ISSN 2560-421X UDK 33+502/504

ECONOMICS of Sustainable Development

2

Vol. III Niš, 2019

ECONOMICS OF SUSTAINABLE DEVELOPMENT
ЕКОНОМИКА ОДРЖИВОГ РАЗВОЈА

ДРУШТВО ЕКОНОМИСТА “ЕКОНОМИКА” НИШ
SOCIETY OF ECONOMISTS “EKONOMIKA”, NIS

The Journal is issued two times a year. Year III, VII-XII 2019, Vol. 2

ECONOMICS
OF SUSTAINABLE DEVELOPMENT

PUBLISHER: Society of Economists "Ekonomika", Nis

EDITORIAL BOARD

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Bank Account: 160-19452-17

Printed by:
"MEDIVEST"
18000 Niš
Copies: 200

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ПРЕГЛЕДНИ РАДОВИ / SCIENTIFIC REVIEW ARTICLE

ECONOMICS OF SUSTAINABLE DEVELOPMENT
Vol. 3, july-december 2019, № 2
UDK 33+502/504
ISSN 2560-421X
P. 1-7
ORIGINAL SCIENTIFIC ARTICLE
doi:10.5937/ESD1902001J
Received: November, 10, 2019
Accepted: December, 11, 2019

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SENSITIVITY ANALYSIS OF TRAVEL AND TOURISM COMPETITIVENESS INDEX TO CHANGES IN COMPONENT WEIGHTING[3]

Abstract

The competitiveness of the tourism industry in contemporary business conditions is a key factor for the success and survival on the market. In this regard, it is very important that not only companies, but also national tourism economies, monitor the level of competitiveness they have reached in order to get directive on how to further improve their business. One of the important indicators of the competitiveness of tourism at the level of national economies is the Travel and Tourism Competitiveness Index (TTCI) created by the World Economic Forum (WEF). However, there are different opinions in the literature about the methodology of this Index, especially when it comes to attributing significance to each variable that is an integral part of it. The subject of research in this paper is the methodology of the Tourism and Travel Competitiveness Index. The aim is to analyze the sensitivity of this Index to changes in the relative importance of the involved variables. The result of the research is to weight the variables within the Index and to obtain new values of subindices that determine the new, different ranking of countries on the world list according to tourism competitiveness.

Key words: *tourism, competitiveness, weighting, sensitive analysis.*

JEL classification: *Z32, C18, O57*

АНАЛИЗА ОСЕТЉИВОСТИ ИНДЕКСА КОНКУРЕНТНОСТИ ТУРИЗМА И ПУТОВАЊА НА ПРОМЕНЕ У ПОНДЕРИСАЊУ ЊЕГОВИХ КОМПОНЕНТИ

Апстракт

Конкурентност туристичке привреде у савременим условима пословања представља кључан фактор успеха и опстанка на тржишту. У том смислу је јако важно да, не само предузећа, већ и туристичке привреде прате ниво конкурентности који су достигле, како би добили смернице за даља унапређења свог пословања. Један од важних показатеља конкурентности туризма на нивоу националних привреда јесте Индекс конкурентности туризма и путовања, креиран од стране Светског економског форума. Међутим, у литератури постоје

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[3] The paper is a result of research within the project 179066, funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia

другачија мишљења о методологији овог Индекса, нарочито када је у питању придавање значаја свакој варијабли која је његов саставни део. Предмет истраживања у овом раду јесте методологија Индекса конкурентности туризма и путовања. Циљ рада јесте извршити анализу осетљивости овог Индекса на промене релативног значаја укључених варијабли. Резултат истраживања у раду јесте пондерисање варијабли у оквиру сваког од четири подиндекса овог Индекса и добијање нових вредности подиндекса које опредељују и нови, другачији ранг земаља на светској листи према конкурентности у туризму.

Кључне речи: *туризам, конкурентност, пондерисање, анализа осетљивости.*

Introduction

The interest in the competitiveness of the tourism sector in terms of the dynamic and hardly predictable business environment is certainly expressed. The achieved level of competitiveness is an indicator on which the future development policies and strategies of this sector should be based. For the national economy is of particular importance to improve each segment that represents the element of competitiveness in order to be closer to the best tourist destinations. Therefore, the importance of the Travel and Tourism Competitiveness Index, as a generally accepted indicator of competitiveness of tourism of national economies, in this segment is highlighted.

However, the methodology used by the World Economic Forum to calculate this index is a matter of interest for a some authors, who also hold a critical view. One of the authors' remarks relates to giving equal importance to all the variables involved in the calculation of this Indes. The Travel and Tourism Competitiveness Index (TTCI) consists of four subindices, which are calculated as a simple average of fourteen pillars. That means that to each pillar the equal importance has been assigned. Bearing in mind the large number of complaints about the weighting pillars included in TTCI, the paper emphasizes the calculation of weights according to the relative importance of the pillars.

The aim of the research in this paper is to analyze the sensitivity of this Index to changes in the relative importance of the involved variables. The result of the research is to weight the variables within each of the four subindices of this Index and to obtain new values of subindices. The result is a new and different ranking of countries in the world according to competitiveness in tourism.

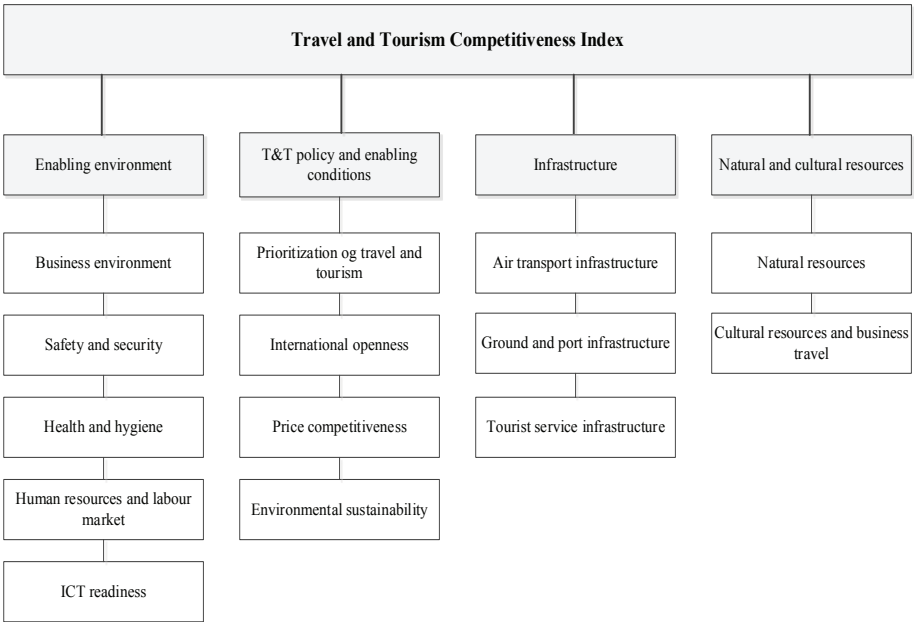
Travel and Tourism Competitiveness Index and some limitations in its methodology

The competitiveness of the tourism industry in modern conditions of globalization is a key factor for the success of tourism enterprises in the market. In addition to monitoring and investing efforts to improve the competitiveness of individual enterprise, monitoring and improving the competitiveness of tourism of each national economy is great importance in that sense, one of the generally accepted indicators of tourism competitiveness at the level of the national economy is *The Travel and Tourism Competitiveness Index* created by the World

Economic Forum since 2007 (WEF, 2017, p. 50). The main objective of the methodology within the *Travel and Tourism Competitiveness Index* is to quantify the impact of factors and policies that affect the attractiveness and development of tourism in different countries (WEF, 2017, p. 46). Through the annual *Travel & Tourism Competitiveness Report*, the World Economic Forum assesses factors that affect the competitiveness of tourism and ranks of countries according to the established *Travel and Tourism Competitiveness Index* (Jovanović, 2016, p. 149). The starting point of this model is that the destination competitiveness is based on inherited resources, which makes its comparative advantages, and the capacity of the destination to further develop existing resources and create competitive advantages (Crouch, 2007).

The structure of the Travel and Tourism Competitive Index (Figure 1) consists of subindices obtained as the mean of a large number of variables.The data used to calculate the value of each variable are derived from the official reports of the states covered by the *Index* and on the basis of the data from *Executive Opinion Survey Sample.* „The Survey provides a yearly evaluation of critical aspects of competitiveness for which statistical data is missing because it is either impossible or extremely difficult to measure on a global scale" (WEF, 2018).

Figure 1. Subindices of the Travel and Tourism Competitiveness Index (2015 - 2017)



Source: WEF (2015) The Travel and Tourism Competitiveness Report 2015, Geneva, Switzerland

The *Travel and Tourism Competitiveness Index* now consists of four subindices (WEF, 2015, p. v). According to the *Travel & Tourism Competitiveness Report* from 2015 and 2017, subindeces of this *Index* are (WEF, 2017, p. 4):

1. *Enabling Environment*. - This subindex includes five pillars: Business environment, Safety and security, Health and hygiene, Human resources and labour market and ICT readiness.

2. *T&T Policy and Enabling Conditions.* - This subindex includes four pillars: Prioritization of travel and tourism, International openness, price competitiveness and Environmental sustainability.
3. *Infrastructure.* – This subindex includes the level of availability and quality of physical infrastructure necessary for the development of tourism within each national economy, such as Air transport infrastructure, Ground and port infrastructure and tourist service infrastructure.
4. *Natural and Cultural Resources.* – The basis of this subindex constitutes two pillars: Natural resources and Cultural resources and business travel.

