“Analyzing the risk of entrepreneurship in tourist traffic”

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ARTICLE INFO	Roland Weiss, Jozef Zuzik, Erik Weiss, Slavomir Labant and Marcela Gergeľová (2018). Analyzing the risk of entrepreneurship in tourist traffic. *Problems and Perspectives in Management*, *16*(1), 199-206. doi:10.21511/ppm.16(1).2018.19
DOI	http://dx.doi.org/10.21511/ppm.16(1).2018.19
RELEASED ON	Friday, 02 March 2018
RECEIVED ON	Friday, 02 June 2017
ACCEPTED ON	Thursday, 26 October 2017

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JOURNAL	"Problems and Perspectives in Management"
ISSN PRINT	1727-7051
ISSN ONLINE	1810-5467
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
8	4	4

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BUSINESS PERSPECTIVES

LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10, Sumy, 40022, Ukraine

www.businessperspectives.org

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ANALYZING THE RISK OF ENTREPRENEURSHIP IN TOURIST TRAFFIC

Abstract

The contribution is aimed at developing a model of demand in tourist traffic with due regard to economic, geographical, demographical and social factors such as the GDP, Consumer Price Index, prices of trips, revenues per capita, exchange rate, etc. Important parts of this model are made up by the unpredictable negative situations that have already happened some time ago. The aim is to identify them and perform a follow-up analysis of the potential threats to a company involved in the tourist industry. Rated among those situations are terrorism, earthquakes and aviation accidents.

Keywords tourism, risk, entrepreneurship

JEL Classification L26, L83

Received on: 2nd of June, 2017
Accepted on: 26th of October, 2017

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INTRODUCTION

Tourist traffic belongs to the branch of services that forms substantial part of our everyday life. The share of tourism in the global GDP is increasing from year to year not mentioning negative occurrences. Their share in the economics of developed countries is significant, making up more than half or even two thirds of the output. Within the service sector, tourism is reputable known for its high dynamics thus rated among rapidly developing branches.

The growing number of cases related to terrorism, earthquakes, aviation accidents, floods and illnesses make an influence on tourism, thus becoming themes of more specific research. This contribution is focused on modelling demand in tourist traffic and analyzing the specific risks. Investigation is concerned with the influence exerted by economical, geographical factors, as well as those also present, yet unpredictable situations such as terrorism, earthquakes and aviation accidents.

Effective tool for strategic planning not only in the tourism sector are also geomarketing (Gergeľová, Kuzevičová, Kuzevič, Mixtaj, 2013). International tourist traffic is harmed by events, which might occur in the destination area, or competitor's destinations, source markets or can happen at a large distance from both of them. The consequences can be mild and relatively short-termed, or they prove fatal to the existing branch and its systems. Serious interruptions also termed as shocks may affect the destination or the source market. They also influence the public and private sectors and disturbing the plans of tourists. Over the recent years, substantial interruptions of such kind have caused many problems to tourist traffic. Among them were cases such as war conflicts, financial crisis in Asia, and terrorist's attacks in the USA.

Source: WTO.

