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Regional analysis of direct gross domestic product from tourism in Romania during 2014-2019

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Abstract. *The Tourism Satellite Account provides data on the tourism sector since 2011. The presentation of this data, as it is currently done only at national level, does not allow for studies or analyses at regional level or by specific areas of interest. At present, a limited number of countries in the world, around 15, break down these indicators by region. The article reviews the evolution of academic studies on the Tourism Satellite Account, starting from the time when no data on tourism industries or the indirect effects of tourism activities were recorded, to the present day, where principles and methods for extending the Satellite Account to the regional level are presented.*

The research question is: What is the level of Direct Gross Domestic Product from tourism for each development region in Romania? The methodology used to achieve the research goal involved correlation analyses on the variables studied, namely: Domestic Tourism Consumption, Number of Overnight Stays and Direct Gross Domestic Product from Tourism, as well as simple and multi-factor regression analyses, for which Direct Gross Domestic Product from Tourism is the outcome variable. The data used in these analyses are recorded from the periodicals of the Tourism Satellite Account and from the periodic records of the National Statistical Institute. The conclusions drawn from the data analysis are based on the analysis of the quality of the statistical estimators used. The data analysis, led to the conclusion that the development of the tourism sector in the period under study 2014-2019, with a growth rate over the entire period of 1,41 in terms of GDPDT, is relatively evenly distributed over each region in terms of the regional level of growth rate. The transfer of the Satellite Account aggregates by development regions or specific tourism areas, carried out in this article is a building block for other research methodologies on the analysis of all factors contributing directly or indirectly to the growth in GDP of the tourism sector.

Keywords: *Tourism Satellite Account, Direct gross domestic product from tourism, tourism consumption, regionalization, Number of Overnight Stays*

1. Introduction

In studies, the development of the tourism sector is generally associated with the percentage of Gross Domestic Product (GDP) achieved (Gossling et al., 2005; Nastase, 2007; Turcov, 2010). At

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present, worldwide, the share of the tourism sector in national economies is around 5%. Other correlations to measure the level of development are given by the association with the percentage of income of local communities and the number of employees in the tourism sector in relation to the total number of employees in the study area. As a benchmark, the ratio of employment is 6-8%. This figure refers both to employees in the tourism sector who are directly involved in tourism activities and those who are indirectly involved in tourism activities.

With regard to the sustainability of tourism sector development, the general conclusions found in the literature (Gossling, 2010; Boghean, 2007) refer to the need for tourism sector development, mainly based on the consideration that greenhouse gas (GHG) emissions from the tourism sector represent about 5% of total emissions, which is considered as a solid basis for the sector to comply with sustainable development principles and rules.

The central theme currently being addressed for the development of the tourism sector is based on research and the continuous acquisition of new knowledge on an ongoing basis. The analysis of actions in the field of tourism as well as tourism activities is carried out through the results of the operation of the proposed systems or developed functions. Current theories that can be considered related to this approach are: Sustainable tourism and development concept. With the development of these theories, the principles underlying sustainable tourism research should be mentioned in this study, namely:

- maintaining the integrity of the environment as a basic element for the existence and livelihood of future generations;
- tourist destinations and therefore the tourist activities to be carried out there must be determined by the local community, the environment and also by the tourists.

All these key principles should lead to the following central points being included in the actions:

- The way in which the environment is conserved (references should include actions that lead to environmental degradation, respectively conservation and development of natural resources);
- The way in which the local community is developed (which are the concrete actions by which the local community does not change its social ties, manages to preserve its traditions or protects not only in the sense of conservation but also in the sense of development of man-made resources);
- The way in which local education is developed (which actions are supported to develop local population' knowledge and how tourists contribute to the development of the local community);
- Greenhouse gas monitoring (which actions or plans are being monitored and also what action is being taken following regular analysis of these indicators).

It should be explicitly stated in this situation that any plan containing monitoring will be on-going and the corrective actions required are short-term reviews.