The methodology for calculating TTCI is often discussed by researchers (Zečević, 2011; Fernández & Díaz, 2017; Lopes, Muñoz & Alarcón-Urbistondo, 2018). One of the disadvantages that is often highlighted is the weighting of variables. In a large number of studies stands out the limitation of the *Travel and Tourism Competitiveness Index* because this model of competitiveness gives equal importance and significance to all indicators included in the analysis. However, the question arises is whether all indicators are equally significant to the tourist when deciding on the destination's choice (Lubbe, 2015) or whether a potential tourist gives some indicators a greater or lesser significance.

Thus, Crouch (2007) points to several shortcomings in the Travel and Tourism Competitiveness Index. According to him, one of the drawbacks of this Index is *weighting of variables* (p. 77). The *Travel and Tourism Competitiveness Index* does not weight the variables included in the analysis. This means that equal importance has been given to all variables.

Lin & Huang (2009) in their research deal with the problem of weighting the variables and apply Grey Relational Analysis and sensitivity analysis „in order to be able to evaluate the tourism competitive potential and to identify and analyse the essential criteria of tourism competitiveness in Asian countries" (p. 281).

Vega & Picazo-Tadeo (2018) in their research „*World tourist destinations with a composite indicator of competitiveness: To weigh or not to weigh?*" used the Data Envelopment Analysis and Multi-Criteria-Decision-Making techniques to rank countries covered by the Tourism Competitiveness Report of the WEF according to the new weighted indicators. The conclusion to which they came is that „several economic, geographical, cultural and political features are significant determinants of the competitiveness of tourist destinations" (p. 20).

Pulido-Fernández & Rodríguez (2016) use an alternative methodology for calculating this index based on two points of reference to propose a new standardisation, which takes the aspiration and reservation level for each pillar. Subsequently, they calculated a synthetic index that measures the state of the pillar in the worst position, as well as other alternative indices. After the analysis, they ranked the countries according to the new index values and got a different ranking compared to the Tourism Competitiveness Report issued by the WEF (Pulido-Fernández & Rodríguez, 2012, p. 137).

Lan, Wu & Lee (2012) in their paper „Exploring an Objective Weighting System for Travel & Tourism Pillars" use Expectation Maximization (EM) clustering algorithm to group the 139 ranked countries into three classes and then performs the Artificial Neural Network (ANN) analysis to explore the objective weighting system for the fourteen pillars. The analysis concludes that Tourism infrastructure, Ground transport infrastructure, Air transport infrastructure, Cultural resources, Health and hygiene and ICT infrastructure are the most important pillars that influence the overall tourism competitiveness Index (Lana, Wub & Lee, 2012, p. 189).

TTCI calculation based on weights obtained by Principal Component Analysis

When aggregating indicators into a composite index, weights can be assigned according to the adopted theoretical framework, expert opinion, the results of factor analysis (in case of using sets of heterogeneous variables), correlation with the dependent variable (Saisana & Tarantola, 2002). Their goal is that the weight of the weights corresponds to the relative importance of each variable (or group of variables or components) in the composite index (Greco et al., 2019). The weights have an important influence on the values of the composite indices and therefore the weighting system must be explicit and transparent.

The following weighting methods are most commonly used (Jovičić, 2006):

- Equal weights,
- Weights based on statistical models (such as regression analysis or principal component method)
- Expert opinion weights (budget allocation, analytical hierarchical process, etc.)

Each of the weighting methods has its advantages and disadvantages in terms of potentiating one and marginalizing other factors that influence the expression of the preference of the decision-makers. In this paper, the method of principal components for the determination of weights was applied. Principal component analysis (PCA) is a method within a factor analysis, which provides several possibilities for calculation of weights. The goal of PCA to extract the maximum variance from the data set with each component. The first component is a linear combination of observed variables that maximally separates subjects by maximizing the variance of their component scores. The second component is formed from residual correlations, and the subsequent components also extract maximum variability from residual correlations (Tabachnick & Fidell, 2007).

As the TTCI consists of four subindices, created from fourteen pillars, a factor analysis was applied to each of subindices in order to obtain weights that indicate the importance of each pillar included into subindex. The first subindex Enabling environment includes five pillars: *Business Environment*, *Safety and security*, *Health and Hygiene*, *Human resources and labour market* and ICT readiness. These pillars will be the variables included in the first factor analysis. First, the fulfillment of assumptions for the application of factor analysis was checked. Based on the Kaiser-Meyer-Olkin Measurement of Sampling Adequacy value, which was higher than 0.5 (Table 2), it can be concluded that the conditions for the factor analysis application are met. Also, based on realized significance level of the Bartlett's Test of Sphericity (by which the correlation matrix was tested), it can be concluded that the data are suitable for the application of factor analysis.

Table 2. KMO and Bartlett's Test results for the first subindex

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.784
Bartlett's Test of Sphericity	Approx. Chi-Square	470.748
	Df	10
	Sig.	0.000

Source: Authors` calculation

Criteria for a number of factors (components) extracted were: associated eigenvalues higher than one and cumulative variance explained at least 60%. According to these criteria, one component was extracted. Only one component has an eigenvalue higher than 1 (3,511), and at the same time this component explains 70.22% of the total variability (Table 3). In this way, it was confirmed that the *Enabling environment* subindex could be expressed as a single latent variable made up of five original variables (pillars).

Table 3. The variance explained by the first factor analysis

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	3.511	70.225	70.225
2	0.696	13.919	84.145
3	0.474	9.488	93.633
4	0.184	3.685	97.318
5	0.134	2.682	100.000

Source: Authors` calculation

The level of agreement of each pillar with the subindex is expressed by factor loadings (Table 4), while the square of the factor loading represents the proportion of the total unit variance of the pillar which is explained by the subindex. Weighting is based on squared values of factor loadings (% of the variance).

Table 4. Factor loadings and weights in the first factor analysis

Pillar	Factor loading	Squared factor loading	Weight
Business environment	0.800	0.640	0.192
Safety and security	0.740	0.548	0.177
Health and Hygiene	0.786	0.619	0.188
Human resources and labor market	0.918	0.842	0.220
ICT readiness	0.929	0.863	0.223

Source: Authors` calculation

By analyzing the calculated values of the weights it can be noticed that the highest relative importance in the structure of the *Enabling environment* belongs to *the ICT dimension* (0.223), while the least significant pillar is *Safety and security* (0,177). In calculating Enabling environment subindex the weighted arithmetic mean was applied (which represents a fundamental difference compared to the current methodology for TTCI score calculation).

The subject of the second factor analysis was the pillars included in the second subindex *T&T Policy and enabling condition***.** These are pillars: *Prioritization of travel and tourism, International openness, Price competitiveness and Environmental sustainability*. In this case, the preconditions for applying factor analysis were checked. Kaiser-Meyer-Olkin Measure of Sampling Adequacy amounts 0,648, and significance of Bartlett's Test of Sphericity is lower than 0,0001. So it can be said that the conditions for applying factor analysis are fulfilled. According to the above mentioned criteria for factors extraction, only one component is extracted, since only one component has an eigenvalue higher than 1 (Table 5).

Table 5. The variance explained in the second factor analysis

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	2.228	55.701	55.701
2	0.918	22.959	78.661
3	0.507	12.673	91.334
4	0.347	8.666	100.000
Extraction Method: Principal Component Analysis			

Source: Authors` calculation

From the aspect of the factor analysis, subindex *T&T Policy and enabling condition* can be regarded as a new latent variable which includes four empirical variables (pillars). Based on the values of factor loadings (Table 6), it can be seen that pillar *Price competitiveness* is inversely correlated with the subindex. Because of situations like this, the basis for calculating the weights are squared values of factor loadings.

Table 6. Factor loadings and weights in the second factor analysis

Pillar	Factor loading	Squared factor loading	Weight
Prioritization of travel and tourism	0.723	0.523	0.235
International openness	0.826	0.683	0.306
Price competitiveness	-0.684	0.468	0.210
Environmental sustainability	0.744	0.554	0.248

Source: Authors` calculation

By analyzing the calculated values of the weights it can be noticed that the highest relative importance in the structure of T*&T Policy and enabling condition* belongs to the pillar *International openness* (0.306), while the least significant pillar is *Price competitiveness* (0.210). The score of *T&T Policy and enabling condition* has been calculated as the weighted average.

The subject of the third factor analysis, applied in this paper were the pillars included in the subindex named *Infrastructure*, which are: *Air transport infrastructure, Ground and port infrastructure* and *Tourist service infrastructure*. At the beginning, the conditions for the application of factor analysis were checked and they were fulfilled. Kaiser-Meyer-Olkin Measure of Sampling Adequacy amounts 0.747 and significance of Bartlett's Test of Sphericity is lower than 0.0001. According to the criteria for the number of factors to be extracted. In this case only one factor has an eigenvalue higher than 1. At the same time, 82.48% of the total variability was explained by this factor (Table 7).

Table 7. The variance explained in the third factor analysis

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	2.474	82.480	82.480
2	0.293	9.782	92.261
3	0.232	7.739	100.000
Extraction Method: Principal Component Analysis			

Source: Authors` calculation

Table 8 shows the values of factor loadings, based on which it can be seen that the highest level of agreement with the subindex *Infrastructure* shows pillar *Air transport infrastructure*, while the lowest level of agreement shows pillar *Ground and port infrastructure*.