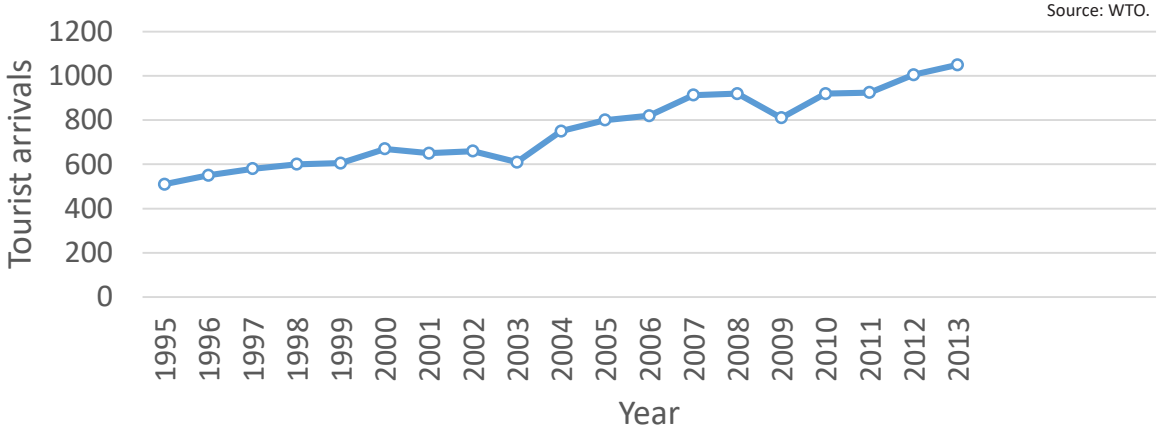

Figure 1. Development of tourism between 1995–2013

Interruptions negatively affecting tourism are classified either as crises or catastrophes (Faulkner, 2001). Only a relatively small share of attention has been paid to catastrophic phenomena in the field of tourist traffic, their impact on the branches of tourism and the reactions of other industries and the government agencies trying to cope with the consequences. Faulkner is one of those who consider non-application of such research a great shortcoming, because it is of great importance both for the future and assisting tourist traffic in coping with events that are mostly unpredictable. By contrast, under standard or piece-time conditions, forecasting future activities in tourism has turned out to be a useful tool for planning tourist activities ahead of time, widely applied by governments and the tourist industry (Uysal, Crompton, 1985; Witt, Song, 2001; Kuzevičová, Gergeľová, Kuzevič, 2013). Forecasting involves application of a number of analytical techniques based on recent data on tourist flows taking place between the source markets and destinations, as well as a whole range of economic factors to foresee future trends. However, it is still difficult to predict future economic activity (Bosáková, Kubák, Andrejkovič, & Hajduová, 2015), particularly in the times of uncertainties. In manufacturing industries the uncertainties can be reduced and impact of factors can be understood by experiments like in Kaselyova, Tkáč (2014). The situation in tourist industry is different. Factors that can affect tourist traffic cannot be predicted in terms of the future. What is known about the future is that there are several circumstances in stock, which might affect the course of events over the coming years.

Development of tourist traffic between 1995 and 2013 is illustrated in Figure 1. It reveals a dynamic growth from 1995 till 2008, when the recession on a worldwide scale is set in. Fortunately, international tourism has managed to recover from the difficulties caused by the global financial crisis and the economic recession so much typical for the end of 2008 and the beginning of year 2009. The arrival of tourists from abroad increased by 6.7% amounting 935 millions of visitors. Last year, however, the tourist traffic suffered a 2.8% growth, making up 1067 millions of tourists. Fortunately, tourism in the developing countries has managed to recover again. During 2008, a huge number of 913 millions of tourists were engaged in travelling. According to the World Tourism Organization, the WTO, this sector is assumed to record further growth even though at a slower pace, i.e., between 4 up to 5%.

The year of 2013 has turned out to be the most prosperous one for destinations in the Pacific and Asia, recording a growth rate exceeding 6.8%. The smallest growth was typical of destinations in Middle East. More detailed changes are presented in Table 1.

Table 1. Development of tourism in 2013 by regions (%)

Source: WTO.

World	Europe	Asia, Pacific	America	Africa	Middle East
4.7	5.0	6.8	3.5	4.8	–3.4

Situation for the recent decade is clearer from Table 2. The best period of time recorded by tourism was in 2004 witnessing a growth rate of 10.3%. On the contrary, the worst period of time came in 2009 when a four per cent fall-back was recorded. The sector of tourism has provided the proof of its ability to recover fast and dynamically. In 2001, the famous terrorist attack was committed in New York, which resulted in a drop of 0.1% within the industry. In 2003, the sector fell again into a crisis due to the spread of the SARS virus causing a year-to-year fall in visits by 1.6%. However, the biggest crisis tourism had ever faced came in 2009 as a result of the global economic recession. However, even those negative circumstances were unable to inhibit its dynamism and capability of revival, which, in 2010, resulted in a growth rate of 6.7%.

Table 2. Year-to-year development of tourism over the period of 10 years (%)

Source: WTO.

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
3.0	–1.6	10.3	5.4	5.5	6.6	2.1	–4.0	6.7	4.5	4.1	5.0

1. METHODOLOGY

When developing the model for a tourist company, panel data have been used. Currently, the data and files of the type are used in various areas of economics and finance. To them the so-called panel models are used, which for practical reasons require even higher level of simplification regarding the general system of econometrical equations. Here two types of panel models are distinguished, respectively, with two different ways of formal writing (Cipra, 2008).