It should also be noted at this point in the research that the four focal points listed above cannot be considered as independent of each other. The study of dependency intensity and analytical dependency relations can be the subject of further research that is based on the scientific framework appropriate to the topic. This study aims at studying the qualitative elements that can contribute to the numerical development of such a phenomenon.

In addition to the economic efficiency parameters specific to each activity, the analysis criterion from the point of view of the local community and its partnership is given by the level of revenue from local budgets as a result of implementing a tourism programme. Used on a large scale, a first criterion that can be analysed is the income multiplier, an indicator that can provide the real level of income in local budgets. Worldwide it is considered to be 0,19 in congested regions

and 3,40 in mountain or coastal regions. Although not much information is available, studies indicate higher multipliers in areas with important cultural destinations. Another indicator that has been considered a benchmark recently is the level of spending per tourist per day. This indicator is used both in terms of the amount of value brought to the local community and the importance of the tourist area visited. In addition to the factors capturing this revenue (mainly local households), the indicator tends to become a benchmark for tourism as a sector in GDP.

Interventions through which the poor can be integrated into the tourism sector can include: transport services, food services, souvenirs or other actions that can have a multiplier effect. It is expected that in the future, the more sustainable the development, the greater the possibility of integrating the poor.

As it is known, in any type of economic activity, measuring results, i.e. performance in the activity, offers a picture of the potential for growth with a view to subsequent stimulation through specialised programmes or other support actions. Of the five classes of measurement systems for tourism activities classified by Vanhove (2005), we will choose the Tourism Satellite Account (TSA) as the basis for our analysis.

As defined by the World Tourism Organisation (UNWTO) in 2000, "The Tourism Satellite Account is a set of definitions and classifications integrated into tables that provide a picture of the economic impact of tourism on the demand and supply side". As can be seen from the definition, the TSA is a fundamental tool for assessing the share of tourism activities in the national economy and the effects they generate through their multiplier effect. In Romania, the TSA is produced by the National Institute of Statistics and it is published annually.

The essence of the TSA is the balance between domestic tourism consumption and tourism supply, determined for all types of tourism service activities.

According to the "Tourism Satellite Account: Recommendations on the Conceptual Framework 2008", the main aggregates determined are the following (National Institute of Statistics, Tourism Satellite Account 2014-2019):

- Domestic tourism consumption (DTC);
- Gross value added from tourism industries (GVATI);
- Gross direct value added from tourism (GDVA);
- Direct gross domestic product from tourism (GDPDT);
- Volume of employees in tourism (VAT).

The definitions of all these aggregated indicators are those found in the regular publications of the Tourism Satellite Account.

Given that the TSA aggregates are presented in periodicals only at the country level, the main question that is the purpose of this research is: What is the level of GDPDT for each of Romania's eight development regions? Consequently, the second question arises: How can the data be transferred from the central to the regional level?

The assumption of the model is that the regional level of GDPDT depends on:

- The number of overnight stays in tourist accommodation facilities (NIREG);
- Domestic tourism consumption (DTC).

It should be noted that the number of overnight stays is recorded at regional level, which leads to consider it as a direct determinant, while domestic tourism consumption is recorded in the publications only at the whole country level.

Please note that the period for which data have been recorded is 2014-2019, as at the time of the study the last TSA publication containing data at national level corresponds to 2019.

2. Literature review

The first theoretical analyses of TSA were made by Nordstrom (1996) in Sweden and by Smith (1995) in Canada and analysed the impact of tourism on national economies, i.e. comparing it with the criteria set out by the UNWTO.

The analysis according to the UNWTO criteria was developed by Frechtling in 1999 he updated the concepts and methodologies for the new TSA:RMF 2008 framework (UNWTO, 2008).

The framework elements for the application of TSA in different countries are generally the same (Calvin et al., 2003; Wu et al., 2019), but as Smeral (2006) notes, the usefulness at that time was limited as only direct implications in the economy were inferred, and not indirect ones.