Table 8. Factor loadings and weights in the first factor analysis

Pillar	Factor loading	Squared factor loading	Weight
ATI	0.918	0.843	0.337
GPI	0.896	0.803	0.329
TSI	0.910	0.828	0.334

Source: Authors` calculation

The weights calculated on the basis of squared factor loadings are quite uniform in this subindex. The pillar *Air transport infrastructure* has a slightly higher weight than the other two pillars (0.377), while the pillar *Ground and port infrastructure* has the lowest weighting value (0.329). The score of subindex *Infrastructure* was calculated as the weighted mean of the three pillars listed.

The fourth subindex within the TTCI called *Natural and Cultural Resources* and consists of two pillars: *Natural Resources* and *Cultural Resources and Business Travel*. Factor analysis was also applied to these pillars. Factor loadings and weights based on them indicate the equal importance of these two pillars in the subindex structure. So, the procedure for calculating the values of the *Natural and Cultural resources* subindex has not been altered in relation to the current WEF methodology. The overall score of TTCI was calculated as the simple mean of the four subindices, which provides the equal importance of all these composite indicators of tourism competitiveness.

Table 8 shows a comparative overview of the descriptive measures for the TTCI score according to the current methodology (applied in reports) and according to the proposed methodology. Based on descriptive measures, it can be concluded that the change in the TTCI calculation methodology would change the min and max values of the TTCI, as well as the average TTCI values from 3.821 to 3.786 (Table 9). However, the variability is higher. Namely, according to the new methodology, the average deviation of each country's score from the average TTCI score is 0.704, which is higher than the deviation according to the current methodology.

Table 9. Descriptive statistics

Variable	Mean	N	Std. Deviation	Std. Error Mean
TTCI – report	3.821	136	0.686	0.059
TTCI –new methodology	3.784	136	0.704	0.060

Source: Authors` calculation

Paired samples t-test was applied in order to test the significance of differences in the average values of TTCI according to the current and new methodology. A decrease in the average TTCI value of 0.037 after the application of the new methodology was found to be statistically significant (p-value <0.001). This means that changing the methodology

significantly influences the average measured level of competitiveness in the tourism of analyzed countries (Table 10).

Table 10. Results of paired samples t-test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
TTCI – rep TTCI - new	0.037	0.115	0.010	0.018	0.057	3.798	135	0.000

Source: Authors` calculation

The change in methodology results in a change in the rank of countries for which TTCI is accounted for. Firstly, an overview of the changes in the top 10 positions in the ranking list is given in Table 11. Spain, which was the first in the rank list, remained in the first place. Germany and France switched places, as did Australia and USA.

Table 11. Top 10 countries according to both methodologies

Rank	According to TTCI report		According to new methodology	
	Country	Score	Country	Score
	Spain	5.4	Spain	5.4
	France	5.3	Germany	5.38
	Germany	5.3	France	5.3
	Japan	5.3	Japan	5.24
	UK	5.2	UK	5.22
	USA	5.1	Australia	5.12
	Australia	5.1	USA	5.11
	Italy	5	Italy	5
	Canada	5	Canada	4.96
	Switzerland	4.9	Switzerland	4.94

Source: Authors` calculation

Changing the methodology would result in an increase in scores in a large number of countries. The biggest positive change, i.e. the largest score increase recorded Congo (+0.18). The ten countries with the largest increase in TTCI score are shown in Table 12.

Table 12. Countries with the highest positive change

Country	Change
Congo	0.18
Germany	0.08
Colombia	0.05
Denmark	0.05
Peru	0.05
Netherland	0.04

Switzerland	0.04
Belgium	0.03
Israel	0.03
Norway	0.03
Turkey	0.03

Source: Authors` calculation

In addition to positive changes, the revised methodology would also result in negative changes in TTCI scores, i.e. decrease in TTCI score. The largest decrease in TTCI score would be related to Mauritania (Table 13), where it would decrease by 1.3 which is as much as a decrease of 30% of the current score.

Table 13. Countries with the biggest negative change

Country	Change
Mauritania	-1.30
Algeria	-0.10
Burundi	-0.10
Paraguay	-0.10
Russia	-0.10
Tanzania	-0.10
Albania	-0.09
Gabon	-0.09
Qatar	-0.09

Source: Authors` calculation

Several countries would not change their existing score by a new methodology. Those countries are: Bosnia and Herzegovina, Croatia, Dominican Republic, Egypt, Estonia, France, Greece, Italy, Jamaica, Jordan, Senegal and Spain.

Conclusion

The Travel and Tourism Competitiveness Index consists of four subindices, wich are calculated as a simple average of fourteen pillars. That means that to each pillar the equal importance has been assigned. Bearing in mind the large number of complaints about the weighting pillars included in TTCI, the paper emphasizes the calculation of weights according to the relative importance of the pillars.

The authors use different analyzes to get new, weighted values of pillars and subidexes and thus determine which indicator within the Index contributes more or less to its total value. So, some authors use the Grey Relational Analysis, Multi-Criteria-Decision-Making techniques, and clustering. In this paper, the method of principal components for the determination of weights was applied. A factor analysis was applied to each of subindices in order to obtain weights that indicate the importance of each pillar included into subindex.

By analyzing the calculated values of the weights it can be noticed that the highest relative importance in the structure of the subindex - *Enabling environment* belongs to the *ICT dimension*, while the least significant pillar is *Safety and security* (0,177). In the structure of subindex - T*&T Policy and enabling condition,* it can be noticed that the highest relative

importance belongs to the pillar *International openness*, while the least significant pillar is *Price competitiveness*. Within a subindex *Infrastructure*, the pillar *Air transport infrastructure* has a slightly higher weight than the other pillars, while the pillar *Ground and port infrastructure* has the lowest weighting value. Applied Factor analysis on forth subindex *Natural and Cultural Resources* indicated the equal importance of two pillars (*Natural Resources* and *Cultural Resources*) in the subindex structure.

The change in methodology in this way, results in a change in the rank of countries for which TTCI is accounted for. So, changing the methodology resulted in an increase in scores in a large number of countries. The biggest positive change, i.e. the largest score increase recorded Congo (+0.18). In addition to positive changes, the revised methodology also resulted in negative changes in TTCI scores, i.e. decrease in TTCI score. The largest decrease in TTCI score be related to Mauritania. Several countries have not changed their existing score by a new methodology. Those countries are: Bosnia and Herzegovina, Croatia, Dominican Republic, Egypt, Estonia, France, Greece, Italy, Jamaica, Jordan, Senegal and Spain.

The application of different methods for assigning weights to the variables included in the TTCI can contribute to a better understanding of the importance of individual variables to the overall competitiveness. In this regard, the paper shows that TTCI is sensitive to the weighting of variables and leads to a change in the value of the subindices and the overall rankings that some countries have on the world tourism competitiveness list. This can be a useful tool for policy makers in analyzing indicators that contribute to the competitiveness of tourism at the national economy level.

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ECONOMICS OF SUSTAINABLE DEVELOPMENT
Vol. 3, july-december 2019, № 2
UDK 33+502/504
ISSN 2560-421X
P. 13-19
ORIGINAL SCIENTIFIC ARTICLE
doi:10.5937/ESD1902013M
Received: October, 17, 2019
Accepted: December, 01, 2019

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APPLICATION OF MATHEMATICAL MODELING IN ECOLOGY[4]

Abstract

The aim of this paper was implementation of mathematical modeling in ecological research on the example of the prevalence of odonates in Serbia. For research purposes cix areas were selected for which the number of species of odonants was given, a similarity coefficient was calculated, and based on the data as the number of species and environmental variables of the place (altitude, temperature and precipitation), multiple linear regression (MLR) model was presented describing the number of species odonants depending on altitude, temperature and precipitation. The areas studied were the rivers Tisa, Sava-Danube, Velika Morava, Južna Morava, as well as the mountain areas Zlatibor and Golija. The occurrence of the species was highest at the Sava-Danube site, followed by the Tisa. Odonates occurrence was lowest in the Golija site. The results of the study showed that environmental variables are significantly associated with odonates distribution. The MLR model based on the species dependence of altitude, temperature, and precipitation showed an extremely high degree of agreement.

Key words: *Mathematical modeling, MLR, environmental factors*

JEL classification: *C0, C1,Q54*

ПРИМЕНА МАТЕМАТИЧКОГ МОДЕЛОВАЊА У ЕКОЛОГИЈИ

Апстракт

Циљ рада је примена математичког моделирања у еколошким истраживањима на примеру распрострањености одонаната у Србији. За потребе истраживања

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[4] Paper is part of the project III 46006 "Sustainable agriculture and rural development in function of Republic of Serbia strategic goals achievement within the Danube region" financed by the Ministry of Education, Science and Technological Development, period 2011-2019

одабрано је шест подручја за која је дат број врста одонаната, затим је израчунат коефицијент сличности а на основу података о броју врста и чинилаца спољашње средине (надморска висина, температура и падавине), док је моделом вишеструке линеарне регресије (МЛР) представљен број врста одонаната врста у зависности од надморске висине, температуре и падавина. Проучавана подручја били су речни токови Тисе, Сава-Дунав, Велике Мораве, Јужне Мораве, као и планинска подручја Златибора и Голије. Број врста био је највећи на месту Сава-Дунав, а затим на подручју Тисе. Појава одоната била је најмања на подручју места Голије. Резултати истраживања су показали да су променљиви чиниоци животне средине значајно повезани са дистрибуцијом одоната. Модел МЛР заснован на зависностима од висине, температуре и падавина показао је изузетно висок степен слагања.