Panel models with fixed effects

Panel models with fixed effect can be formally written as follows:

$$y_{jt} = \alpha + x_{jt}\gamma + \varepsilon_{jt}, \qquad (1)$$

where $\varepsilon_{jt} \approx iid\left(0, \sigma^2\right)$, $j = 1, ..., m$, $t = 1, ..., T$.

To distinguish between cross-sectional units, only the parameter of intercept α is used, which in that manner absorbs all the unsighted factors thereby identifying the differences between the cross sectional units. In view of the fact that the differentiation distinctiveness of the cross-sectional units is modelled by means of a fixed parameter α specific to each of the cross-sectional units, hence the use and marked the model with fixed effects.

Panel model with random effects

Panel model with random effects can be formally written as follows:

$$y_{jt} = \alpha + x_{jt}\gamma + \omega_{jt}, \qquad (2)$$

where $\omega_{jt} = \varepsilon_{jt} + \mu_{jt}$, $\varepsilon_{jt} \approx iid\left(0, \sigma^2\right)$, $j = 1, ..., m$, $t = 1, ..., T$, the random components are independent of one another for all j and t. This model is based on the idea that the effects identifying the individual cross-sectional units are random by nature, as if we were making a random choice from a large population of such units. When deciding as to which of the pairs of models with fixed or random effects is to be used, Gujarati recommends focusing on two rules:

- if the value of T is large and that of the n is small, then there will probably be a small difference between the values of the FEM and REM parameters – in such case the more simple FEEM is recommended;
- if the value of n is large and that of the T is small, then there will be a large difference between the values of FEM and REM parameters – in case when the choice of cross-sectional units is considered totally at random, consequently, the REM model is preferred, otherwise the FEM again.

Table 3 is offering some of the suggested models in which the authors applied the methods of least squares (MLS) and the apparently incoherent equations (AIE).

Table 3. Overview of methods of suggested models

Author	Function	Method
Akis	Log-linear	MLS
Crouch	Log-linear	MLS
Di Matteo	Log-linear	MLS
Jensen	Log-linear	MLS
Vanegas	Log-linear	MLS
Webber	Log-linear	MLS
Morley	Linear	AIE
Witt	Log-linear	MLS
Song	Log-linear	MLS
Shan	Linear	AIE

A step-by-step research of the available reference revealed that when applying the method of least squares the log-linear function turned out to be the most frequently used function.

In view of the amount and types of the data collected, the log-linear model is the most actual and suitable based on the panel data with random effect:

$$log\, y_{jt} = \alpha + x_{jt}\beta_{jt} + \varepsilon_{jt} + \mu_{jt}. \qquad (3)$$

The development of the model was based on the results of monitoring 23 countries performed over the period from 1997 to 2008. The arbitrary variable y_{jt} in the model represented the revenues of the country from tourism. α is a constant in the model. ε_{jt} $^{\varepsilon_{jt}}$ is the error of the model and μ_{jt} stands for the random component. The monitored countries were Austria, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom, and the USA. As determinants of x_{jt} the following variables have been inspected:

- Price of a travel per capita – calculated as quotient of the costs of all the travellers (with costs of transportation included) and the number of visitors arriving in the given country in a specified year. The data were obtained from the database of the WTO.
- CPI – Consumer Price Index is expressing the price level of consumer goods making use of the so-called market or consumption basket. It is made up of selected groups of goods and services. The weight assigned to the prices of goods in the market basket reflects the economic importance of the individual sorts of goods and groups of goods. The economic importance is given by the quotient of the costs of households spent for the given group of goods and services. Sources of information were those issued by the World Bank.
- Official exchange rate is calculated as a yearly average based on monthly averages expressed in units of local currency against the United States Dollar (USD). The data were obtained from the databases of the Word Bank.
- Aviation accidents – based on the available data, the model presents data of aviation accidents disclosed by the International Civil Aviation Organization, the ICAO.
- Visit rate of a country is expressed by the number of all tourists having travelled to the country regardless of the purpose of their journey, be it for a holiday at the seaside, relaxation, business trip or visiting relatives.
- Terrorist events – this variable involves numbers of terrorist attacks in the given country as recorded by the statistics database of the RAND corporation.
- Victims of terrorists – unlike the attacks, this variable is based on the official number of victims resulting from terrorist attacks in the given country. The data have been obtained from the database of RAND, a US based company specialized in terrorism.
- Market – reveals the number of all the active inhabitants of a given country as recorded

by the International Labor Organization (ILO).