The TSA currently provides a reflection of the contribution of the tourism industries to the overall national economy (Smeral, 2010; Eugenio-Martin and Campos-Soria, 2011; Camacho-Murillo, 2019). Given the need for analysis at regional level as well, it is clear that regional TSAs are necessary, bearing in mind the need to investigate the impact of the tourism industries in the regions as well. This issue has been addressed by Frechtling (2009). At the same time, he also points out that a problem in carrying out regional accounts lies in the lack of high quality statistical data in order to obtain good estimates of the data. He considers that the development of a TSA at regional level can be based on the same data from which a national TSA is constructed, and that another way would be to distribute the TSA from the national level to the regions by relating the values to certain clearly determined characteristics or indicators.

Frechtilng (2009) also notes that a regional TSA must follow the same definitions as at the national level, and on the other hand must generate the same aggregate values as at the national level.

As C. Ferent (2020) notes, the Tourism Satellite Account in Romania does not provide information broken down by regions, counties or localities, as is the case for accommodation units or overnight stays, for example, which makes it currently inoperable for local or regional studies.

3. Methodology

The purpose of this study is to identify a method based on relating the values of aggregate indicators to other clearly determined indicators in order to obtain percentage values of GDPDT by development regions. It should be noted that a measurement of these values has also been carried out by C. Ferenț (2020), who used the same research methods as those used to construct the CST.

The evolution of the main tourism aggregates from 2014 to 2019 is shown in Table 1 (National Institute of Statistics, Tourism Satellite Account 2014-2019).

Table 1. Evolution of main tourism aggregates

			Indicators (mil lei)		*Amount of people*
Anii	**DTC**	**GVATI**	**GDVA**	**GDPDT**	**VAT**
2014	33410,0	27191,1	12484,2	13104,6	349375
2015	37481,3	33426,3	16274,0	17097,3	342755
2016	40173,2	35240,4	20458,5	21153,8	371696
2017	49555,5	41651,3	23196,5	23909,0	373074
2018	56315,1	45911,7	26661,8	27685,6	478754
2019	57995,6	68226,6	30428,5	31564,6	480705

Source: INS Tourism Satellite Account 2014-2019.

A simple visualisation of these data shows that there is a dependency relationship between DTC and GDPDT, illustrated graphically in Figure no. 1.

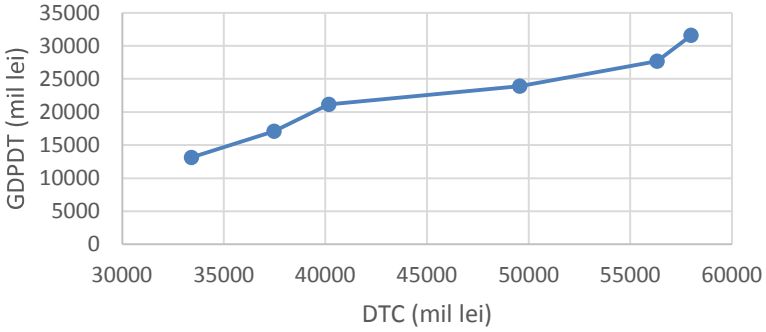


Figure 1. Evolution of GDPDT in relation to DTC between 2014 and 2019

Source: INS Tourism Satellite Account 2014-2019.

To make the estimates, we introduce the following variable into the study: Number of overnight stays (NIREG) in tourist accommodation establishments (thousand units);

The annual aggregate values for NIREG are recorded in Table 2. NIREG values are additionally recorded for the eight development regions of Romania. These values were determined by summing the monthly values recorded in TEMPO_TUR105G_15_2_2022 (National Institute of Statistics, Tourism Satellite Account 2014-2019).

Table 2. Number of overnight stays and accommodation services for visitors 2014-2019

Anii	DTC	NIREG-NORTH WEST	NIREG - CENTRE	NIREG-NORTH EAST	NIREG-SOUTH EAST	NIREG-SOUTH MUNTENIA	NIREG-BUCHAREST ILFOV	NIREG-SOUTHWEST OLTENIA	NIREG-WEST	NIREG
2014	33410	2279	4223	1704	4292	1706	2660	1535	1826	20230
2015	37481	2706	5003	1925	4915	1900	3039	1724	2229	23445
2016	40173	3060	5324	2166	5310	1980	3355	1802	2273	25274
2017	49555	3310	5832	2279	5593	2046	3600	1961	2289	26915
2018	56315	3607	6010	2407	6068	2228	3678	2073	2374	28449
2019	57995	3764	6367	2617	6293	2301	3823	2224	2477	29870

Source: INS Tourism Satellite Account 2014-2019.

