakia was analyzed; the impact of the Covid-19 pandemic on financial results using the example of individual most popular hotels and hotel-recreational complexes was studied.

Keywords: *hotels, hotel-recreation complexes, efficiency, Covid-19 impact, quantitative methods*
JEL Classification: D40, C0, R0

Introduction

Tourism plays an important role in the Slovakian economy; this sector is one of the country's economic development priorities (Balaz, 1995; Bala, 2006; Wach et al, 2008; Malachovský, 2014; Hrubalová, 2015; Bajusová et al, 2024). The development of tourism in Slovakia is supported by various regional programs financed from EU structural funds (Kling, 2001; Pompurová, 2014; Zatko, 2018; Országhová, 2023). These programs are primarily aimed at a comprehensive solution to the problems of structurally weak regions, which in Slovakia include the eastern and north-eastern regions, where the standard of living is significantly lower and the unemployment rate is higher (Mykhei et al, 2026). At the same time, these regions have remarkable tourism and recreational potential thanks to their mountains, forests, rivers and nature reserves. Popular ski resorts and ecotourism areas in Slovakia are located in these regions (Marcekova et al, 2016; Zatko, 2018). The western, central and southern Slovakian regions, where there is a network of health facilities, sports and spa centers, are also interesting for consumers of tourism and health services (Kucerova et al, 2010; Jorgič, 2023). In addition, various regions of Slovakia have a rich cultural and historical potential, which can be seen in well-preserved castles, historical and ethnographic museums, traditional festivals and folklore celebrations (Habán et al, 2012).

SMEs in the Slovakian hotel and restaurant sector, representing roughly 4% of total national SMEs, are predominantly family-run or small-scale businesses critical to tourism, rural development, and regional employment. These businesses faced severe pandemic-era disruptions, relying on limited financial resources, but remain crucial players for tourism development (Kling, 2001; Wach, 2008; Tasáryová et al, 2020; Kliestik, 2022; Vašaničová et al, 2025).

It is important to characterize the key aspects of Slovak SMEs in

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hotels and restaurants industry during last years. There are six important features which are necessary to take into account:

1) Sector Composition: Tourism SMEs, including hospitality, have remained stable, with around 25,000 entities operating between 2016 and 2021. But, the hotel and recreation complex sector in Slovakia experienced a robust recovery and record-breaking performance in 2025, driven by a surge in both domestic and foreign tourism. Accommodation providers (hotels, guesthouses, and similar) recorded a total turnover of €709 million (excluding VAT) in 2025, a 15.7% year-on-year increase (Statista).

2) Performance: Hotels and restaurants, hotel-recreation complexes constitute a significant portion of tourism businesses, often taking the form of family businesses within the SME sector. Family businesses are significant in the sector, though many struggle with productivity and economic performance. In August 2025, for the first time ever, over 800,000 visitors stayed in accommodation establishments, a 9% increase year-on-year. All regions experienced revenue growth, with the highest increases in the Žilinský region (29.7% growth) and Trenčiansky region (over 20% growth). The number of foreign guests grew significantly, up 17% to over 320,000 in August 2025, nearly matching pre-pandemic levels. Net occupancy rate in hotels and similar accommodations: Bedrooms was 40.35% in October of 2025, according to the EUROSTAT. Trading Economics provides the current actual value, an historical data chart and related indicators for Slovakia - Net occupancy rate in hotels and similar accommodations: Bedrooms - last updated from the EUROSTAT on April of 2026. Historically, Slovakia - Net occupancy rate in hotels and similar accommodations: Bedrooms reached a record high of 54.12% in August of 2019.

3) Impact of COVID-19: In Slovakia, signs of coronavirus pandemic began in March 2020 and established travel restrictions with impact on tourism at national, European, and global levels. A decrease in number of foreign visitors was reflected in a significant decline in sales with liquidation consequences for many accommodation facilities, hotels, restaurants, and related services. It was significantly affected by restrictions, forcing 94.7% of surveyed companies to adapt or risk insolvency during the pandemic. Accommodation of visitors reached the level of 49.9% in 2020 compared to 2019. A record low of net occupancy was observed in January of 2021 and equal to 8.10% (Urbanikova, Stubnova, 2020 Farkašová et al, 2021).

4) Financing: The sector has the lowest average wages and high sensitivity to shocks, notably suffering severe impacts from the COVID-19 pandemic (Kliestik et al, 2022). The enormous rise in unemployment was mitigated in 2020 by the state's financial support in coordination with European funds. Many Slovakian SMEs, particularly in hospitality, rely heavily on bank loans and leasing for operational funding. Leasing is a primary funding source (55%) for Slovak SMEs. Regions like Bratislava and Žilina host larger, more profitable companies, whereas regions such as Prešov and Košice exhibit higher financial risks and negative equity (Lukáč et al, 2024).