- Earthquakes – this variable is represented by the number of victims in the wake of earthquakes in the monitored country, along with its effects on the active tourism and revenues from it. The source of data comes from the National Centre for Information on Earthquakes, USA.

- Average net income per capita in a year – this number is stating the revenue of a person living in the country under research focused on active tourism. The data have been obtained from the statistical offices of the countries involved in research and the EUROSTAT as well.

- Preferences – a specific determinant, which is not found in similar models. It is calculated on the basis of data about German tourists. A quotient of tourists who have left for the country and all those, who left somewhere for holiday making, as recorded by the WTO.

2. RESULTS

Applying the model, the following results have been obtained: variable – price of a trip – is of statistical importance at a level of 95 percent, in the model with positive influence. The dependent variable in the country monitored – revenues from tourism – are directly affected by the cost of trips. Raising the prices of trip into a country of destination will result in higher revenues from local tourism. As a matter of course, one has also to take into account the visit rate of the country, which is also a factor of influence.

The second in the order of variables is the CPI (Consumer Price Index) in the country under monitoring, it is also of statistical significance affecting the revenues. Again, it is a direct dependence as increasing the level of prices of goods and services results in higher incomes generated by local tourism. The third in the order of variables is the official exchange rate, which is of no importance in terms of its influence.

In this model, a simultaneous survey was made in 23 countries and the development of exchange rates against the USD is of not much significance in terms of affecting local revenues from tourism. This may be caused by the fact that the countries are not making business in US Dollars, or also by the fact that the fluctuations of the USD exchange rate do affect the overall economic development in this countries as well as the development of the purchasing power of the inhabitants. However, all that with a substantial delay, which is not reflected in the inhabitant's demand for tourism.

The determinant of aviation accidents with a yearly shift as a risk of entrepreneurship in tourism statistically belongs to a factor of neglectable importance. The number of visitors, having spent a minimum of one night, however, is of great statistical importance. It bears direct dependency to the revenues of the country. Growth in the number of tourists is the direct cause of the growth of revenues of the country.

The factor of terrorist events is investigated with a year-delay so as to enable to analyze its effects to the active tourism with the potential for forecasting changes in the dependent variable for the next year. In the monitored countries, these events have turned out to be of no statistical importance. The size of the market of the investigated country in the form of the number of active people is also a factor of no importance. It means that the number of inhabitants and the size of the country do not, in any way, affect the revenues from tourism.

The risk of the effect of earthquakes on tourism in the countries monitored is also a factor of no importance. In the analyzed country, the number of victims in the wake of earthquakes does not influence the revenues from tourism.

The factor of the average yearly income has turned out to be of no importance. It must have been caused by the fact that it is about the income of the citizens of the monitored country and not the country of the visitor(s). Preferences of tourists have achieved a statistically important effect with a positive sign. It means that the higher the preference of the country, the higher the revenue obtained.

Table 4. Model results

Variable	Coefficient	Importance
Constant	5.901816	0.0000
Price of a trip	0.000525	0.0000
Cpi	0.020042	0.0000
Exchange rate	0.000595	0.5816
Aviation accidents (–1)	0.002445	0.1394
Number of visitors	9.82E–06	0.0387
Terrosist events (–1)	–0.000534	0.2668
Market	3.17E-09	0.5157
Earthquakes	0.000734	0.4386
Average yearly income	1.03E-05	0.0647
Preferences	0.029513	0.0000
Terrorist victims (–1)	1.19E–05	0.7963

The last factor is the number of victims as a result of terrorist attacks. This coefficient has turned out to be of no statistical importance. The overall constant of the model has achieved a statistical importance and its size is expressed as 5.90.

The coefficient of determination for the model has achieved the value of 0.84. The corrected coefficient of determination has achieved the value of 0.83. In other words, the declared precision of this model is stated at 83 per cent. The number of periods analyzed in the model is 11. The number of cross-sectional units is 23 and the total number of monitoring has achieved the value of 253. The standard error of the regression shows the value of 0.14. The standard error of the dependent variable is at the value of 0.35.

