Monte Carlo as a Method for Examining of Business Changes in Tourism in Slovakia

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https://doi.org/10.53465/CEECBE.2025.9788022552257.50-63

Abstract: The business environment in tourism encompasses a set of factors influencing the establishment, development, and sustainability of businesses in this sector, including economic, legislative, and market conditions. The dynamics of this environment are crucial for the economic stability of the sector. The main objective of this paper is to model the development of business establishments and closures in the tourism sector based on historical data and the influence of selected factors. The data used for this study were obtained from the Statistical Office of the Slovak Republic upon request. To achieve this objective, correlation and regression analysis were employed to examine relationships between economic variables, while a Monte Carlo simulation was used to predict future business activity trends. The results indicated that there are only moderately statistically significant relationships between economic factors and business establishment or closure. Domestic tourists' expenditures showed a weak positive correlation with business formation, whereas expenditures on inbound tourism had the opposite effect. The Monte Carlo simulation suggested that, assuming historical trends continue, the number of newly established businesses will stabilize at around 7,500 per year, while the number of closed businesses will be approximately 6,000 per year. Extreme scenarios demonstrated that economic fluctuations could lead to significant deviations, with the pessimistic scenario predicting a higher number of business closures and the optimistic scenario indicating a more favorable sectoral development.

Keywords: Business in Tourism, Dynamics of Business in Tourism, MonteCarlo Method, Slovakia, Development

JEL Classification codes: Z31, Z32

INTRODUCTION

Tourism is one of the most important sectors of the economy, significantly contributing to job creation, regional development, and overall economic stability of countries (Hall & Page, 2019). Despite its dynamism and growth potential, the business environment in this sector constantly faces challenges arising from various economic, legislative, and unpredictable external factors (Papatheodorou, 2021). Between 2017 and 2022, tourism businesses had to adapt not only to standard market mechanisms but also to extraordinary events such as the global COVID-19 pandemic, changing business regulations, and fluctuations in demand and supply (Gössling, Scott & Hall, 2020). Tourism holds a key position in the global gross domestic product, and as such, the business environment in tourism is the subject of research by numerous economic scholars. They emphasize the significance of the economic and regulatory environment in tourism, highlighting that these conditions are crucial for the rise and fall of businesses.

Papatheodorou (2021) discusses how legislative changes have evolved and altered the environment, requiring businesses to adapt in order to survive. The quality and development of the business environment are crucial measures of countries' global competitiveness. This situation is particularly favourable in Europe, where an open community offers unique opportunities for market entry and business development (Valaskova, 2022). Slovakia represents an interesting case for analysing the impacts on the business environment in tourism. Given its geographical location, rich natural and cultural heritage, and growing attractiveness for both domestic and international tourism, understanding the dynamics of this sector is essential. Despite positive trends, the business environment faces several challenges, such as seasonality, high operating costs, legislative changes, and issues related to the COVID-19 pandemic. Analysing these factors can help identify key determinants of business sustainability and stabilization in this sector. The main objective of this paper is to model the development of business establishments and closures in the tourism sector based on historical data and the influence of selected factors. Special attention is given to the formation and closure of businesses, assessing the impact of economic, legislative, and pandemic factors on their existence (Baum & Hai, 2020). To enhance understanding and predict future developments, a Monte Carlo simulation was applied, enabling the modelling of various scenarios based on historical data and stochastic processes (Law & Kelton, 2019). Additionally, the simulation provides forecasts for future developments and strategic recommendations to enhance the resilience of tourism businesses. Based on the above, we can conclude that the possibility of prediction using the Monte Carlo method in the context of the dynamics of business establishment and closure in the tourism sector has not been sufficiently explored. Moreover, there is a lack of specific factors that could be used in forecasting. In this regard, we identify a research gap that this paper aims to address.