5) Digitalization: While 12% of Slovak SMEs sell online (lower than the 16% EU average), they are increasingly adopting digital tools like cloud and RFID. Slovak family businesses state that continuous innovation activity and digitalization are a part of their company's long-term strategy (Gúčik, Marciš, 2018). Family businesses realize that technological advances are one of the global trends that will change the way we do business in the world. Almost 90% of the surveyed family businesses consider digitization and technology innovation to be the most important innovation activities in the next period (Urbaníková et al, 2020).

6) Important area for Slovak Economy, but some factors should be taken into account as: Regional Differences, Seasonal Factors, perspectives for Wellness, Sport and Rural Tourism: Slovakia is a prominent destination for sport and health tourism, combining natural healing resources with diverse active leisure opportunities, particularly in its mountainous regions, specific capacities for wellbeing tourism (Kucerova et al, 2010). The country is renowned for its traditional spa culture, high-quality medical treatments, and year-round outdoor activities. Tourism acts as a catch-up accelerator for poorer regions but requires targeted investment to overcome underdevelopment. Maintaining support and investment in sports infrastructure would have long-term advantages for both the sports community, the general public and sport tourists (Jorgič, 2023). While some resorts (like High Tatras) have year-round appeal, many areas are highly dependent on summer or winter seasons (Mykhei et al, 2026). Seasonality, which is one of the most undesirable companions due to the significant negative effects it causes, can be considered a general feature of tourism (Tasáryová, Pakšiová, 2020). Small businesses are essential in rural and agro-tourism, contributing to regional employment and cultural heritage preservation (Habán et al, 2012).

Thus, considering, on the one hand, the rather large potential of various tourist facilities in Slovakia, primarily represented by hotels, hotel and recreational complexes, tourist bases, etc., it is important to analyze the influence of various factors on their performance indicators and key financial results.

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The purpose of the study

The objectives of the study are: to identify the influence of various factors on performance indicators and financial results using the example of hotels and hotel-recreational complexes in Slovakia; to analyze the specialization and evaluation of the most popular hotels and hotel-recreational complexes in various regions of Slovakia using a sample; and to study the impact of the Covid-19 pandemic on financial results using the example of individual most popular hotels and hotel-recreational complexes.

The data and methods

The data for the study consisted of key financial and economic indicators of the most popular hotels and hotel-recreational complexes in Slovakia, presented in open databases and analytical journals. The primary research methods were comparative analysis, econometric methods, and multivariate analysis. A description of the methods used is provided below.

Data Envelopment Analysis (DEA) is a non-parametric, linear programming-based method used to measure the relative efficiency of similar decision-making units (DMUs), such as companies, institutions, or hotels. By analyzing multiple inputs and outputs, it identifies an efficient frontier (best practices), with efficiency scores ranging from 0 to 1, or 0% to 100%. DEA uses linear optimization to calculate the highest possible efficiency ratio for each unit without requiring a pre-set weighting scheme, making it highly objective and data-driven. DEA is often used to evaluate, compare, and improve the performance of operational units that convert inputs into outputs (Sherman, Zhu, 2006). Integrated Index calculated by Hellwig's method. It also known as the Taxonomic Measure of Development (TMD) or the Wroclaw Taxonomy, is a synthetic linear ordering technique developed by Polish economist Z. Hellwig in 1968 (Roszkowska, 2024). It is used to rank multi-dimensional objects (such as countries, regions, or companies) based on a set of diagnostic variables reduced to a single, integrated synthetic index. The method defines a reference point, often called the "etalon" object, which represents the highest values of stimulant variables (positive factors) and lowest values of destimulant variables (negative factors).

Cluster analysis is an unsupervised machine learning technique used to partition data into groups (clusters) where items in the same group are more similar to each other than to those in other groups. It aims to maximize inter-cluster distance and minimize intra-cluster distance to find underlying structures, commonly applied in market segmentation, image processing, and pattern recognition (Everitt et al, 2001).

Econometric analysis is the application of statistical methods and mathematical models to economic data to verify theories, test hypotheses, and forecast future trends. It combines economic theory with real-world data to quantify relationships, moving beyond theoretical assumptions to empirical evidence. It utilizes tools like regression analysis, frequency distributions, and hypothesis testing to turn qualitative theories into measurable, quantitative models (Greene, 2003).