It can also be observed from the analysis of these data that there is a dependency relationship between DTC and NIREG, illustrated graphically in Figure 2.

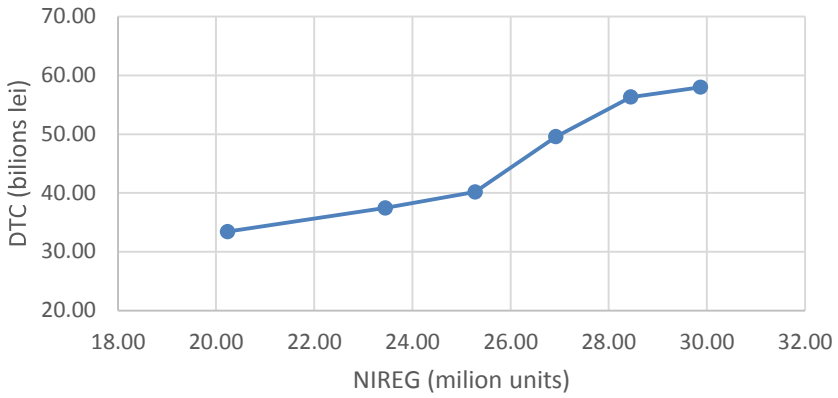


Figure2. Evolution of CTI in relation to NIREG between 2014 and 2019
Source: INS Tourism Satellite Account 2014-2019.

2.1. Model hypotheses

As can be seen from the graphical methods, the following hypotheses can be formulated, considering as model variables: Domestic Tourism Consumption (DTC), Direct Gross Domestic Product from Tourism (GDPDT), Number of Overnight Stays (NIREG).

1. Domestic Tourism Consumption (DTC) is a determining factor for Direct Gross Domestic Product from Tourism (GDPDT);
2. Number of overnight stays (NIREG) is a determinant of Domestic Tourism Consumption (DTC);
3. Domestic Tourism Consumption (DTC) and Number of Overnight Stays (NIREG) are the determinants of Direct Gross Domestic Product from Tourism (GDPDT).

2.2. Methodology used

The regression analysis of the evolution of the variables involved for the period under consideration took into account the following conclusions:
- Estimation of the parameters corresponding to the adjustment equation adopted;
- Determining the intensity of the link between the variables by calculating the correlation ratio (R) and the coefficient of determination. As we know, the closer the value of the correlation ratio is to 1, the stronger the link between the variables, and the link can be considered linear around 1.

Statistical analysis of the data was conducted using SPSS v26.

The Model Summary tables record values for the Correlation Ratio (R) as well as for R square which represents the coefficient of determination, i.e. the extent to which the variation in the values of the predictor variable influences the variation in the values of the outcome variable. The results from ANOVA models contain two essential elements: F-values and Sig. The F-value is the value of the F-statistic and Sig is the probability of rejecting the hypothesis made even though it is true. Small values of Sig, meaning Sig < 0.05, signify the rejection of the hypothesis of lack of significance of the dependency of the variables and the possibility of concluding that the variables are dependent with the correlation ratio or coefficient of determination calculated.

Methods based on statistical regression have also been used for ASD data. Thus, Dudek et al. (2020), develops a multifactor regression model in which GDP is the outcome factor and GDVA (resulting only from accommodation and food services) and gross capital formation are considered as determinants. Also, Cerovic et al. (2015) perform a regression-based link between the number

of overnight stays and the number of tourist arrivals to the overall level of GDP. Their goal was to determine the influence of tourism on overall economic growth. In this study the research will aim to decompose the aggregate TSA values from the global to the regional level based on the analysis of the factors with determinant influences on them.