1 LITERATURE REVIEW

Clearly defining the business environment is not an easy task, as it is influenced by numerous factors, different approaches to understanding its significance, and other elements that complicate a unified interpretation. The business environment can be understood as a set of external and internal factors that influence business activities and may affect its present and future operations (Malach et al., 2005; Kew & Stredwick, 2005; Fernando, 2011; Cherunilam, 2016; Čakanišin & Halenárová, 2024). The business environment is closely linked to the market economy, which significantly impacts developments within the environment (Krošláková et al., 2017). It reflects the quality of economic conditions and prerequisites for economic activity (Kubica, 2015). A high-quality business environment creates conditions for long-term sustainable economic growth and serves as a fundamental prerequisite for business development and increased economic competitiveness of countries (Belanová, 2014; Majercak et al., 2015). The business environment in tourism can be defined as a set of factors that influence business entities within the tourism sector and affect its dynamics. Gúčik (2010) defines the external environment as a combination of economic, social, cultural, political, legislative, ecological, and technological factors. In their research, Šebová et al. (2017) identified four key factors affecting the business environment of tourism enterprises in Slovakia: the inflation rate, availability of production factors, access to credit resources for entrepreneurs, and interaction between educational institutions and businesses. Within the tourism sector, several specific factors influence the business environment, including legal regulations on tourism and consumer protection in this sector (Magurová et al., 2016), national tourism policies (Kerekeš, 2007), the level and efficiency of destination management (Fyall & Garrod, 2020), transportation infrastructure (Michniak, 2010), and environmental policy (Tisdell, 2001; Holden, 2008).

The dynamics of the business environment are explored in various directions at the academic level. Tobback (2021) focused his study on the establishment and closure of businesses in the tourism sector in Belgium, France, and the Netherlands. This study examined volubility, involvement, ritualization, and efficiency in these interactions, which are crucial for effective tourism business operations. Authors Martín and Martínez (2019) analyzed the termination of businesses based on non-economic factors, emphasizing that these considerations often outweigh economic costs and influence entrepreneurs' decisions regarding business entry and exit in tourism. One of the most significant areas of research on factors affecting tourism businesses has been the impact of the COVID-19 pandemic. Gössling, Scott, and Hall (2020) analyzed the effects of COVID-19 on the tourism sector, identifying key challenges that businesses faced, including travel restrictions, declining demand, and supply chain disruptions. The future development of the tourism sector has been addressed by, for example, Halenárová and Čakanišin (2024). Their study focused on analyzing the future development of employment in tourism. They identified a positive growth trend in all observed tourism sectors in the future. Baum and Hai (2020) focused on the sustainability of business models during crises and proposed strategies to enhance business resilience. Studies suggest that effective change management plays a key role in improving the performance of Slovak companies, particularly through internal process improvements and operational adjustments. Data analysis reveals a direct relationship between implementing changes and the return on equity (ROE) (Sujová & Simanová, 2023). This paper identifies that Slovak businesses primarily adopt a functional approach to change management, focusing on financial improvements. It highlights that operational changes are the most common, with success linked to internal process enhancements and project management optimization using log frame techniques (Sujová & Simanová, 2022).

The use of Monte Carlo simulation in business environment analysis is extensively discussed in the work of Law and Kelton (2007), who demonstrate the effectiveness of this method in modeling potential development scenarios based on historical data. These approaches provide a deeper understanding of risk factors and possible measures to support the stable development of the business environment in the tourism sector. By employing random sampling techniques, Monte Carlo simulations can assist decision-makers in forecasting the potential impacts of legislative changes and market conditions on small and medium size enterprises (SMEs) (Coelho et al., 2025). The method's ability to model both symmetric and asymmetric distributions helps capture the full range of possible business outcomes (Ding, Zhiyan, et al, 2021). Based on the above, however, it is not clear which factors should be used in creating this simulation for the development of the establishment and closure of tourism businesses. Therefore, we decided to use available tourism-specific data from the Tourism Satellite Account of the Slovak Republic to enable future international comparisons.

2 METHODOLOGY

The main objective of this paper is to model the development of business establishment and closure in the tourism sector based on historical data and the influence of selected factors. The data used in this study were obtained from the Statistical Office of the Slovak Republic upon request. For the analysis of business establishment and closure in the tourism sector, data were collected for individual tourism industries according to the classification of the Tourism Satellite Account of Slovakia, as well as for individual enterprises categorized under the NACE classification. These data were then aggregated to determine the total number of business entries and exits in the tourism sector. To identify the impact of selected factors, the modelling process included parameters such as direct tourism Gross Domestic Products (GDP) expenditures on inbound, outbound, and domestic tourism, and the total number of visitors.

Data for these parameters were sourced from the Tourism Satellite Account 2022. The available period for all observed values was determined for the years 2013 to 2022.