The main findings

One of the serious problems of many hotels and hotel-restaurant complexes in Slovakia has been their low profitability and inefficiency, which is related to inappropriate marketing strategies, strong competition in the sector, low competitiveness or the lack of a favorable environment (Országhová, 2023; Lukáč, 2024). Various methods can be used to analyze the reasons for inefficiency, e.g. a qualitative approach (SWOT, expert opinions) or quantitative methods such as: DEA, integral index, econometrics, etc. (Bajusová, 2024).

In this part of the study, we used the DEA method, which makes it possible to calculate the score index, which varies from 0 to 1 (Sherman, Zhu, 2006). In this method we can use some inputs, variables that are important factors, such as the turnover per employee or the average price per room in the hotel, etc., as output such indicators as the profit per employee or the return on equity (ROE) can be considered. In the DEA method, it is possible to define the optimal frontier and calculate the distance of the cases (e.g. hotels) from the most efficient patterns (hotels that have the best efficiency level using their values for inputs). The cases that are absolutely efficient receive a score of 1, the cases that are not absolutely efficient receive a score of 0.

Using the data for the period 2013-2014, we applied the DEA and calculated the scores for the leading hotels in Slovakia that were included in the rating compiled by Trend Magazine. The "revenue per employee" indicator was used as the input variable, while the "value added per employee" indicator was used as the output variable.

The results of the calculation of the point values using the DEA method are shown in Fig. 1.

As can be clearly seen, the lowest DEA value was determined for the Austria Trend Hotel in Bratislava. Other hotels, such as: Hotel "Privilege" in Kosice, "Lux" in Banska Bystrica, "Alexandra" in Puchov had the lowest values of DEA scores and were inefficient in terms of output/input ratio, so they have relatively high values for revenue per employee, but the value added per employee was significantly lower. In contrast, the best results in terms of efficiency were achieved by such hotels as: Zochova chata, Grand Hotel Bellevue, Boutique Hotel in Dubna Skala were proved. The above-

mentioned hotels achieved the best results in terms of the key figures "added value per employee" and "turnover per employee" compared to other hotels.

The DEA method or other methods, e.g. the Stochastic Frontier Model, are advanced and are often used to measure efficiency and detect ineffective cases. However, it should be noted that DEA and the Stochastic Frontier Model require special software to calculate the results. This can be difficult for business practitioners who prefer to work with simpler methods and available tools such as Excel. For this reason, we

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have calculated the integral or integrated index using a method presented in the work of Z. Hellwig, a well-known Polish statistician (Roszkowska, 2024). The idea of this method is based on the calculation of the Euclidean distance of standardized values of the initial indicators from the etalon (point with the best coordinate values for the initial indicators). By a simple modification, the values of the distances are then converted into the new values from 0 to 1. The best values are equal to 1 (the results are equal to the etalon), the worst values are equal to 0, the furthest distance from the etalon.

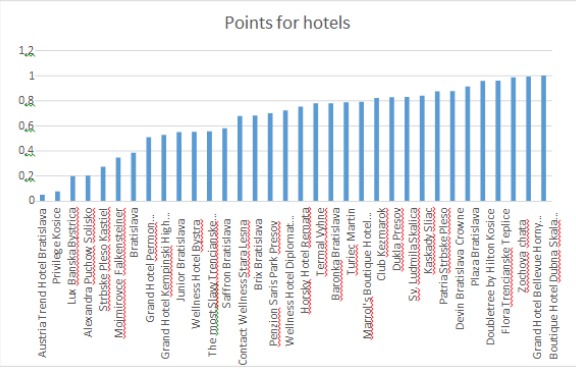

Fig. 1. The ordered values of the DEA scores for leading hotels in Slovakia for 2014

Source: own calculations based on information in Trend Magazine

The results of the calculation of the integral index are shown in Fig. 2. Three indicators were used to calculate the integral index: Turnover per employee, value added per employee and profit before tax per employee. The methodology for calculating the integral index is relatively simple and can be implemented in Excel. The results of the calculation of the values for the integral index may differ from the values obtained in the case of the application of DEA, but the same idea of identifying effective and ineffective cases is maintained.

According to the results of the calculation of the integral index for the leading hotels, we can state that the lowest values were determined for the Wellness Hotel, the "Privilege" Hotel in Kosice and the Austria Trend Hotel in Bratislava. The highest scores were recorded for the Zochova chata and Marrol's Boutique Hotel in Bratislava.