2.3. Regression analysis results

Analysing the correlation, by applying the linear regression method, between the Number of Overnight Stays (NIREG) as a determinant of Domestic Tourism Consumption (DTC), the results presented in Tables 3-4 were obtained.

Table 3. Determination ratio between NIREG and DTC

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,961[a]	,923	,904	3185,12872
a. Predictors: (Constant), NIREG				

Source: Authors' own research.

Table 4. Analysis of the variance of NIREG and DTC

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	487194488,647	1	487194488,647	48,023	,002[b]
	Residual	40580179,821	4	10145044,955		
	Total	527774668,468	5			
a. Dependent Variable: DTC						
b. Predictors: (Constant), NIREG						

Source: Authors' own research.

Analyzing the correlation, by applying the linear regression method, between Domestic Tourism Consumption (DTC) as a determinant of Direct Gross Domestic Product from Tourism (GDPDT), the results presented in Tables 5-6 were obtained.

Table 5. Determination ratio between DTC and GDPDT

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,973[a]	,947	,934	1742,16589
a. Predictors: (Constant), DTC				

Source: Authors' own research.

Table 6. Analysis of variance of DTC and GDPDT

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	218137876,057	1	218137876,057	71,871	,001[b]
	Residual	12140568,018	4	3035142,004		
	Total	230278444,075	5			
a. Dependent Variable: GDPDT						
b. Predictors: (Constant), DTC						

Source: Authors' own research.

Analysing the data, we observe high values of the correlation ratio as well as the coefficient of determination in both cases. This leads at this point to the strong argument to determine the existence and the strength of the link between the NIREG and DTC variables as dependent variables and GDPDT as the outcome variable. The results of this analysis, using the multifactor regression method, are presented in Tables 7-8.

Table 7. Determination ratio between NIREG, DTC and GDPDT

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,993[a]	,986	,977	1022,19556
a. Predictors: (Constant), NIREG, DTC				

Source: Authors' own research.

Table 8. Analysis of variance of NIREG, DTC and GDPDT

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	227143792,798	2	113571896,399	108,693	,002[b]
	Residual	3134651,277	3	1044883,759		
	Total	230278444,075	5			
a. Dependent Variable: GDPDT						
b. Predictors: (Constant), NIREG, DTC						

Source: Authors' own research.

The results obtained from this analysis practically demonstrate the basic hypothesis that the NIREG and variables influence the values of the GDPDT variable. The coefficient of determination in this case is 98,6%, i.e. the values of the factor variables influence 98,6% of the level of GDPDT, the remaining 1,4% being a contribution of other actions.

The level of dependence determined leads us at this point to the possibility of determining the regional values of GDPDT on the basis of the values recorded by the NIREG and DTC variables for each of the eight development regions.

Table 9. Share of regions in GDPDT

Anii	NORTHWEST (%)	CENTRE (%)	NORTH EAST (%)	SOUTH EAST (%)	SOUTH - MUNTENIA (%)	BUCHAREST ILFOV (%)	SOUTHWEST OLTENIA (%)	WEST (%)
2014	11,3	20,9	8,4	21,2	8,4	13,2	7,6	9,0
2015	11,5	21,3	8,2	21,0	8,1	13,0	7,4	9,5
2016	12,1	21,1	8,6	21,0	7,8	13,3	7,1	9,0
2017	12,3	21,7	8,5	20,8	7,6	13,4	7,3	8,5
2018	12,7	21,1	8,5	21,3	7,8	12,9	7,3	8,3
2019	12,6	21,3	8,8	21,1	7,7	12,8	7,4	8,3

Source: Authors' own research.