Initially, a correlation and regression analysis was conducted to determine the statistical significance of selected indicators on the number of newly established and closed tourism businesses in Slovakia. Using linear regression analysis, the causal relationship was evaluated between the dependent variables, which include the number of newly established tourism businesses (XA) and the number of closed tourism businesses (XB), and the independent variables, which consist of expenditures on inbound tourism (X1), expenditures on domestic tourism (X2), expenditures on outbound tourism (X3), direct GDP from tourism (X4), and the number of visitors (X5). The results indicate that none of the variables are statistically significant at the 5% significance level, although some show slight tendencies to influence business stability. The regression analysis was performed using the Ordinary Least Squares (OLS) method to quantify the impact of independent variables on the number of closed businesses in the tourism sector. The model was defined as follows:

$$XA=\beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5+\varepsilon \quad (1)$$

where:

- X_A – number of newly established tourism businesses / X_B number of closed tourism businesses in tourism in Slovakia
- X_1 – expenditures on inbound tourism
- X_2 – expenditures on domestic tourism
- X_3 – expenditures on outbound tourism
- X_4 – direct GDP from tourism
- X_5 – number of visitors
- $B_0, \beta_1, \ldots, \beta_5$ –regression coefficient
- ε – error term

The hypotheses formulated to achieve the objectives of the article through correlation and regression analysis are as follows:

- H1: Expenditures on inbound tourism (X1) have a positive and statistically significant impact on the establishment of new businesses in the tourism sector in Slovakia.
- H2: Expenditures by domestic tourists (X2) have a positive and statistically significant impact on the establishment of new businesses in the tourism sector.
- H3: Expenditures on outbound tourism (X3) have a negative and statistically significant relationship with the establishment of new businesses in the tourism sector.
- H4: Direct GDP from tourism (X4) has a positive and statistically significant impact on business establishment in this sector.
- H5: The number of visitors (X5) has a positive and statistically significant relationship with the establishment of new businesses in the tourism sector.
- H6: Expenditures on inbound tourism (X1) have a negative and statistically significant impact on the closure of businesses in the tourism sector
- H7: Expenditures by domestic tourists (X2) have a negative and statistically significant impact on business closure.
- H8: Expenditures on outbound tourism (X3) have a positive and statistically significant relationship with business closures in the tourism sector.

- H9: Direct GDP from tourism (X4) has a negative and statistically significant impact on business closures in the tourism sector.
- H10: The number of visitors (X5) has a negative and statistically significant relationship with business closures in the tourism sector.

Monte Carlo simulation is a stochastic modelling technique used to assess uncertainty and predict probable outcomes by running a large number of simulations based on probability distributions. In this study, a Monte Carlo simulation was applied to estimate the future number of business closures in the tourism sector in Slovakia over a five-year period, considering economic volatility and industry dependencies. Before conducting the simulation, it is essential to clearly define its objectives. In this case, the goal is to model the dynamics of business establishment and closure in the tourism sector in Slovakia, with the aim of identifying risk factors and forecasting future developments. Defining the objective includes selecting variables that influence the model and specifying the expected outcomes (Prasad, 2021).

To create a probability distribution, fundamental statistical indicators are required:

- Minimum values: The lowest number of newly established or closed businesses during the observed period.
- Maximum values: The highest number of newly established or closed businesses.
- Average values: The average number of newly established or closed businesses over the observed period.
- Variance and standard deviation: To determine the variability of values.

For the Monte Carlo simulation, a normal distribution was chosen, as tourism businesses exhibit stable data with small deviations. However, it is acknowledged that tourism businesses may also have a cyclical nature. Due to the unavailability of monthly and quarterly data, annual data for the period 2013–2022 were used instead. The simulation was conducted to project outcomes for the next five years, up to 2027. The data were statistically processed to identify minimum, maximum, and average values, as well as variability, ensuring that the simulation accurately reflects possible future trends in business dynamics within the tourism sector.

We generated 10,000 random samples for each variable within the Monte Carlo simulation based on its defined normal distribution. Correlation between variables was reprocessed using Cholesky decomposition. Subsequently, the number of newly established tourism businesses (XA) and closed tourism businesses (XB) in Slovakia was calculated for each iteration based on the simulated values. The summarized results cover a five-year period, including the computation of key statistical indicators: aggregation of results over the five-year period, estimation of the average number of closed businesses, a 95% confidence interval, and the probability distribution of extreme outcomes.

The validation of the simulation was conducted by comparing the simulation results with historical data to verify the accuracy of the model. Additionally, the simulation was performed for different scenarios (optimistic, realistic, and pessimistic) to account for various possible developments.