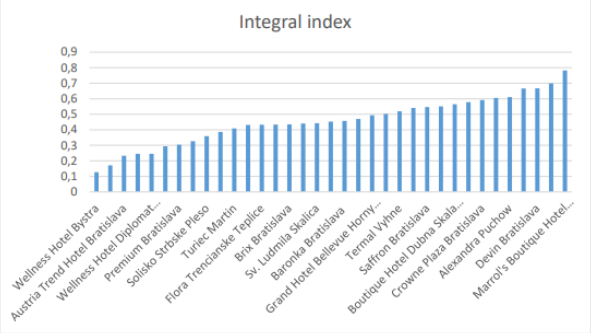

Fig. 2. The calculation of the integral index for the leading hotels in Slovakia for 2014

Source: own calculations based on information in Trend Magazine

Most hotels have between 13 and 54 employees. The number of hotels with more than 100 employees was relatively low. It is therefore clear that most hotels are examples of small and medium-sized enterprises.

Fig. 3 analyzes the relationship between sales per employee and value added per employee. As can be seen from the graph, the R^2 coefficient (or the proportion of variance explained by the model) is relatively low, only 0.1257 or 12.57% of the values of the dependent variable (value added per employee) are adjusted by the regression. The residuals or spillover are therefore large in many cases, which means that the heterogeneity of the observations should be taken into account.

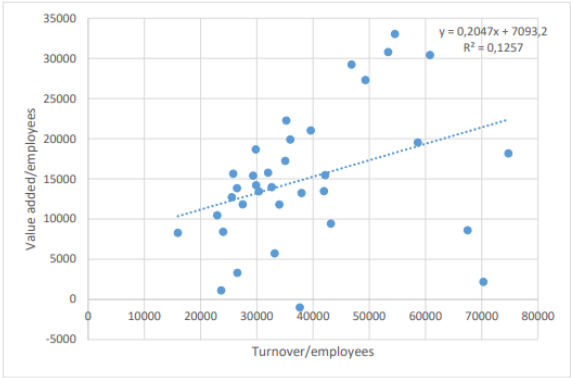

Fig. 3. The relationship between "revenue per employee" and "value added per employee" for leading hotels in Slovakia
Source: own elaboration in Excel

Fig. 4 analyzes the relationship between sales per employee and profit before tax per employee. As can be seen from the diagram, the R^2 coefficient is 0, which means that there is no deterministic dependency between the indicators mentioned.

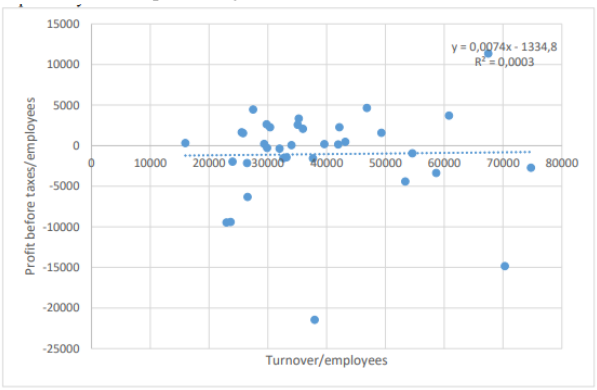

Fig. 4. The relationship between "Revenue per employee" and "Profit before tax per employee" for leading hotels in Slovakia
Source: own elaboration in Excel

Let's analyze the impact of the room rate and some indicators that can characterize the demand for services (hotel nights) for customers.

Fig. 5, Fig. 6 and Fig. 7 show the relationships between the most important indicators for the leading hotels in Slovakia in 2014. As we can see from these figures, the values of the R^2

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coefficients are very small, which means that the impact of the mentioned factor such as "price" on the results (dependent variables) is not significant.

In Fig. 8, the relationship between the price per room and the proportion of foreign guests (FG%) was analyzed. It can be seen that the price has no significant influence on this indicator.

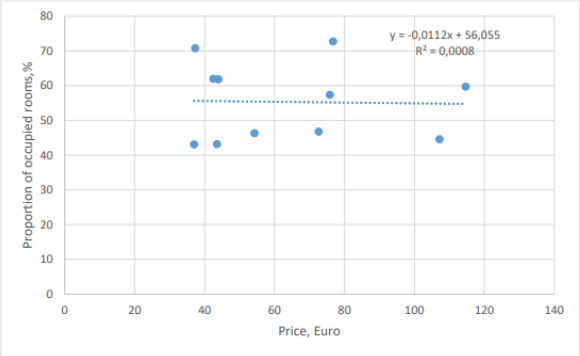

Fig. 5. The relationship between the "price per room" and the "occupancy rate" for leading hotels in Slovakia