Following the results of the model focus was shifted on the significant variables as the average values for the year compared with the average revenues for the same period. Graphically, Figure 2 reveals that the negative change in the price of the trips is larger than the change in the revenues from tourism. In positive numbers, the opposite is true: the

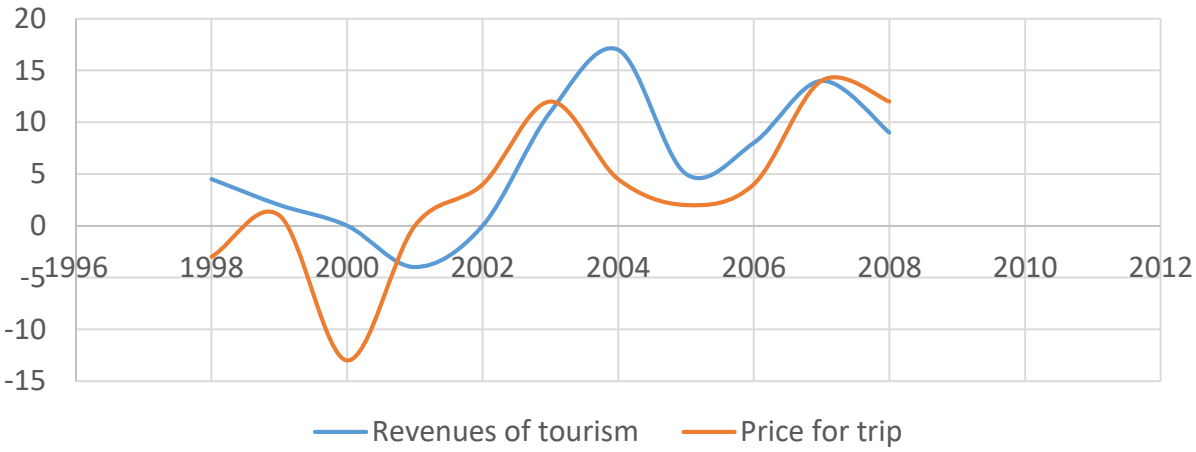

Figure 2. Development of revenues from tourism and the prices for trips for the period 1998–2008 (values representing the average of perceptual year-to-year differences of 23 countries)

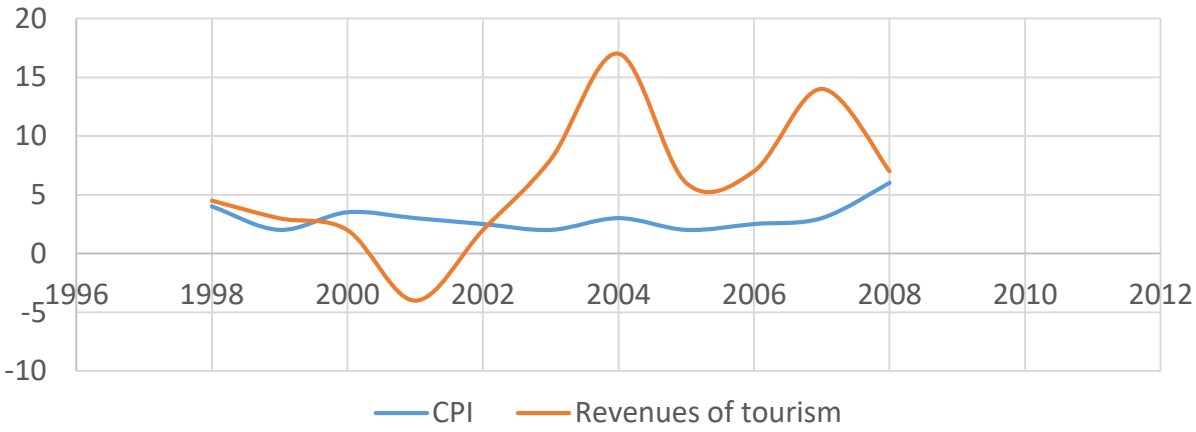

Figure 3. Development of revenues from tourism and Consumer Price Index for the period 1998–2008 (values representing the average of percentual year-to-year differences of 23 countries)