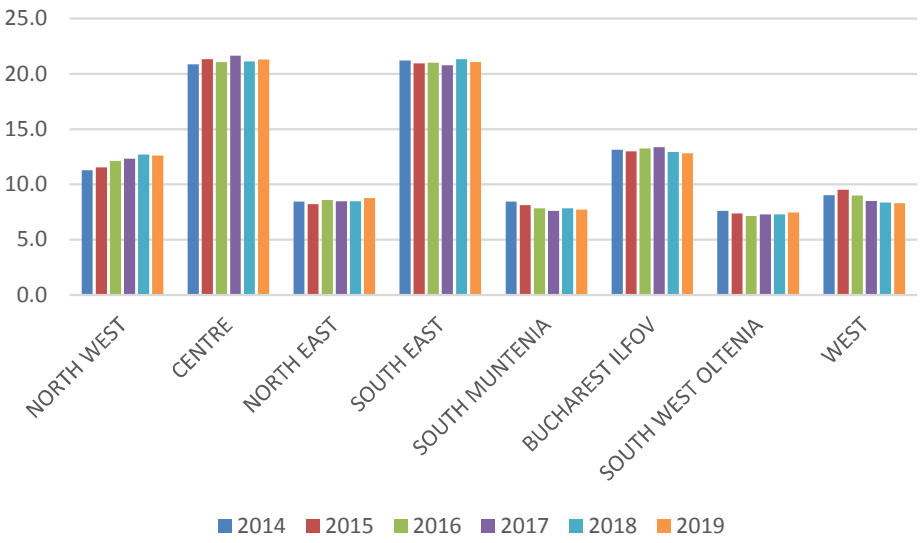


Figure 3. Evolution of Regions in GDPDT between 2014-2019

Source: Authors' own research.

4. Conclusion

Determining the influences in the GDPDT can lead to overriding investment policies or more so to the sizing of financial resource allocation shares.

The regionalisation of aggregated tourism indicators provides a picture of the impact of each area on the tourism economy.

As can be seen, the highest values are to be found in the Central Region and the South East Region. The first conclusions that can be drawn are naturally related to the influence of natural resources that determine the levels recorded, as in the Centre Region are the Apuseni Mountains, the Brasov tourist area or the Sibiu tourist area. In the South East Region we find the coastal area and the Danube Delta. Business tourism has an impact in the Bucharest Ilfov region, which in this case does not have significant natural resources. On the other hand, the other Regions are in correlation with the overall regional development level, with lower values for West Region where the general economic level is higher than in other regions.

Respecting the proportions, the other aggregated TSA indicators can be determined, as well as other derived indicators such as labour productivity in tourism activities or the level of GDPDT per capita in each development region.

The future aim of this research may be to identify the role and extent to which natural resources influence the volume and level of tourism activities.

It would be relevant to know the amount of added value that a point in the natural resource assessment area provides or how much a point in the man-made resource assessment area provides. Of course, such research should be carried out by area or at most by development region. That is why it is important to ensure the plausibility of regional estimates so that we can rely on their quality in the assessments we make.

The analyses carried out must be based on the study of time series. The limitation is due to the fact that time series are generated by dependent statistical variables, therefore the criteria and method of analysis will be determined by characteristics of the dependent variables.

It is also important to regionalise as treating this problem on a national scale would not lead to relevant conclusions or solutions for the development of the tourism sector.

On the one hand, it is necessary to identify at regional, zonal or local level the ratio/proportion in which natural or man-made resources influence the level of demand. Naturally, supply will always be greater than demand, but it is essential to identify the factors that determine demand.

Tourism development must be closely linked to its sustainability, and this can only be achieved through investment. Investment in sustainable tourism must provide opportunities in the areas of water, energy, waste management and biodiversity conservation. Analysis indicators should refer on the one hand to the reduction of energy and water consumption and on the other hand to the renewable resources used in their consumption. From this perspective, all processes with low greenhouse gas emissions should be monitored and promoted. One of the sectors that needs to be closely monitored is transport. The first step to be encouraged is a shift to rail transport, which is currently considered the 'greenest' in the segment. Another general indicator of energy consumption can be seen as the ratio of the value level of energy consumption to the company's turnover, especially as this indicator is also used worldwide.

Given that tourism business is entirely private, the economic efficiency factor will have the greatest impact on development. Consequently, in order to achieve real effects in the transition to sustainable development processes, intensive analysis processes and partnerships with local authorities will be needed.