Source: own elaboration in Excel

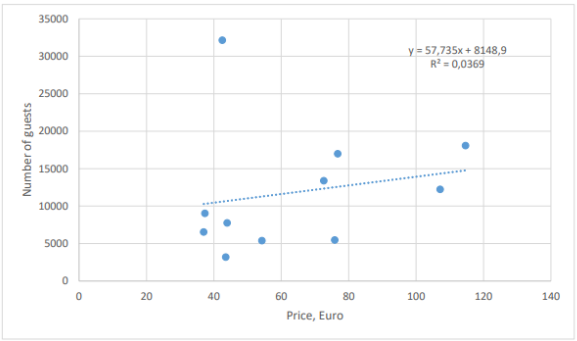

Fig. 6. The relationship between the "price per room" and the "number of guests" for leading hotels in Slovakia

Source: own elaboration in Excel

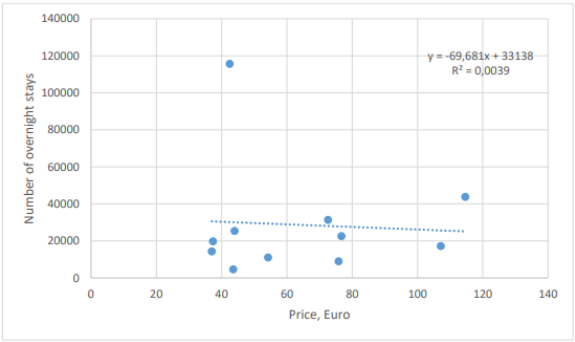

Fig. 7. The relationship between the "price per room" and the "number of overnight stays" for leading hotels in Slovakia

Source: own elaboration in Excel

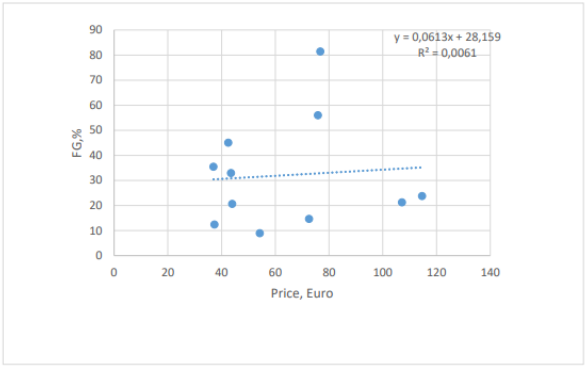

Fig. 8. The relationship between "Price per room" and "FG, %" (share of foreign guests) for leading hotels in Slovakia

Source: own elaboration in Excel

Tables 1- 2 show the results of the simple regression in which the influence of the factor variable "class/category of hotel" on the dependent variable "price per room" was analyzed.

As we can see from the results, the price per room is determined by the category of the hotel. This relationship is strong and the correlation coefficient is equal to 0.875.

Table 1. The results of the estimated parameters for the linear regression model

	Estimation of the parameters in the standardized model	Standard error for the parameter in the standardized model	Estimation of the parameters in the initial model	Standard error for the parameter in the initial model	Student's t - criterion	Probability
	b*	Std.Err.	b	Std.Err.	t(9)	p-value
Interception			-95,8007	29,68508	-3,22723	0,010369
x1	0,875811	0,160885	46,2997	8,50515	5,44372	0,000409

Source: calculation by authors in Statistica

Table 2. Characteristics of the simple regression

Characteristics	Value
Coefficient of multiple correlation R	0,875811
Coefficient of determination R^2	0,767045
Adjusted R^2	0,741161

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Fisher's criterion F(1,9)	29,63407
Probability (p)	0,000409
Standard Error of the estimate	14,0458

Source: calculation by authors in Statistica

For the data of about 100 best hotels in Slovakia included in the database Hotels Slovakia. Global hotel rating - top hotels[1] for tourists in the period 2022-2023, a pie chart was created for the analysis of hotel types.

As we can see from Fig. 9, 30% of hotels were rated as single or with friends; 27% of hotels were rated as good for romantics; 24% of hotels were rated as good for families; 10% of hotels were rated as good for families and only 9% of hotels were rated as good for children.

Fig. 10 shows the distribution of the best hotels in Slovakia according to customer rating and hotel class/category. As we can see, most of the hotels have the class/category of 3-4 stars (Fig. 10).

Fig. 11 shows the hotel types. There are the following types: Private hotel (PH); Hotel (H); Hotel complex (HC); Mini hotel (MH); Spa hotel (SH); Aparthotel (AH), Boutique hotel (BH), Eco hotel (EH) and unspecified hotels.