To incorporate economic variability, three distinct scenarios were created:

- Pessimistic scenario (-10% business activity) – reflects economic downturns, higher tax burdens, or declining demand in the sector.
- Realistic scenario (baseline trend) – represents the most probable future trend based on historical data.
- Optimistic scenario (+10% business activity) – assumes favorable economic conditions, increasing demand, and government incentives to support entrepreneurship.

In each scenario, the average number of newly established and closed businesses was adjusted while maintaining historical volatility and correlations between factors.

3 RESULTS AND DISCUSSION

3.1 Monte Carlo simulation for newly established tourism businesses in Slovakia

Table 1 presents the correlation matrix, which quantifies the relationships between the number of newly established businesses and selected indicators related to tourism and the economy in Slovakia. The correlation coefficients range from -1 to 1, where values closer to 1 indicate a strong positive correlation, values around 0 suggest a weak or no relationship, and values closer to -1 indicate a negative correlation.

Tab. 1 The correlation of selected indicators with the establishment of tourism businesses in Slovakia

		XA	X1	X2	X3	X4	X5
	1						
XA	0.5329	1					
X1	-0.2787	0.1309	1				
X2	0.0855	0.4713	0.8719	1			
X3	0.0375	0.4415	0.8493	0.9787	1		
X4	0.0294	0.4645	0.8978	0.9830	0.9769	1	
X5	0.1295	0.3146	0.9348	0.9532	0.9425	0.9723	1

Source: Own processing by the authors in the Gretl statistical program based on data from the Tourism Satellite Account of Slovakia and the Statistical Office of Slovakia, 2013–2022

Domestic tourism expenditures show a slight positive correlation (0.085) with business establishment, indicating that an increase in domestic tourist spending may have a mild impact on supporting the business environment. Expenditures on inbound tourism (-0.278) are negatively correlated with the number of newly established businesses, suggesting that higher spending by foreign tourists does not directly contribute to the creation of new businesses, or that this relationship may be influenced by other factors. Expenditures on outbound tourism (0.037) and direct tourism GDP (0.029) exhibit near-zero correlation with the number of new businesses, implying that these variables do not have a direct impact on business activity. The number of visitors (-0.129) has a weak negative correlation with business establishment, which may indicate that a higher number of tourists does not necessarily lead to an increase in new business entities. The high correlation between domestic and outbound tourist expenditures suggests that rising household incomes support travel both within the country and abroad.

When conducting the regression analysis (Table 2), it was found that the variable X4 (Direct GDP from Tourism) had the lowest p-value ($p = 0.120$), suggesting that the economic performance of the tourism sector may have some influence on the establishment of new businesses, though not strong enough to confirm statistical significance. Expenditures on inbound tourism (X1) have a negative coefficient (-0.00269), indicating that higher spending by foreign tourists may be linked to the number of new businesses. This result may be related to the stabilization of existing businesses, which reduces the need for establishing new ones. However, given the p-value of 0.144, this relationship is not statistically significant. Direct GDP from Tourism (X4) has the highest positive coefficient (0.007631), suggesting that stronger economic performance in the sector may support the establishment of new businesses. However, this relationship is only at the threshold of significance ($p = 0.120$), meaning that with a larger dataset, it could potentially be confirmed as a significant factor.

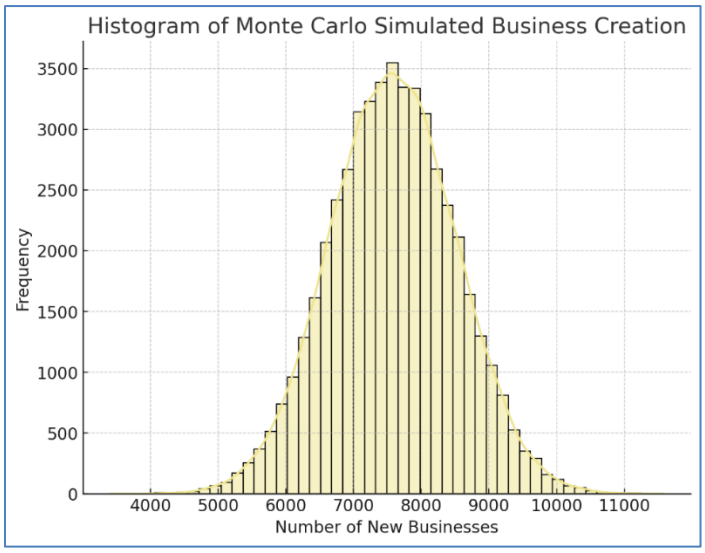
Tab. 2 Regression analysis of selected indicators on the establishment of tourism businesses in Slovakia