The reasoning for the investments to be made must be based on an analysis of the tourism potential of the area, the volume and objectives of the investments being determined by the particular parameters of each area analysed. Obviously, investments will not be made on the basis of natural resources where these do not exist, the development directions being given by man-made resources. Where both types of potential resources are present, investments will be made in relation to local development policies for the area. This is another argument for the need to regionalise TSAs.

4. Bibliography

Boghean, C. (2007). Prospects for sustainable development of Romanian tourism. *Journal of tourism,* 3, 58-62.

Calvin, J., Munday, M., &Roberts, A. (2003). Regional Tourism Satellite Acconts: A useful policy Tool. *Urban Studies*, 40(12), 2777-2794.

Camacho-Murillo, A. (2019). Methods and measurement techniques in tourism. *Turismo y Sociedad*, 24, 211-216.

Cerovic, S., Knezevic, M., Matovic, V., & Brdar, I. (2015). The contribution of tourism Industry on the GDP growth of western Balkan Countries. *Industria*, 43(3), 159-170.

Dukec, D., Kecek, D., & Klopotan I. (2020). Empirical Analysis of tourism impact on Croatian GDP. *Proceedings of 63rd International Scientific Conference on Economic and Social Development*, 389-396.

Eugenio-Martín, J. L., & Campos-Soria, J. A. (2011). Income and the substitution pattern between domestic and international tourism demand. *Applied Economics*, 43(20), 2519-2531.

Ferent, C. (2020). An Analysis of the regionalized tourism satellite account data in Romania for the period 2011-2017. *Journal of tourism*, 30. Retrieved from http://www.revistadeturism.ro/rdt/article/view/480.

Frechtling, D.C. (1999). *The tourism satellite account: foundations, progress and issues*. Elsevier.

Frechtling, D.C. (2009). Measurement and analysis of tourism economic contributions for sub-national regions through the Tourism Satellite Account.*Enzo Paci Papers*, 6.

Retrieved from http://webunwto.s3.amazonaws.com/imported_images/39098/frechtling_eng.pdf.
Gossling,S., Peeters, P., Ceron, J.P., Dubois, G., Patterson, T., & Richardson,R.B. (2005). The *eco-efficiency* of *tourism*. *Ecological Economics*, 54(4), 417-434.
Gössling, S., & Peeters, P. (2015). Assessing tourism's global environmental impact 1900-2050. *Journal of Sustainable Tourism,* 23(5), 639-659.
National Institute of Statistics (2016). *Tourism Satellite Account 2014*.
National Institute of Statistics (2017). *Tourism Satellite Account 2015*.
National Institute of Statistics (2018). *Tourism Satellite Account 2016*.
National Institute of Statistics (2019). *Tourism Satellite Account 2017*.
National Institute of Statistics (2020). *Tourism Satellite Account 2018*.
National Institute of Statistics (2021). *Tourism Satellite Account 2019*.
Năstase, C. (2007). Dezvoltare durabilă și turism durabil, *Revista de Turism*, 3, 54-57.
Nordstrom, J. (1996). Tourism satellite account for Sweden 1992-1993. *Tourism Economics*, 2(1), 13-42.
Smeral, E. (2006). Tourism satellite accounts: a critical assesment. *Journal of Travel Research*, 45(1), 92-98.
Smeral, E. (2010). Application of the TSA in a regional context: the case of Viena.*Tourism review,* 65(1), 57-65.
Smith, SLJ. (1995). The tourism satellite account: perspectives of Canadian tourism associations and organizations. *Tourism Economics*, 1(3), 225-244.
Turcov, A. (2010).Trends in the development of contemporary world tourism.*Journal Economica*, 4 (74), 141-144.
UNWTO, (2008). On economic contribution of Tourism. Retrieved from https:// www.unwto.org/standards/on-economic-contribution-of-tourism-tsa-2008.
Vanhove, N. (2005). *The economics of tourism destination* (1st ed.). Burlington, MA: Elsevier butterworth-Heinemann.
Wu. D.C., Liu, J., Song, H., & Fu, H. (2019). Developing a web based regional tourism satellite account information system, *Tourism Economics*, 25(1), 67-84.