Fig. 9. The distribution of the best hotels in Slovakia by type

Source: own elaboration

[1] https://www.tophotels.com/global-rating

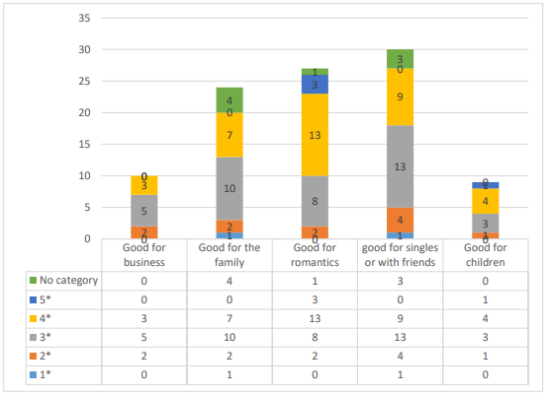

Fig. 10. The distribution of the best hotels in Slovakia according to customer rating and hotel class/category

Source: own elaboration

Fig. 11 and Fig. 12 show the distribution of the 100 best hotels according to the class/category of the top hotels and their types in Slovakia (source: Global hotel rating - TopHotels)

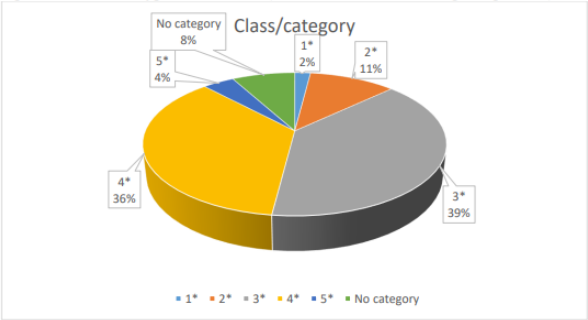

Fig. 11. The distribution of the best hotels in Slovakia by class/category of hotels

Source: own elaboration

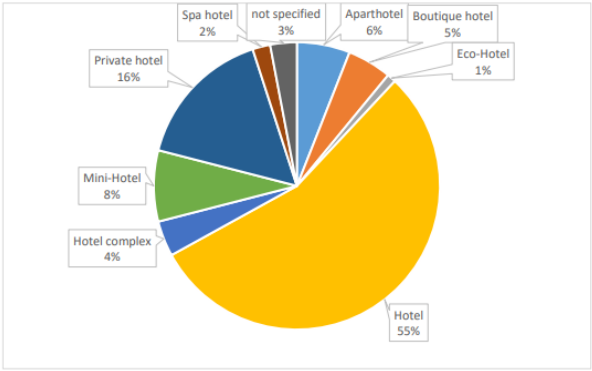

Fig. 12. The pie chart for the distribution of the top 100 hotels by type in Slovakia

Source: own elaboration

We then present the results of applying a multiple regression model in which we analyzed the impact of the type of hotel (dummy variables D_PH, D_H, D_BH, D_HC, D_MH, D_AH) and its class/category on the overall level of satisfaction rated by customers.

The results of the model are shown in Table 3 and Table 4. It can be seen that the class/category of the hotel has a statistically significant influence on the satisfaction score awarded by the customers. Other variables (dummy variables) that characterize the type of hotel have no statistically significant influence. This means that the heterogeneity of the observations can be explained by the hotel types. The hotel types did not define the deterministic differences in the formation of the overall score, which reflects the satisfaction level of the customers. The different customer satisfaction levels were therefore observed in all hotel types.

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Table 3. The results of the study: multiple regression model for the total score (TG)

	Estimation of the parameters in the standardized model	Standard error for the parameter in the standardized model	Estimation of the parameters in the initial model	Standard error for the parameter in the initial model	Students t criteria	Probability
Interception			4,237741	0,209817	20,19734	0,000000
Class	0,304335	0,114942	0,119481	0,045126	2,64774	0,009535
D_PH	-0,085769	0,158825	-0,109741	0,203215	-0,54002	0,590486
D_H	-0,061968	0,188260	-0,058321	0,177181	-0,32916	0,742783
D_BH	-0,030414	0,127613	-0,065459	0,274652	-0,23833	0,812152
D_HC	-0,017048	0,116532	-0,046877	0,320430	-0,14629	0,884010
D_MH	0,057799	0,134916	0,099935	0,233270	0,42841	0,669354
D_AH	-0,004413	0,132304	-0,008716	0,261317	-0,03336	0,973463

Source: own elaboration in Statistica

Table 4. The characteristics of multiple regression

Characteristics	Value
Coefficient of multiple correlation R	0,300701
Coefficient of determination R^2	0,090421
Adjusted R^2	0,021214
Fisher's criterion F(7,92)	1,306528
Probability (p)	0,256096
Standard Error of the estimate	0,466403

Source: own elaboration in Statistica

Then, we used 100 observations for hotels and hotel recreation facilities for the period 2019-2020 and applied the cluster analysis for grouping hotels and hotel recreation facilities in the coordinates of "revenue" and "profit". For the application of cluster analysis, the k-means method was used and the data were grouped into 5 clusters: 1 cluster contains 5 cases; 2 cluster contains 25 cases; 3 cluster

contains 2 cases; 4 cluster contains 65 cases and 5 cluster contains 3 cases. The results of the cluster analysis are shown in Table 5.