Кључне речи: *Математичко моделовање, MLR, еколошки чиниоци*

Introduction

In the field of ecology, scientists are confronted with the dynamics of nature, in terms of population growth or decline in a large number of plant and animal species. Given the strong influence of man and nature and the entire living world, it is necessary to apply mathematical models that will evaluate the impact of the environment on a population of some species. Knowledge about the environmental impact on living organisms may contribute to their preservation (Suhling et al., 2006).

Species are not similarly distributed across the Earth. The serious decrease in species number (Chapin et al. 2000) increased the urgency to understand species distribution in order to develop effective conservation strategies (Robinet et al. 2019; Franzese et al. 2019). An understanding of the relationship between species and the environment is of great importance (Williams et al., 2002).

The utilization of insect as bioindicators is limited to their habitat type (McGeoch, 1998). The odonates are freshwater invertebrates and are often used as ecological indicators of habitat quality (Hardersen, 2000; Sahlen and Ekestubbe, 2001; Silva et al., 2010; Arimoro et al., 2011; Simaika and Samways, 2011). Some studies (Samways and Steytler, 1996; Oppel, 2006; Silva et al., 2010) have pointed out that odonates may serve as an indicator for changes in landscapes. But, their reaction to environmental conditions in numerous areas of the world is unknown (Bried and Mazzacano, 2010; Clausnitzer et al., 2012). Knowledge about the environmental impact on odonates may contribute to their preservation (Sahlen and Ekestubbe, 2001; Suhling et al., 2006).

A substantial number of studies have focused on the impact of temperature and precipitation on distribution odonata (Hickling et al., 2005; Finch et al., 2006; Hassall, 2012). Temperature increments may encourage the development of odonata species ranges and lead to increments in local biodiversity in northern latitudes (Hassall and Thompson, 2008).

Latitudinal gradients in species richness are observed for a wide range of taxonomic groups (Gaston 2000). Spatial patterns in species richness can be described as the result of several mechanisms (Gaston and Blackburn 1990). Among the factors crucial for the

impact on the species number of some area, the most dominant are: altitude (Rahbek 1995), energy availability (Gaston 2000), climate (Rohde, 1992), habitat heterogeneity (Rahbek and Graves 2000; Kerr 2001), and disturbance (Huston 1994).

No previous studies have addressed the effects of climate and habitat parameters on odonates in Serbia. In this study, factors that influence number of species in Serbia were examined. The effects of temperature, precipitation and altitude on the number of odonates species were investigated. So, the potential of odonates to serve as indicators of climate effects on freshwater systems of this region was evaluated.

Materials and methods

Serbia is situated in the Danube basin on the edge of the Mediterranean area, covering 88,361 km^2 (Fig. 1). Serbia has rich genetic, species, and ecosystem diversity because of its geographic position (continental and Mediterranean influences, relief...). (Amidžić et al., 2014)

The paper analyzes the biodiversity of the odontas, both on the territory of the whole Republic of Serbia and at 6 different specific sites (Đukić, 2014). Collected data are average temperature, altitudes, and precipitation of regions from Republic Hydrometeorological Service of Serbia, Figures 2, 3 and 4.

The first site (1) is located in the north of Serbia, and this is the stream of the Tisa River. This site can be characterized by an altitude of up to 200m, mean annual temperatures around 15-25 °C, and precipitation (up to 600 mm per year). The second site (2) is a part of the stream and the mouth of the Sava and Danube rivers around Belgrade. The altitude is 400 m in this area. The mean annual temperature ranges from 20-25 °C. Precipitation is 600-700 mm. The third site (3) is the stream of the Velika Morava, at an altitude of 400 m. The mean annual temperature ranges from 10-15 °C. Precipitation is 600-700 mm. Zlatibor is the fourth selected site (4) in the southeastern part of Serbia. This site has a significantly higher altitude, up to 1500m, mean annual temperature 10-15 °C, and precipitation level 800-900 mm per year. The fifth site is the stream of the Južna Morava river (5), at an altitude of 400 m, the mean annual temperature is 5-10 °C, and the level of precipitation is 900-1000 mm per year. The last site is mount Golija (6), altitude above 1600 m, mean annual temperature 10-15 °C, and precipitation level up to 600 mm.

Figure 1: Study area map

Source: Google maps and Alciphron - database of insects in Serbia (Odonata)

Data analysis. The Jaccard coefficient of similarity (Jt) determines the similarity of the fauna of the investigated sites and is calculated as

$$J_t = \frac{m_{11}}{(m_{11} + m_{10} + m_{01})}$$

t – fauna of areas we compare, m_{11} - number of species common to both fauna we compare, m_{10} - number of species present in the first of the comparing fauna, m_{01} - number of species present in another fauna.

MLR model in Statistica. Multiple linear regression analyses are widely used in the analysis of data in ecology. It is widely used because it results in an equation that contains the effects of all variables that we want to consider in the description of a phenomenon or process (Boldina and Beninger 2016).

Results and discussion

The number of species registered by sites are as follows: S1= 42, S2= 49, S3=33, S4= 32, S5= 39, S6= 13. Table 1 shows coefficient of similarity among observed sites in the form of a matrix.

Table 1. Jacarrd´s coefficient between sites

J_r	1	2	3	4	5	6
1	1	0.70	0.46	0.48	0.56	0.15
2		1	0.61	0.57	0.74	0.20
3			1	0.57	0.66	0.15

4				1	0.78	0.22
5					1	0.21
6						1

Source: Alciphron - database of insects in Serbia (Odonata) and RHS

The data required for model formation (MLR) are given in Table 2. Survey data indicate that the largest number of species has been identified in the S2 area, at an altitude of 400 m, with an average annual temperature of 22.5 °C and an annual rainfall of 700 mm. On the other hand, the smallest number of species is identified in the S6 area, with an altitude of 1800 m and an average annual temperature of 12.5 °C.

Table 2 Number of species by region and basic environmental parameters

Region	S	H (m)	t (°C)	p (mm)
1	42	200	20	600
2	48	400	22.5	700
3	34	400	12.5	700
4	32	1500	12.5	900
5	39	400	7.5	1000
6	13	1800	12.5	600

Source: Alciphron - database of insects in Serbia (Odonata) and RHS

Correlation coefficients between altitude (h), temperature (t) and precipitation (prec.) are:

r (h - t)= - 0.33 r (h - p)= - 0.03 r (t - p)= - 0.63

According the results, species occurrence was highest in Sava-Dunav site, followed by Tisa site. Odonates occurrence was lowest in the Golija site. In order to express the similarity of the fauna of the explored sites, the Jaccard coefficient was used and a high percentage of similarities was found among most of sites, with the exception of Golija. Based on the calculated correlations, Table 3, the inverse proportionality between the number of species and altitudes is found as the most dominant.

The resulting MLR model is shown in Table 3. The equation is given as follows:

$S (h, t, per.) = \beta 0 + \beta 1 \cdot h + \beta 2 \cdot t + \beta 3 \cdot prec.$

Table 3: MLR model of species number in dependence of altitude, temperature and precipitation

	Beta	St.err. of Beta	B	St.err. of B	t (2)	p-level
Interception			-15.433	5.1553	-2.993	0.0958
h	-0.5917	0.0488	-0.010	0.0009	-12.114	0.0067
t	0.7097	0.0627	1.536	0.1358	11.309	0.0077
prec.	0.6519	0.0592	0.048	0.0043	11.005	0.0081

Source: Alciphron - database of insects in Serbia (Odonata) and RHS

R=0.99809045 R2=0.99618454 adj.R2=0.99046135

F(3, 2)=174.06 p<0.00572 St.err.of estim.=1.1779

Based on the MLR, Table 3, temperature is found as the most dominant factor that influence odonates diversity (the highest B value).

Conclusion

Based on the results presented in the paper, it is possible to conclude the great importance of temperature on the diversity of the odonata in six observed sites. Increasing the number of species corresponds to the environment with higher temperature and lower altitude. The highest number of odonates species is found along the river flows in the plain area, while the smallest number of speciesis found on the mountainous areas. The MLR model shows the dependence of the number of species in some area, of an altitude, temperature and precipitation. The resulting model shows a high level of agreement with real values, R> 0.99.

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ECONOMICS OF SUSTAINABLE DEVELOPMENT
Vol. 3, july-december 2019, № 2
UDK 33+502/504
ISSN 2560-421X
P. 21-28
SCIENTIFIC REVIEW ARTICLE
doi:10.5937/ESD1902021C
Received: September, 14, 2019
Accepted: October, 12, 2019

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THE CORPORATE SOCIAL RESPONSIBILITY IN SERBIAN HOSPITALITY INDUSTRY[2]

Abstract

One of the characteristics of business in the 21st century is the use of the corporate social responsibility (CSR) concept. The modern trends in the hospitality industry condition the firms to maintain a competitive advantage in the market by applying the CSR. The firms can use the CSR concept through different dimensions. Ecological, social and employee protection dimensions are most common among them. The firms can come across certain hurdles while realizing the CSR. On the other hand, they can achieve some advantages for the internal and external environment of the enterprise. The aim of this paper is to determine whether Serbia has a small number of hotels which use the CSR concept.