	Coefficients	Standard Error	t Stat	P-value
XA	1553.478	2558.003	0.6073	0.5764
X1	-0.00269	0.001483	-1.8122	0.1441
X2	0.001308	0.002378	0.5502	0.6114
X3	-0.00279	0.002307	-1.2091	0.2931
X4	0.007631	0.003873	1.9700	0,1201
X5	-9.1E-05	9.08E-05	-1.006	0,3713

Source: Own processing by the authors in the Gretl statistical program based on data from the Tourism Satellite Account of Slovakia and the Statistical Office of Slovakia, 2013–2022

The histogram (Fig. 1) illustrates the distribution of simulated values for the number of newly established businesses, generated using the Monte Carlo method. The simulation was conducted to predict the future development of new business establishments based on historical data and correlations with economic factors.

Fig. 1 Monte Carlo simulations of tourism business establishment in Slovakia based on correlation results



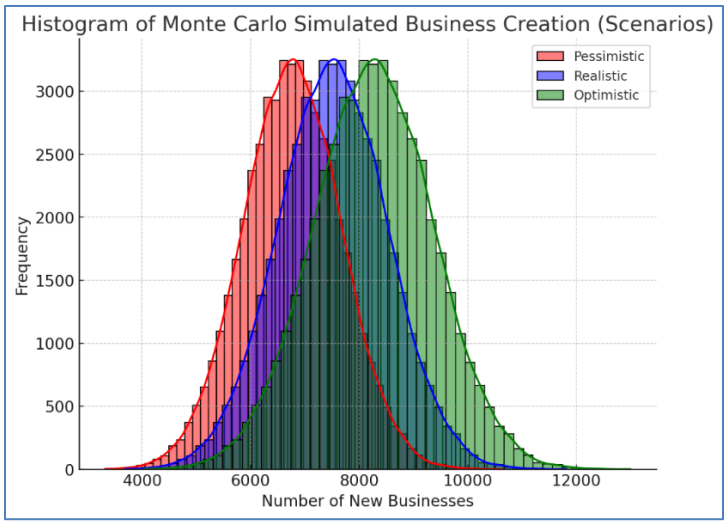
Source: Own processing in the R statistical program based on the results of correlation analysis for closed tourism businesses in Slovakia

The most frequently simulated values (mode) range between 7,000 and 8,000 new businesses. The median value of the simulations (mean) is approximately 7,500 businesses. The standard deviation determines the dispersion of values, with most simulations falling within the range of 5,500 to 9,500 businesses. On the left side of the histogram, lower values (~4,000 businesses) represent pessimistic scenarios with a lower number of newly established businesses. On the right side (~11,000 businesses), optimistic scenarios suggest a high growth in entrepreneurial activity. The majority of simulations are concentrated in the centre of the distribution, indicating the most probable outcomes. The decreasing frequency of extreme values indicates that a very low or very high number of business start-ups is less likely.Monte Carlo predictions indicate that the number of newly established businesses in the future will likely fluctuate around 7,500 businesses per year. The histogram confirms a stable trend with a normal distribution, where extreme values are less probable. For a more precise analysis, a

confidence interval (e.g., 95% CI) can be determined, and risks in extreme scenarios can be evaluated (Fig. 2).

The histograms suggest that the number of newly established businesses follows an approximately normal distribution, meaning that most simulated results are concentrated around the mean value of each scenario. The most probable outcomes range between 6,000 and 9,000 businesses per year, depending on the scenario.

Fig. 2 Monte Carlo simulation scenarios for newly established tourism businesses in Slovakia



Source: Own processing in the R statistical program based on the results of correlation analysis for closed tourism businesses in Slovakia

The pessimistic scenario (red curve) assumes a 10% decline in the number of newly established businesses compared to the realistic scenario. The average predicted value is around 6,500 businesses per year, with a high probability falling within the range of 5,000 – 7,500 businesses. The realistic scenario (blue curve) represents the most probable development based on historical trends. The expected value is around 7,500 businesses, with most simulations ranging between 6,500 – 8,500 businesses. This scenario corresponds to a stable business environment without significant economic shocks. The optimistic scenario (green curve) models a 10% increase compared to the realistic scenario, indicating higher entrepreneurial activity. The average expected number of new businesses is around 8,500, with most simulations falling between 7,000 – 10,000 businesses. This scenario reflects the possibility of favorable economic conditions supporting entrepreneurship. In all three scenarios, the variance of values overlaps, meaning that even in an optimistic scenario, a decline is possible, and conversely, in a pessimistic scenario, the number of new businesses could exceed expectations. Extreme values are less likely, suggesting that most predictions will fall within the main interval of approximately 6,000 – 9,500 businesses.