Table 5. Characteristics of clusters for hotel and hotel-resort complexes in Slovakia

Indicator	Features	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Revenue	Medium	12992080	6383924	97904000	2407151	2147829
	Standard deviation	1754702	1442434	1172383	938565,	269309,
				0	4	6
Profit	Medium	3213278	311360	-6923500	-142743	-4989938
	Standard deviation	5061146	1137478	15571200	570007,4	506782,1

Source: own calculation in Statistica

As shown in Table 5, clusters 1 and 2 contain the hotels and hotel recreation facilities that were profitable in the period 2019-2020, while the other clusters 3-5 contain the hotels that had varying degrees of losses and were not profitable in the period 2019-2020.

The distribution of observations according to the clusters is shown in Fig. 13.

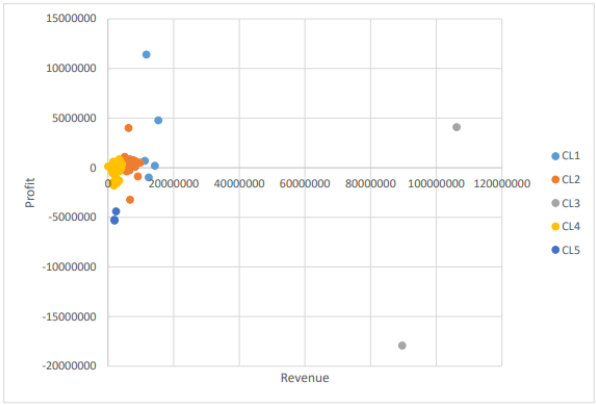

Fig. 13. The results of the cluster analysis for the observations

Source: own elaboration

Table 6 lists the members of clusters (hotels and hotel and recreation complexes) and in table 7 the transition matrix is given.

The results presented in Table 8 show that the highest probabilities (equal to 1) were for the situation in which the hotels and the hotel-recreation complex were in clusters 3, 4

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and 5 in 2019 and remained in the same clusters in 2020. However, looking at the highest transition probability with change of cluster type, the value 0.84 is observed for the transition from cluster 2 (profitable) to cluster 4 (unprofitable) in the period 2019-2020.

So we can see the negative impact of Covid-19 when a significant number of hotels and hotel and leisure complexes were affected by the closure issue and suffered losses.

Table 6. the members of clusters in the Hotels and Hotel-Recreation Complex grouping

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
2019 -Sorea, Bratislava; Carlton Property, Bratislava; Grand Hotel Permon, Pribylina; Hrebienok Resort, Vysoke Tatry; Best Hotel Properties, Bratislava; 2020 - no members	2019 - BHP Tatry, Bratislava Central hotel administration, Bratislava; Hotel Partizan, Bystra Tatra Hotel Slovakia, Vysoke Tatry; Vadas, Sturovo; Bad, Sliac; Wagon Slovakia Kosice, Kosice; Druzby, Demanovska Dolina; Tatra United Corporation, Bratislav; D.J.K., Kosice; Aspect-Vyhne, Bratislava	2019, 2020 - Mountain resorts of the Tatras, Liptovsky Mikulas	2019-2020 Aplend, Martin; Nores Resort, Bratislava; Kaffex, Strba; Golf International, Velka Lomnica; Grapent, Modra; Samtreid, Kezmarok; Tatra Trading international, Stara Lesna; Doprastavn Services, Bratislava; Wellness, Patince; Eurocom&Co, Bratislava; 2019 - Eurovea Hotel, Bratislava	2019-2020 Yvex, Bratislava
	Omega Investments, Bratislava; Grand Hotel Bellevue, Vysoke Tatry; Interhouse Kosice, Kosice Left Hotel, Bratislava; Tehelne Pole, Bratislava; Hotel Eurovea, Bratislava; Diamond Hotels Slovakia, Bratislava; Accor-Pannonia Slovakia, Bratislava; 2020 - Sorea, Bratislava; BHP Tatry, Bratislava; Carlton Property, Bratislava; Grand Hotel Permon, Pribylina; Hotel Partizan, Bystra; Tatra Hotel Slovakia, Vysoke Tatry		2019 - 2020 Luxmag, Bratislava; SlovInn Jasna, Demanovska Dolina; Hotel Alexandra Wellnesz, Liptovsky Jan; STH-Stavohotely, Bratislava; 2019 - Diamond Hotels Slovakia, Bratislava; 2019-2020 Domena, Vysoke Tatry; A.V. Plus, Presov HI Kongres Hotel Zilina, Zilina; Mac-Gastro, Bratislava; Adeli Center, Katlovce; Hotel Senec, Bratislava Aqualand Male Bielice, Partizanske; Centurion Motor Oil, Bratislava; Senger&Partners, Bratislava; Hotel Devin, Bratislava; 2020 - Central Hotel Management, Bratislava; Accor-Pannonia Slovakia, Bratislava	