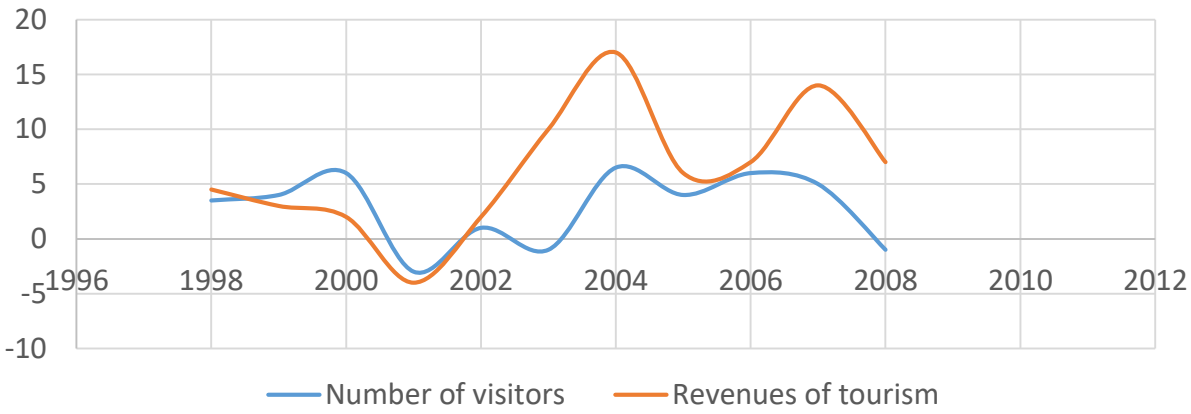

Figure 4. Development of the number of visitors and revenues from tourism for the period 1998–2008 (values representing the average of percentual year-to-year differences of 23 countries)

year-to-year change in the revenues for tourism is larger than the change in the change in the price for the trip. In the year 2007 are the maxima of curves almost equal, so the changes in the prices of the trips and revenues are almost identical.

The second important factor brought under comparison is the Consumer Price Index of the countries surveyed. In the years 1999 and 2002, the average changes in the Consumer Price Index and the revenues from tourism are identical (Figure 3). In 2008, the curves are again converging, but the difference remains roughly 2%. The largest differences between the analyzed data have been achieved in the revenues for the year 2004 amounting roughly to 17%, whereas the CPI remained at the level of 3%.

The third important parameter is the number of visitors for the country. Identical changes in the visit rate and the revenues obtained from tourism were recorded in the second half of the year 1998 and also in the second half of 2001 (Figure 4). The largest difference in changes has become evident in 2004. However, in 2008, there is a decline in both of the monitored variables. A fact may have probably been caused by the beginning of the financial and economic crisis.

CONCLUSION

The adverse effects of the environment and the negative events can be handled by the companies of tourism effectively, namely by means of statistical econometric models, which help determine the crucial factors affecting entrepreneurship in this branch. Based on the analysis, we have concluded that of the analyzed factors it is the price of the trips, development of the consumer price index and visit rate of the country the matter mostly.

REFERENCES

1. Bosáková, L., Kubák, M., Andrejkovič, M., & Hajduová, Z. (2015). Doing business abroad: utility function model for country selection in preliminary screening phase. *Central European Journal of Operations Research, 23*(1), 53-68. Retrieved from https://link.springer.com/article/10.1007/s10100-013-0328-1
2. Cipra, T. (2008). *Financial econometrics*. Ekopress, Praha.
3. Faulkner, B. (2001). Towards a framework for tourism disaster management. *Tourism Management, 22,* 135-147. Retrieved from https://ru.scribd.com/document/348660275/Faulkner-B-2001-Towards-a-framework-for-tourism-disaster-management-Tourism-Management-22-pdf
4. Gergeľová, M., Kuzevičová, Ž., Kuzevič, Š., Mixtaj, L. (2013). Marketing with support of the use of GIS tools. *Marketing & komunikace, 23*(3), 16-17.
5. Kaselyova, B., Tkáč, M. (2014). Design of experiments in truck company. *Quality Innovation Prosperity, 19*(1), 45-58. Retrieved from http://www.qip-journal.eu/index.php/QIP/article/view/419

6. Kuzevičová, Ž., Gergeľová, M., Kuzevič, Š. (2013). Spatial models of historical sites and their use in geotourism. *Acta Geoturistica, 4*(2), 48-53. Retrieved from https://geotur.fberg.tuke.sk/pdf/2013/n02/06_Kuzevicova_v4_n2.pdf

7. Uysal, M., Crompton, J. (1985). An overview of approaches used to forecast tourism demand. *Journal of Travel Research, 23*(2), 7-15. Retrieved from http://journals.sagepub.com/doi/abs/10.1177/004728758502300402

8. Witt, S. F., Song, H. (2001). Forecasting future tourism flows. In A. Lockwood & S. Medlik (Eds.), *Tourism and hospitality in the 21st century* (pp. 106-118). Oxford: Butterworth-Heinemann.