3.2 Monte Carlo simulation for closed tourism businesses in Slovakia

To examine the relationship between selected indicators and business closures in the tourism sector in Slovakia, a correlation and regression analysis was conducted. The correlation analysis revealed a negative correlation between business closures and expenditures on inbound tourism (XB – X1: -0.450). A relatively strong negative correlation indicates that higher expenditures by foreign tourists may contribute to a lower number of business closures. This relationship suggests that inbound tourism helps stabilize the business environment in the

tourism sector and provides businesses with sufficient revenue to maintain operations (Table 3).

Tab. 3 Correlation of closed tourism businesses in Slovakia with selected indicators.

	XB	X1	X2	X3	X4	X5
XB	1					
X1	0.0968	1				
X2	0.0974	0.8719	1			
X3	0.1210	0.8493	0.9787	1		
X4	0.0900	0.8978	0.9830	0.9769	1	
X5	0.17466	0,9348	09532	0.9425	0.9723	1

Source: Own processing by the authors in the Gretl statistical program based on data from the Tourism Satellite Account of Slovakia and the Statistical Office of Slovakia, 2013–2022

Tab. 4 Regression analysis of selected indicators on closed tourism businesses in Slovakia

	Coefficients	Standard Error	t Stat	P-value
Intercept	5413.0960	2531.5494	2.1382	0.0992
X1	-0.0006	0.0014	-0.4223	0.6944
X2	-0.0001	0.0023	-0.0693	0.9480
X3	0.0007	0.0022	0.3495	0.7443
X4	-0.0026	0.0038	-0.6851	0.5308
X5	8.86556E-05	8.98875E-05	0.9862	0.3798

Source: Own processing in the R statistical program based on data from the Tourism Satellite Account of Slovakia and the Statistical Office of Slovakia, 2013–2022

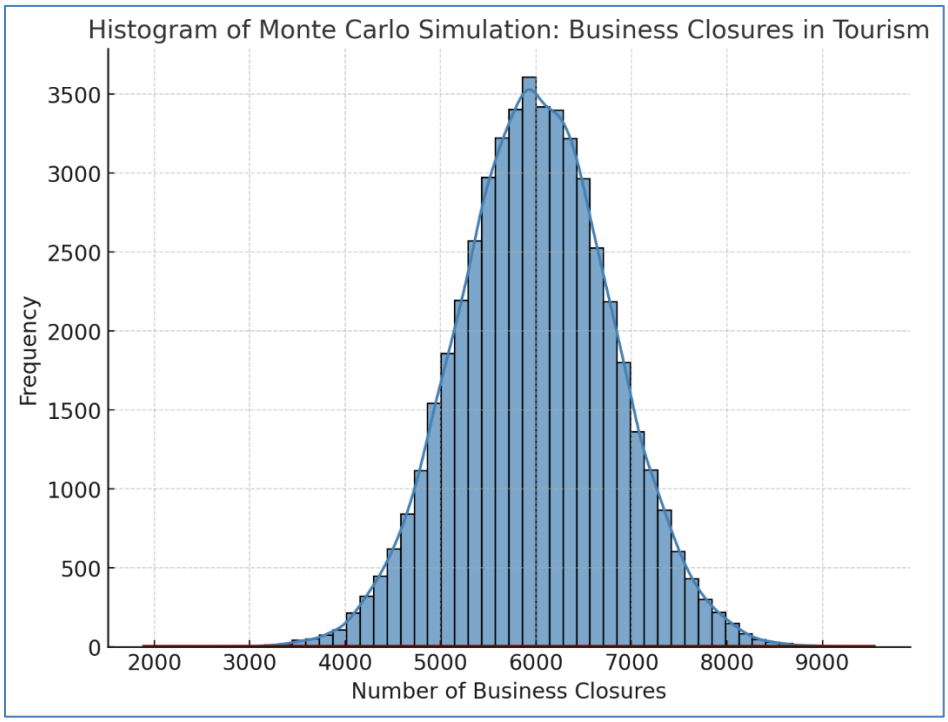
The correlations between closed businesses and economic factors are very weak (maximum 0.17), indicating that none of these indicators have a significant linear relationship with business closures. The strongest correlation is between X5 (number of visitors) and X4 (tourism GDP) (0.97), suggesting that a higher number of visitors is associated with increased economic activity in the sector. The correlations between different expenditure categories (X1 – X3) and tourism GDP (X4) are high (above 0.85), indicating possible multicollinearity among these variables (Table 3).