Key words: *social responsibility, hospitality industry, firms, Serbia.*

JEL classification: *M14, Z32*

ДРУШТВЕНО ОДГОВОРНО ПОСЛОВАЊЕ ПРЕДУЗЕЋА У ХОТЕЛСКОЈ ИНДУСТРИЈИ СРБИЈЕ

Апстракт

Једна од карактеристика пословања предузећа у 21. веку јесте примена концепта друштвено одговорног пословања (ДОП). Савремене тенденције у хотелској индустрији условљавају предузећа да кроз примену концепта ДОП-а одрже конкурентску предност на тржишту. Примену концепта ДОП-а предузећа могу остварити кроз различите димензије. Најчешће су то еколошка, социјална и димензија заштита запослених. Током реализације ДОП-а се може наићи на одређене баријере. Са друге стране, могу се остварити и одређене користи за интерно и екстерно окружење предузећа. Циљ овог рада јесте утврдити да ли хотели у Србији примењују концепт друштвено одговорног пословања.

Кључне речи: *друштвана одговорност, хотелијерска индустрија, предузећа, Србијаи*

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Introduction

The firms often encounter numerous challenges on the market. The solutions for them have to be in accordance with the principles of ethics, economy, and law. Apart from producing revenue, the companies are expected to take care of the environment, employees, and local communities (Cramer, 2017). Today, the competition is ruthless and it's difficult to sustain in the market. The companies should accept the CSR concept in order to increase the competitiveness and have dedicated and engaged employees (Zientara et al., 2015). In his paper, Ciriković (2012) points out that the use of the CSR leads to a better competitive position of the company both on the national and international market which creates an efficient and effective business.

The social responsible behavior brings benefits not only to the company, but also to the community. There are numerous examples of the firms in the hospitality industry which are socially responsible. This has helped them sustain and become leaders on the market. Abram & Jarzabek (2016) write that the hotels that implement the CSR concepts will not solve the social macro problems such as unemployment, poverty, social exclusion and demography. However, they can contribute to the reduction of problems on the local scale. Such an approach is consistent with the statement "Think globally, act locally".

Certain corporations have created their own dedicated organizational units to effectively manage their social obligations. (Wang et al., 2016). Leipziger (2017) indicates that the investors and management of a company have to realize that the corporate management, social and ecological results are the important elements of the sustainable financial profitability. So, the CRS is a chance for the firm to achieve the adequate gain through the positive impact on the environment.

However, there are companies which are not sufficiently engaged in the CRS concept. They don't even show whether they are dedicated to the implementation of the social responsibility concept. In his paper, De Grosbois (2012) states that, even though a large number of companies report commitment to CSR goals, much smaller number of them provide details of specific initiatives undertaken to contribute to these goals and even less of them report actual performance achieved in the field of the CSR.

On the other hand, numerous hurdles can influence the insufficient implementation of the CSR. The results of the Bello et al. (2017) research show that the major barriers to the implementation of the CSR are the financial restrictions and the lack of interest and understanding of the CSR by the higher management. Given that the companies are extremely sensitive to the financial aspect of business, this can present a major barrier in the introduction of the CSR

Many companies try to respect the CSR concept. However, there are those that only focus on gaining profit without regard to the community, ecological and social issues. The aim of the paper is to determine whether the hotels in Serbia implement the CSR concept.

Corporate social responsibility and sustainability of hotels

The social responsibility is the company's realization that equal chances for all, equality, racial equality, workplace equality, appropriate work conditions, harmless products and services exist (Vuković & Voza, 2016).

According to Atanacković (2011) the corporate social responsibility (CSR) is a concept within which the companies willingly integrate social and environmental

challenges into their business. The CRS is characterized by the strategy of the ethics and sustainability management (Sekulić & Pavlović, 2018). When talking about the hotels, numerous factors can exert influence on their strategy of the CSR. Calveras (2015) states that the factors can be the economies of scope and the internal organization of the hotel.

The company has a chance to show its social responsible behavior in different fields. According to the ISO 26000 standard, there are seven major principles of the social responsibility: organizational governance, human rights, labor practices, the environment, fair operating practices, consumer issues, community involvement and development (Image 1).

Image 1: Seven main principles of social responsibility

Source: International Organization for Standardization. ISO 26000 and the International Integrated Reporting Framework briefing summary, available at: https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100402.pdf)

According to Jovanović (2017), the CSR is the important indication of the corporate sustainability and sustainable development. Szczuka (2015) states that the CSR is a response of the economic sector to the sustainability challenges.

Gaweł et al. (2015) say that the benefits of the CSR implementation are visible within the company and in its external environment. According to these authors, they include:

1. Financing environmental protection,
2. Creating new jobs,
3. Lowering prices of products,
4. Improving product's quality,
5. Complying with legal regulations,

6. Fair competition,
7. Improving communication,
8. Reducing pollution.

The sustainable business can help the hospitality industry to obtain the benefits. Vujošević & Krstić-Furundžić (2015) write that, by following the sustainable business, the following subjects can benefit:

1. The management and employees of the hotel by achieving results,
2. The guests by providing the high level of service,
3. Environment by decreasing the negative impact on it.

The CSR is the factor of the sustainable business promotion (Milić, 2017). As such, it exerts a positive impact on the specific aspects of business, shown in Table 1.

Table 1: The positive influence of CRS

	Business Aspects
CSR	Competitive Advantage
	Reputation
	The ability to attract and retain the employees, buyers, clients, or users
	Maintaining employees' morale, dedication, and productivity
	The attitude of the investors, owners, donors, sponsors, and financial community
	The relation with the companies, governments, media, suppliers, colleagues, users, and community within which one works
	Preservation of the natural resources and energy efficiency

Source: The author's presentation according to Milić, Z. (2017)

An empirical study of Benavides-Velasco et al. (2014) in the Spanish hotels of the Andalusian region shows that the adoption of the CSR improves the capacity of hotels to create benefits for their stakeholders. These results then have a positive effect on hotel performance.

Tolušić et al., (2014) think that the company which takes care of the economic, social, and ecological impact is successful in the CSR. Also, Vuković & Voza (2016) say that the CSR concept means that one company should achieve its business goals and expectations of the owner. In addition, it should balance the economic, ecological, and social imperatives. Quien (2012) believes that the CSR is produced as a response of the way a community, region, and society perceive the social issue. The idea is that the organization is not only focused on its work, but it considers the entire context, i.e. the community within which it operates.

The Forms and Dimensions of the Social Responsibility

Salarić & Jergović (2012) say that the CSR exists both inside and outside the company. The CSR inside the company refers to the areas such as: investing in human capital, health and safety, managing changes and natural resources used in the production. On the other hand, the CSR outside the company entails: the local community, business partners and suppliers, consumers, government, local associations, etc.

The companies through their sustainable development have a chance to show they are socially responsible in numerous dimensions. According to Jovanović (2017), aside from the economic and legal dimensions, the following responsibilities are important to the company's business: ethical and philanthropic. According to Ivanović & Krstić (2017), the basic dimensions of the social responsibility are:

1. Ecological responsibility – emphasizes the major social responsibility of the company regarding the sustainable development and sustainable economy in terms of protection and preservation of the healthy environment.
2. Social responsibility – stresses the company's responsibility to participate in the resolution of different social issues.
3. Employees' health and workplace safety – encourages the managers and employees to decrease the risks (accidents and injuries at the workplace). Also, it teaches them to realize or improve the existing programs that make sure employees' preserve their health and are safe at the workplace.
4. Ethical behavior – refers to the behavior that follows the principles of the social moral and ethical norms.

Today, a company has to create an environment where it can use one of the three corporate social opportunities. Grayson & Hodges (2017) refer to these corporate social opportunities as commercially viable activities, which also advance environmental and social sustainability. According to these authors, the social opportunities are based on:

1. Innovations in developing new or improved products and services,
2. Organizing the business differently in a new business model,
3. Serving under-served or creating new markets.

Social Responsibility of Hotels in Serbia

The implementation of the CSR concept is a characteristic of the developed countries. In Serbia, this concept is used in numerous industries. Regarding the hospitality industry, Milovanović (2014) thinks that the pioneers in the CSR implementation are those hotels which are a part of the international hotel chains.

Grayson & Hodges (2017) stress that about 2,000 international companies regularly report on their impact on the environment and society. Also, the same authors write that in some countries (e.g. France, Australia) it is mandatory to publish reports. The understanding of the CSR in Serbia is insufficient and it requires increased education and motivation of the owners, managers, and employees in tourism and hospitality (Stojanović-Aleksić & Bošković, 2016). Milovanović (2014) and Kicošev et al. (2017) in their papers stress that the social responsibility isn't sufficiently represented in the hospitality industry in the Republic of Serbia.

There are hotels which operate in Serbia and serve as an example of how to behave socially responsible. Milovanović (2014) mentiones the following programs of the social responsibility of hotels in Serbia:

- The hotel chain InterContinental (IHG) implemented the Green Engage system in 2009. The system is for the evaluation, management, and reports in order to efficiently use the energy an water, decrease waste and the negative

impact of it on the environment and community. The results of this program are manifested in the energy reduction of 25%.

- Hotel Palace received an award for educating students, many of whom work in the prestigious national and international hotels as managers. Hotel Palace employes the best candidates.
- Hotel Hyatt Regency in Belgrade has reduced energy use by 20% thanks to the new technologies. The hotel has also introduced the paper recycling program. The hotel's cleaning department uses microfiber-based cloths which don't require them to use a lot of cleaning products. At the same time, they use the aerosol chemicals, thus reducing the pollution.