Source: compilation by authors based on the results of the

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cluster analysis

Tables 7- 8 show the transition of members between the clusters.

Table 7. The transition matrix for the change of clusters for members in the period 2019-2020

Cluster	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Cluster 1	0	3	0	1	1
Cluster 2	0	3	0	16	0
Cluster 3	0	0	1	0	0
Cluster 4	0	0	0	24	0
Cluster 5	0	0	0	0	1

Source: compiled by the author based on the results of the cluster analysis

Table 8. The transition matrix for probabilities of cluster changes for members in the period 2019-2020

Cluster	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Cluster 1	0	0,6	0	0,2	0,2
Cluster 2	0	0,16	0	0,84	0
Cluster 3	0	0	1	0	0
Cluster 4	0	0	0	1	0
Cluster 5	0	0	0	0	1

Source: compilation by authors based on the results of the cluster analysis

Based on these indicators, a cluster analysis of the hotel and leisure facility data was carried out and certain groups of hotel and leisure facilities with similar characteristics were identified.

The DEA method was used to identify examples of effective use of hotel and leisure complexes and recommendations were made for other tourism facilities where the indicators were not effective.

These research results can be useful in developing and improving strategies for the management of hotel and recreation complexes in Slovakia.

At the same time, it is necessary to carry out a more detailed qualitative and quantitative study of tourism and hotel potential, as there are significant regional differences in the structure and development trends of the various types of tourism potential, as well as problems with underutilization of the various types of tourism potential in certain regions of the country.

In addition, it is very important to forecast the various tourist flows and create favorable conditions for a higher level of development of foreign and domestic tourism in Slovakia.

Discussions and Conclusions

Slovakia offers untapped opportunities in nature, UNESCO sites, and castle tourism, which are now being supported by a new national strategy aimed at systemizing development. Historically, the sector has suffered from a lack of consistent national strategy and fragmented management, although efforts are increasing. Hotels and restaurants, hotel-recreation complexes in Slovakia operate primarily as SMEs, playing a significant role in the tourism sector and high pandemic-related vulnerability. The industry is dominated by family businesses and small, non-chain entities, often facing lower digitalization rates compared to the EU average.

Slovak tourism is a growing, high-potential sector, contributing significantly to regional employment, with a record-setting year in 2019 before COVID-19. Spa, mountain, and wellness tourism are the crucial components and key investment drivers, particularly in regions like the High Tatras. High visitor concentration is observed in mountain areas (High Tatras) and urban centers like Bratislava, which acts as a driver for real estate investment. Tourists show a strong preference for wellness hotels, spa facilities, and high-end resorts, particularly in high-mountain areas. In addition, growing demand for wellness is enhancing the attractiveness of spa enterprises. The market shows strong investment potential, particularly in short-term rentals, which can offer over 30% higher returns in popular tourist areas.

The region-specific focus should be taken into account. The Bratislava region relies heavily on foreign guests (nearly 70% of turnover), while other regions (e.g., Banskobystrický) are dominated by domestic visitors. But highest turnover and visitor numbers are consistently generated in the Bratislavský, Žilinský, and Prešovský regions, which together accounted for nearly 64% of total accommodation turnover. Next important factor is seasonality: the sector is highly seasonal, peaking in the winter (skiing) and summer (hiking, water parks), with lower demand in transitional months.

To increase the competiveness of the tourist infrastructure and hotels, hotel-recreation complexes are necessary to implement more innovations, digitalization and technology adoption: there is an increasing trend towards adopting digital services, including smart room features and mobile check-ins.

Also it is important to develop the effective marketing strategies and take into account short-term rental challenges. Similar to other Alpine regions, popular tourist areas are facing rising land prices and housing shortages for locals, potentially affecting long-term development.

Nevertheless, the industry outlook remains positive, with 2025 statistics showing that tourism is almost entirely back to pre-Covid (2019) levels, falling short by only a small margin in the first three quarters. The continued investment in capacity, particularly in regional and recreational hubs, suggests strong ongoing growth.

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