The overall regression model does not explain a statistically significant variability in the closure of tourism businesses in Slovakia. None of the independent variables are statistically significant, as all p-values exceed 0.05. The lowest p-value (0.099) is associated with the model's constant, suggesting that business closures are likely influenced by other factors not included in this model. Expenditures on inbound tourism (X1) and domestic tourism (X2) have very small coefficients close to zero, indicating that their impact on business closures is negligible. The number of visitors (X5) has a positive coefficient, but its effect is not statistically significant ($p = 0.379$).

The average value of the simulated results using the Monte Carlo simulation is approximately 6,000 closed tourism businesses in Slovakia. This suggests that, under the assumption of historical trends and current correlations, this figure represents the most probable outcome. The standard deviation indicates the spread of the simulated values, with extreme values

below 4,000 or above 8,000 being less likely but still possible. Confidence intervals (the left and right sides of the distribution) show that with 95% probability, the number of closed businesses in the tourism sector will range between approximately 4,500 and 7,500 in the future (Fig. 3).

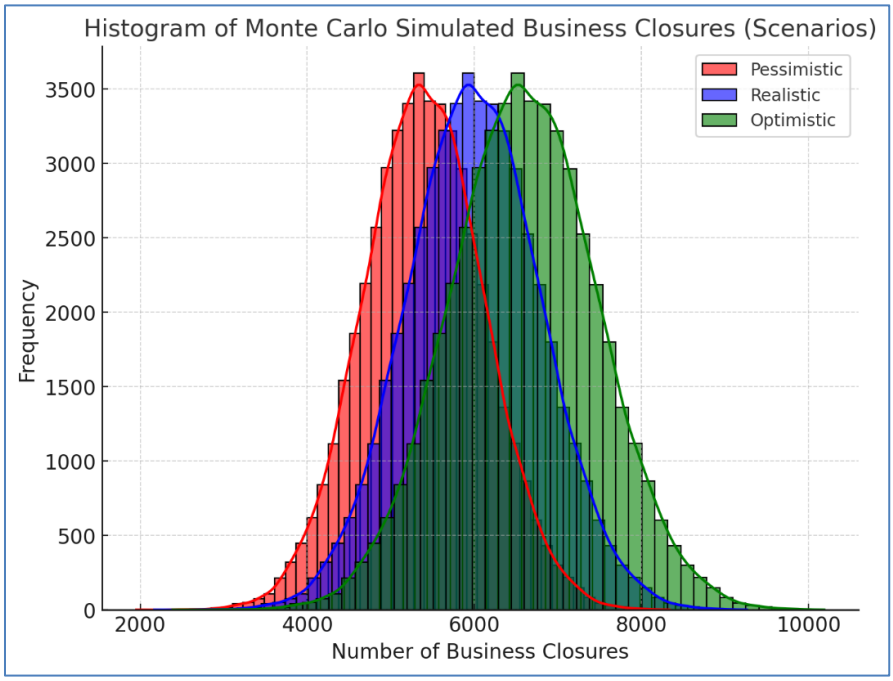
Fig. 3 Monte Carlo Simulation for Closed Tourism Businesses in Slovakia



Source: Own processing in the R statistical program based on the results of correlation analysis for closed tourism businesses in Slovakia

The pessimistic scenario assumes a 10% decline in business activity. In this scenario, the number of closed businesses increases, with the predicted number being 10% higher than in the realistic scenario. This trend may result from negative economic factors such as recession, high inflation, legislative changes, or declining demand in the tourism sector. Values at the upper limit of the confidence interval suggest that in the event of an economic crisis, the number of closed businesses could exceed 7,500 per year. This scenario highlights the need for government interventions, stimulus measures, and protective mechanisms to minimize the risk of mass business closures in the sector. The realistic scenario (continuation of the current trend) assumes a stable level of business closures, ranging between 5,500 and 6,500 annually, which aligns with historical trends. A slight natural fluctuation in business openings and closures is expected, with economic factors remaining relatively stable. This development is likely if current conditions persist, without unexpected economic shocks or major legislative changes. In this scenario, government and regulatory authorities could focus on long-term measures, such as business incubators or improved access to financing to support entrepreneurship (Fig. 4).