Also, certain local hotels in Serbia implement the CSR. They usually do that by improving the employee and client satisfaction and providing education in the field of hospitality (Mandarić & Milovanović, 2016).

Ivanović-Đukić (2011) concludes that the hotel management in Serbia has to realize that the CSR is a strategic priority. It is not a temporary activity which attracts the attention of the public and secures a free promotion. Her conclusion can be a basis for the introduction of the CSR in the international and national hotels in Serbia.

Therefore, we can see that the CSR is implemented in the hotels in Serbia. However, the level of implementation remains low and it is more visible in those hotels which are a part of the international hotel chains.

Conclusion

The imperative for the successful business of a company is to apply the CSR. The CSR, as a business strategy, is the concept which helps one company be recognizable in the market.

The CSR is an important part of the sustainable business. The CSR relies on the three basic dimensions of sustainability, i.e. economic, social, and ecological. The company achieves its social responsibility on a local and global scale by implementing the concept in these dimensions.

If a hotel supports the CSR concept, it can achieve the concept through internal and external business. In this way, it will gain benefits for the employees, managers, stakeholders, local community, country, and nature, etc. The path to implementing this concept isn't by any means an easy one. The hotel has to overcome numerous barriers. As the major barriers, authors stress finance and the disinterest of managers in the implementation of the CSR.

The fact is that the state of the hospitality industry in Serbia is improving. There are attempts to modernize the hotel business in different destinations. Certain hotels in Serbia already use the CSR concept. These are usually the venues which are a part of the hotel chains. A small number of local hotels also implement the concept. In the end, we can conclude that the CSR is not sufficiently developed in the hospitality industry in Serbia.

In order to achieve the desired effects, the hospitality industry in Serbia should perceive the CSR as a chance for improvement. The CSR has to be an activity which will be

carried out in the companies all the time. This is a concept which should be implemented in the business strategy of the hotels in Serbia.

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ECONOMICS OF SUSTAINABLE DEVELOPMENT
Vol. 3, july-december 2019, № 2
UDK 33+502/504
ISSN 2560-421X
P. 29-38
SCIENTIFIC REVIEW ARTICLE
doi:10.5937/ESD1902029S
Received: September, 06, 2019
Accepted: November, 01, 2019

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ARE LOHAS CONSUMERS A PERSPECTIVE TOURISM SEGMENT?[2]

Abstract

In most social communities today, issues such as sustainability, ecology and the environment are becoming increasingly important. Consumers are no longer considering just the impact that their choices have on themselves, but are increasingly considering the impact their choices have on the environment. For this reason, significant attention is being paid to organically produced products, unpolluted areas and suppliers that adhere to good sustainability practices. This trend of life has led to the creation of a consumer group that incorporates sustainable behavior into all aspects of life (LOHAS). The aim of this paper is to examine the characteristics of this market group through a review of the existing literature, as well as to determine if LOHAS consumers represent a promising segment when it comes to tourism.

Key words: *LOHAS, sustainability, lifestyle, green consumers, tourism*

JEL classification: *Z32, Q51*

ДА ЛИ СУ LOHAS ПОТРОШАЧИ ПЕРСПЕКТИВАН ТУРИСТИЧКИ СЕГМЕНТ?

Апстракт

У већини данашњих друштвених заједница питања попут одрживости, екологије и заштите животне средине, постају све важнија. Потрошачи више не разматрају само утицај сопственог избора по њих саме, већ све више разматрају и какав утицај њихов избор има на околину. Из тог разлога, све већа пажња поклања се органски произведеним производима, незагађеним подручјима и добављачима који се придржавају добре праксе у области одрживости. Овакав тренд живота резултирао је стварањем групе потрошача која одрживо понашање укључују у све аспекте живота (LOHAS). Циљ овог рада је да се кроз преглед постојеће литературе истраже карактеристике ове тржишне групе, као и да се утврди да ли LOHAS потрошачи представљају перспективан сегмент када је у питању туризам.

Кључне речи: *LOHAS, одрживост, стил живота, зелени потрошачи, туризам*

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[2] The paper is part of the Project No. 179066, funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

Introduction

Population growth and increasing consumption affects the increased use of natural resources and an increase of harmful effects on the environment (Ivanović, Gašić, Peric & Krulj - Mladenovic, 2016). Precisely because of that influence the need for sustainable development emerges as the central thought of many people who undertake various activities to actively contribute to the preservation of the environment.

The issue of environmental sustainability contributes to the appearance of consumers who are interested in sustainable products rather than conventional products because the use of such products, and they as individual persons, can contribute to solving he common problem. As the time was passing, these individuals were singled out from the mass of other consumers, and to enable their easier identification there has been created an acronym - LOHAS.

LOHAS concept, the acronym for Lifestyles of Health and Sustainability (Ray & Anderson, 2000), includes everything from organic food and body care to socially responsible investing, alternative medicine, eco-tourism, renewable energy and energy-efficient cars and appliances (Font & Epler Wood, 2007; Ulrich, 2015). The term also describes a group of consumers who wants to do business with companies they share the same interests and priorities in these areas (Urh, 2015).

LOHAS concept is based on the extensive research undertaken in the United States in the mid nineties of the last century by sociologist Paul Ray who found out that nearly 25% of the U.S. population identified the concepts of health, sustainability and social justice as major elements forming their world view and how they chose to live their lives. Ray called this group the "Cultural Creatives" and described them as innovators and leaders of cultural change, voracious consumers of art and books and also major drivers of a type of consumption that demonstrated a recognition of individual and community impact. However, at the time of Ray's early work, there was little broad recognition of the true size and power of this cultural phenomenon as it was difficult to define from a market perspective (Ray & Anderson, 2000; Baker & Bez, 2007).

The term LOHAS was introduced by market research institute - Natural Marketing Institute (NMI). Furthermore, the concept of LOHAS has turned from the cultural group into a new consumer group, whose market potential is estimated at 200 billion US dollars for the year 2004 (Kreeb, Motzer, & Schulz, 2009). Many market institutions have directed their efforts towards attracting this market segment, seeing it as a new marketing and production opportunities (Heim, 2011).

The aim of this work is, firstly by reviewing of the existing literature, to explore all the characteristics of this group of consumers and their lifestyles. Then, to determine what percentage of the population belongs to the LOHAS and what are the values these consumers are directed to. Last, based on the literature reviewed, it is to determine whether LOHAS consumers represent a promising segment when it comes to tourism.

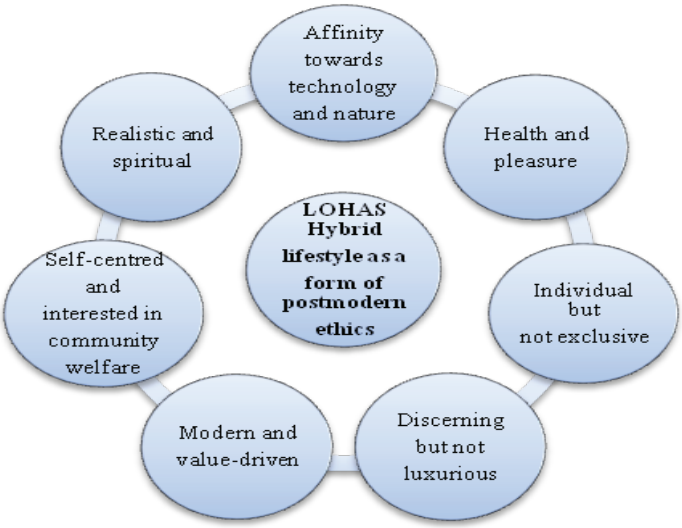
Characteristics of LOHAS consumers

There can be found different definitions of LOHAS consumers in the literature. By Pesek, Helton & Nair (2006) LOHAS consumers are defined as those who value holistic

health, the environment, global social justice, personal development and sustainable living. Urh (2015) added that LOHAS consumers are "those who are passionate about the environment, the planet, social issues, health, about human rights, fair trade, sustainable practices, and peace, spiritual and personal development" (p. 167). Ergüven & Yilmaz (2016) in their study describes LOHAS consumers as the kind of consumer who wants to improve the health and sustainability with their consuming behavior. They consume products and services only if they are not unhealthy and harmful to the environment. They advocate a healthy and conscious lifestyle and care about whether the products or services they consume are produced under acceptable conditions. Schüpbach, Grolle, Dauwalder, and Amhof (2008) point out that this group of consumers is characterized by focusing on conscientious consumption of products in order to contribute to the health, social justice, sustainability and ecology. The Future Institute in Germany defines LOHAS consumers as follows: "LOHAS cannot be fixed to the age, nor to a social stratum, are neither neo-alternatives nor Greenies. More importantly, they represent the first and only sustainable global lifestyle" (Ergüven & Yilmaz, 2016, p. 268). In all these definitions, nature, environment and social standards, appear as components that are very important for LOHAS consumers.

Research by the German Future Institute (Das Zukunftsinstitut) has highlighted another important characteristic of this consumer group and that is a "ybrid" lifestyle (Aue, 2008). It can be seen in Figure 1 that "eing LOHAS means, for example, being in favor of technical developments while enjoying nature, living a self-centered life while thinking about others and being realistic while open to spiritual ideas" (Urh, 2015, p. 169) .

Figure 1: LOHAS consumer characteristics



Source: Urh, B. (2015, p. 169), adapted by the author

The researches have shown that there is no clear socio - demographic group that can be considered as LOHAS and many studies have shown that some correlations are even

contradictory (Urh, 2015). Professional service company Ernst & Young has conducted a survey on consumer concerns about health and sustainability issues, which has involved more than 3,000 people in Austria, Switzerland, the Netherlands and Germany. According to the results of a research, 44% of participants stated that they would pay up to 20% more for an "organic" product rather than a product manufactured under standard procedures (Schüpbach *et al*., 2008). This shows that LOHAS people do not have strict rules, such as giving up on something while maintaining their lifestyles, and that the costliness of a product does not affect their consuming behaviors (Ergüven & Yilmaz, 2016). The study also found that LOHAS consumers are appearing at all demographic levels, and being a LOHAS group does not mean that people are rich or of a certain age or gender. Urh (2015) stated that "although they are not a homogeneous group of consumers, LOHAS share some certain characteristics, for example, that they mainly live in urban areas" (p. 168). The results of a study conducted by the Institute of Natural Marketing (NMI) (2008) showed that the typical LOHAS consumer is a middle-aged married woman who, in most cases, has no children. Also, this research concluded that LOHAS consumers generally have university degrees and are well paid.

In order to discover the priorities and way of thinking of LOHAS consumers, Ergüven & Yilmaz (2016) in their work summarized the results of various surveys conducted after 2000. The data collected showed that LOHAS consumers (Ergüven & Yilmaz, 2016, p. 268):

- Are between the ages of 20 and 90,
- Cannot be identified with a single social stratum,
- Are looking for quality,
- Are in the high-income group,
- Have traveling experience,
- Have higher educational levels,
- Advocate health and sustainability,
- Are environment- and longevity-conscious,
- Prefer an individually-determined lifestyle.

However, LOHAS consumers are difficult to be described based on demographic characteristics such as gender, age, qualifications and income (Szakály *et al*., 2017). Instead, people who rely on the LOHAS principle are typically described in terms of psychological characteristics: it is a broad group characterized by similar values, concerns, and priorities that they share, as well as the criteria they use in purchasing, investing, and lifestyle decisions (Headwaters MB, 2016). More than anything, what distinguishes LOHAS members from non-LOHAS individuals is a permanent interest in integrating their values in many areas of their lives (Urh, 2015).

LOHAS consumer values

Grunert & Juhl (1995) pointed out that the choice of values helps to make different decisions, and therefore the values represent the characteristics of a person or group of consumers, and therefore can play a very important role in the study of consumer behavior. The results of a study conducted by Buerke, Straatmann, Lin-Hi, and Müller

(2017) showed that consumer awareness and value based on sustainability have a positive impact on responsible consumer behavior.

Values such as a responsibility, credibility, and sustainability are the main principles that the LOHAS adhere to in all life circumstances. LOHAS consumers tend to make their purchasing decisions in accordance with their own values of social and environmental responsibility (Urh, 2015). Their commitment to sustainability is seen in the purchase of socially responsible and environmentally friendly products (Szakály *et al.* 2017). For them, it is more important to consume sustainably than excessively. LOHAS people adopt this type of consumption in all aspects of their lives and their consumption habits, from eating, health, through transportation, technology, economics, clothing, cosmetics, holidays, sports and more (Ergüven & Yilmaz, 2016).

Szakály *et al.* (2017), in their study, pointed out five value categories that stood out after analyzing the results of various research related to LOHAS consumers, such as: authentic values, health-conscious values, ethical values, individualist value and environmental-conscious values (p. 3). They point out that authentic values are primarily expressed in the search for local and home made products. The LOHAS people prefer food products, which are locally and seasonably grown, and which do not include carbon footprints in production, storage and transportation stages, (Ergüven & Yilmaz, 2016). Health awareness is manifested through a healthy lifestyle, and environmental awareness is associated with a sustainable lifestyle, which includes a commitment to environmental protection (Szakály *et al.*, 2017). The annual survey of LOHAS behavior conducted by the Institute of Natural Marketing (NMI) found that consumers buy green products, eat organic foods, or use renewable energy, largely due to the fact that they perceive their personal health as a driver who reduces the impact on the environment. They see a strong connection between their personal health and the health of the environment around them (Urh, 2015). Such consumers like to contribute simultaneously to both their personal health and the environment through their choices regarding shopping and habits (Derryberry, 2019).

Individualism is expressed in the pursuit of new products, in following new trends and in brand loyalty (Szakály *et al.*, 2017). LOHAS users first become aware of products such as green dry cleaning, organic food and alternative health therapies, and then try them out, adopt them, become loyal customers and influence their families and friends (Howard, 2007). They may prefer expensive and luxury brands, while being environmentally aware (Ergüven & Yilmaz, 2016). Ethical values are associated with different forms of social responsibility (Szakály *et al.*, 2017). These consumers recognize the contribution and responsibility of individuals towards society, and show their support for business practices that apply ethical principles (Schüpbach *et al.*, 2008).

Thus, LOHAS consumers strive to integrate healthier and more sustainable options into all aspects of their lives. Some of the products and services these consumers choose to adhere to their values include the following (Baker & Bez, 2007, p. 4):

- Food and nutrition - for example: organic and natural foods, vitamin supplements.
- Thoughts and body - yoga, meditation, personal development.
- Home life - natural cleaning products, efficient appliances, recycled paper.
- Buildings and energy - water tanks, solar hot water, green energy.
- Transportation and travelling - low impact of travel, eco tourism.
- Business and money - socially responsible investment, green loans.

The LOHAS market size

Paterson (2008) states that in developed countries even 25% of consumers make environmental and ethical purchasing decisions. According to recent data, it is estimated that there are more than 150 million LOHAS consumers worldwide, and that this market is worth more than $ 750 billion (Mobium Group, 2017). The LOHAS concept of life is mainly related to Western countries, but this trend has expanded and now includes consumers from Asia (Aue, 2008). According to Schulz (2008), LOHAS consumers in Europe represent 18% of the population, which is around 130 million people. Cohen (2007) and Ramirez (2013) estimate that in the United States this segment represents 23% of the population, or about 50 million adults. In Japan, a survey conducted in 2005 showed that LOHAS is characteristic of 29% of the population, or about 37 million people (LOHAS Groupsite, 2019). In New Zealand, this consumer group represents 33% of the population, while Australia has almost 4 million LOHAS consumers (Paterson, 2008). Starting in 2005, LOHAS has been also becoming widespread in China. Taking into consideration the connection of the LOHAS concept and the philosophy of Chinese culture to the concept of health, sustainability and emotional well-being, it was expected that such a concept would be widely accepted among Chinese consumers (Kan, 2010).

LOHAS consumers and Tourism

Ergüven & Yilmaz (2016) state that social benefits, as one of the values LOHAS consumers struggle for, according to the structural and functionalist point of view, can be obtained as a result of tourism activities. Thanks to this segment, the demand for eco-friendly and sustainable tourism trips is growing. LOHAS tourists are characterized by high purchasing power, use of smart technology, interests for cultural travel and experiences, short trips and active vacations (Danube Competence Center, 2015). Compared to other tourists, LOHAS tourists spend even 50% more money during their stay at the tourist destination and have a longer stay at the destination (one to two weeks) (Northflash, 2017). Considering the percentage of consumers who adopt healthy and sustainable lifestyles, as well as the role they can have in economic development and socio - cultural communication, even in relatively underdeveloped regions, this is considered to be a very profitable tourist segment. Therefore, many tourist destinations have to diversify their tourism products and services if they are to attract this group of consumers (Ergüven & Yilmaz, 2016).

LOHAS consumers are emerging as an attractive target group in the context of gastronomy and wine tourism (Ergüven & Yilmaz, 2016). Also, ecotourism, which emerged from the environmental movement, presents one of the biggest market sectors in LOHAS (Urh, 2015). Eco-tourism revenue in the United States in 2002 was estimated at about $ 77 billion (Shum, 2007). More recently, the term eco-tourism, which meant a combination of nature touring and sustainable management, has been expanded to incorporate a focus on indigenous populations and the needs of local communities (Urh, 2015).

One example of good tourism sustainable development practice, directed primarily to attracting LOHAS tourists, is the Xiao Xitou area located in Taipei, China. In order to

differentiate this area as a tourist destination for LOHAS tourists, they have enriched their offer with various activities and contents adapted to this market segment. In order to promote the cultural and tourism industry and the development of LOHAS recreation and tourism, some of the following projects have been launched (Taipei City Government, 2013, pp. 235-239):

1. Baishihu Recreation Farm

After four years of development and investment undertaken by the Taipei City Government, Strawberry Park, as one of the attractions of this district, has been transformed into a multifunctional recreational farm. The Baishihu area characteristics - Suspension Bridge, an ecological wetland, an agricultural fish pond and other interesting places along the Wishing Trail are connected within this project. In this way, an interesting itinerary is created for visitors, and they are given the opportunity to explore this rural beauty on foot. At the same time, this project also solved traffic problems in this area. In a short time this place has become one of the main resting areas for the city residents.

2. Tieguanyin and Nankang Baozhong teas

Taipei, as an area known for its high quality tea industry such as Tieguanyin and Nankang Baozhong, hosts a competition and exhibitions that are organized by DOED every spring and winter. This event represents both an opportunity to promote this industry and an opportunity to earn extra money. During these events, the Taipei Tea Promotion Center offers tea promotion classes and free guide services of tea culture and organized tea culture camps, as well as other events, and in that way making additional income for tea growers (about 20 million dollars of additional revenue).