Fig. 4 Monte Carlo simulation scenarios for business closures in the tourism sector in Slovakia



Source: Own processing in the R statistical program based on the results of correlation analysis for closed tourism businesses in Slovakia

Optimistic scenario (increase in business activity by 10%) in this scenario, the number of closed businesses decreases, with predicted values being 10% lower than in the realistic scenario. This development may be supported by positive economic factors, such as increased demand in tourism, a favourable economic environment, a stable business climate, or government incentives. The lower bound of the confidence interval suggests that the number of closed businesses could drop below 5,000 per year, indicating a healthy business environment. The long-term sustainability of this scenario would require a stable economy, effective business support measures, and low market entry barriers (Fig. 4).

Regression analysis did not reveal a statistically significant relationship between the examined macroeconomic factors and the establishment of new businesses in the tourism sector. Despite a slight positive correlation between business formation and factors such as domestic tourism expenditures and direct sector GDP, these relationships were not strong enough to confirm statistical significance in the regression analysis. Expenditures on outbound tourism and the number of visitors showed no relevant impact on the creation of new business entities. Similarly, in the case of business closures, the correlation with economic factors was very weak, suggesting that their dynamics are influenced more by microeconomic factors, such as regulatory changes, access to financing, competition, and seasonal fluctuations. The Monte Carlo simulation provided valuable insights into the expected dynamics of the tourism sector. Predictions indicate that, if historical trends continue, the number of newly established businesses will be around 7,500 per year, while the number of closed businesses will stabilize at approximately 6,000 per year. This difference suggests a slightly positive business activity balance, though stabilization measures may be necessary to support long-term sector resilience.

The models also highlighted possible extreme scenarios:

- Pessimistic scenario: A 10% decline in business activity would lead to a significant increase in business closures, threatening the stability of the sector.

- Optimistic scenario: A 10% increase in business activity could support the stabilization of existing entities and lead to a rise in the number of new businesses.

A key finding is that domestic tourism expenditures may support business activity, whereas inbound tourism expenditures may not have a direct positive impact on the establishment of new businesses. This paradox may be explained by the stabilization effect of existing businesses, which benefit from higher spending by foreign tourists but do not create sufficient room for new entrants. The regression analysis, correlation analysis, and Monte Carlo simulation identified key factors influencing business dynamics in the tourism sector:

- Business formation in tourism is most strongly supported by the growth of direct tourism GDP (X4), which increases investment opportunities and business profitability. The number of visitors (X5) has a slightly positive impact on the establishment of new businesses; however, expenditures by foreign and domestic tourists did not show a statistically significant effect.
- Business closures in tourism are most significantly influenced by Slovaks' expenditures on outbound tourism (X3)—higher spending on international travel shifts consumer finances outside the domestic sector, leading to a higher number of business closures. Conversely, the number of visitors (X5) helps stabilize existing businesses, reducing their probability of closure.

CONCLUSION

The results of our study confirmed that the business environment in the tourism sector in Slovakia is influenced by multiple economic factors, although their impact on the dynamics of business formation and closure is not always statistically significant. The Monte Carlo simulation provided valuable quantitative insights into the future development of the sector, highlighting a slightly positive balance in the establishment of new businesses while also identifying risks associated with declining business activity. The findings suggest that domestic tourism expenditures may support entrepreneurial activity, whereas foreign tourist expenditures primarily have a stabilizing effect on existing businesses rather than directly fostering new business creation. Future research should incorporate more advanced forecasting methods, such as time series models (ARIMA, VAR), and expand the analytical framework to include microeconomic factors such as access to financing, business size, and market competition. The current limitations of available data, particularly within the Tourism Satellite Account, indicate the need for long-term monitoring and the consideration of delayed effects in the tourism business environment. To achieve more reliable results, future research should expand the dataset and employ more advanced methods, such as nonlinear models or time series analysis.

ACKNOWLEDGEMENT

This paper is part of VEGA 1/0271/23 Sustainable reneval of spa tourism in Slovak Republic in the context of impacts of civilization crises.

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