3. Mountain trails

Taipei mountain trails, used by early settlers to transport coal, fish, tea, and other products, or made as temporary trails for forestry, mining, highway development, and similar, have persisted over the years. One of the key projects undertaken to improve the environment is connected to one of these trails (Huangxi Hot Spring Trail). The work on this trail was completed in 2012, and the final result of the project was the creation of a 600-meter-long route that combines natural and cultural landmarks. The route follows a natural water stream with rich wildlife. Visitors can enjoy the beauty of nature from a short distance, take a relaxing stroll and enjoy a true eco-trip.

4. A bike path on river bank

There are six major routes for cyclists in Taipei. In February 2012, two birdwatching pavilions were built along the riverfront along the Shezi Island bike path, providing places where walkers can enjoy local bird activities, crabs swinging their claws and other animal as well as plant species, typical for the area. In order to expand public recreation and recreation options on the river bank, in September 2012, a "3D Tamsui River Activation Information System" was launched. This system uses up to date technology and integrates water conservation and recreation facilities. The site has six main modules: panoramic shots, panoramic photos, 3D models, graphic profiles of Taipei and rivers, as well as recreational activities. Also, there are 10 bicycle rental stations for recreation. The stations rent different bikes and allow customers to return the bikes to any station in the system.

Conclusion

By raising awareness of the need for environmental protection and the dangers caused by actions that are not in accordance with the principles of sustainability, many companies, as well as individuals, become aware of the impact they have on the environment. Tourism and the environment are interconnected, and environmental protection is therefore fundamental to the future development of tourist destinations.

The motivation of contemporary tourists is increasingly connected to destinations that are guided by the principles of sustainable development (Slavković, 2015). Tsuk (2017) states that sustainability should not be viewed as a criterion for choosing a tourist destination. He points out that criteria are made by price, attractions and location, while sustainability is a key reason why guests return to their destination.

Taking into consideration the current situation, the Natural Marketing Insitute (NMI) (2008) considers that concerns for sustainability will not be reduced in the coming period. Although this market and its consumers have been undervalued and often characterized as "Monsters of the new age or radicals" (Urh, 2015), most market experts perceive the LOHAS market as opportunistic, and believe that this trend will continue in the future (Horx, Huber, Steinle, & Wenzel, 2007; Kotler, 2011; Heim, 2011; Korhonen, Jokinen, & Joutsela, 2014; Urh, 2015).

After reviewing the literature and considering all the characteristics of LOHAS consumers, it can be concluded that they represent the future of further tourism development. First, because of their principles and efforts to protect the environment, they incorporate sustainable behavior in all aspects of life. Then, this lifestyle means higher expenditures, so this group consists mostly of consumers of higher solvency who are willing to spend more money to maintain their lifestyles. Besides, taking into consideration that the issue of sustainability is being mentioned more often and is becoming a growing problem, it can be expected that an increasing number of tourists will join this group. With the growth of this segment, it can be expected that there will be an increase in the number of destinations and companies that direct their business towards attracting and meeting the needs of this particular tourism segment. Based on the Xiao Xitou case study, it can be seen that destinations as well as different businesses can have many benefits from adapting to the lifestyle of LOHAS tourists.

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ECONOMICS OF SUSTAINABLE DEVELOPMENT
Vol. 3, july-december 2019, № 2
UDK 33+502/504
ISSN 2560-421X
P. 39-48
SCIENTIFIC REVIEW ARTICLE
doi:10.5937/ESD1902039M
Received: September, 10, 2019
Accepted: October, 21, 2019

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STRUCTURAL ADJUSTMENT AND SUSTAINABILITY OF AGRICULTURAL PRODUCTION IN SERBIA[4]

Abstract

The starting point in considering the degree of development of agriculture and its sustainability is its production structure. Long-term relationship of crop and animal production in size 2:1 shows that Serbian agriculture is still developing and has not reached the level of developed European countries. The promotion of animal production must be included in every agricultural development policy, as it affects the improvement of the structure of production and exports, the achievement of higher added value, the stability of production, and the increase in capital investments in agriculture. In the assessment of the sustainability of the structure of agricultural production in the Republic of Serbia, the structure of these most important parts of agriculture for the period from 2007 to 2018 was also observed.

***Key words**: sustainability, structural adjustment, agricultural production, crop production, animal production.*

***Jel classification**: Q01, Q13, Q18.*

СТРУКТУРНА ПРИЛАГОЂАВАЊА И ОДРЖИВОСТ ПОЉОПРИВРЕДНЕ ПРОИЗВОДЊЕ У СРБИЈИ

Апстракт

Полазни елемент у разматрању степена развоја пољопривреде и њене одрживости јесте њена производна структура. Дугогодишњи однос биљне и сточарске производње од 2:1 говори о томе да је српска пољопривреда још увек у развоју и да није достигла ниво развијених европских земаља. Фаворизовање сточарске производње мора се укључити у свакој политици развоја пољопривреде, јер она утиче на побољшање структуре производње и извоза, остварење веће додате вредности, стабилност производње, као и повећање капиталних улагања у пољопривреди. У процени одрживости структуре

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[4] **Acknowledgements:** The paper is a part of the research done within the project number 179066 ("Improving the Competitiveness of the Public and Private Sector by Networking Competences in the European Integration Process of Serbia") financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

пољопривредне производње у Републици Србији посматрана је и структура ових најважнијих делова пољопривреде за период од 2007. до 2018. године.

Кључне речи: *одрживост, структурна прилагођавања, пољопривредна производња, биљна производња, сточарска производња.*

Introduction

Structural change is a normal evolution in an economy (Goddard, Weersink, Chen, & Turvey, 1993, p. 476). Continuous economic growth and development is unthinkable without some structural adjustment, which ultimately needs to provide an optimal economic structure. The connection between economic development and the economic structure and structural changes is so obvious and close that even without it economic development (but also agricultural and industrial) cannot be defined (Marjanović, 2015, p. 3).

Under structural changes in agriculture, we mean more participation, or faster growth of certain segments of agriculture. The development of certain branches of agriculture is not uniform, and in this development some branches are lagging behind, while others are developing much faster (Đekić, 2010, p. 150). The strategy of growth and development of the agrarian sector specifies concrete solutions and ways to achieve the stated goals.

The structure of agricultural production is an important indicator of the development not only of agriculture in some country, but also of the entire economy. When it comes to the structure of agricultural output, it refers to the production of agricultural goods and services. As agricultural services make up a very small part of this production, only the main parts of agricultural production will be analysed in the analysis. It is a crop and animal production.

Sustainability of agricultural development imposes the need for an analysis of its structure. Developed countries generally have a higher share of animal production compared to crop production due to the high technology and possibilities of realization of larger investments. Livestock breeding represents the most important and complex structure of agriculture, since for the purpose of nutrition people provide raw materials and have a significant impact on other elements of production, mostly on the production of animal feed (Jovanović, Vučković, & Pajčin, 2014, p. 196). The livestock industry therefore has great global economic and nutritional significance (Steinfeld, Wassenaar, & Jutzi, 2006, p. 514). It is a segment that as a rule represents a capital intensive branch of agriculture and is mainly associated with greater ability to attract investments in agriculture. In addition, animal production is also linked to production that has a significantly higher added and market value, and plays an important role in increasing the value of production and exports, as well as improving the structure of the economy and agriculture. Therefore, livestock breeding is important for the stable and harmonious (sustainable) development of total agricultural production, as well as for a more complete and rational use of natural and human resources (Radović, & Furundžić, 1997, p. 28).

Methodology and data sources

In order to prepare a proposal for restructuring the production of agricultural goods, an analytical method was applied. The structure of crop and animal production, as integral parts of agriculture, is considered in detail. SWOT analysis was carried out in order to obtain an overview of the state of agriculture in the Republic of Serbia, while reference secondary data were used to assess the adequacy of the structure of agricultural output production. In addition, agricultural services are neglected, as they make up only 2.5% of the production of agricultural goods and services. It is a database of the Statistical Office of the Republic of Serbia, as well as the publication Economic Accounts for Agriculture, which is an integral part of the National Accounts System as well as the international statistical system, which provides an assessment of the effects of agricultural policy (Statistical Office of the Republic of Serbia, 2019). The research covered the period from 2007 to 2018, while only 3 representative periods (2007, 2012 and 2017) were taken in certain tables, in order to achieve cost-effectiveness and transparency, as well as easier conclusion based on empirical data.

SWOT analysis and structure of agricultural production in Serbia

In the study of the necessity of structural changes in agricultural production for its sustainable development, we will start from the so-called SWOT analysis of the agricultural sector of the Republic of Serbia (Table 1).

Table 1: SWOT analysis of the agricultural sector of the Republic of Serbia

STRENGTHS	WEAKNESSES
- natural wealth - high quality of human resources - biodiversity - production potential - higher share of agriculture in gross domestic product in relation to participation in the agrarian budget - proximity to the European Union market as the largest export market	- unfavourable structure of agricultural products - low productivity - low level of investment - fragmentation of the plot - a small percentage of irrigated areas - unused production (processing) capacity - disorganization and low degree of connection between manufacturers
OPPORTUNITIES	**THREATS**
- valorisation of unused capacity - development of organic production - multifunctional agriculture - increasing the agrarian budget due to a more favourable fiscal situation - strengthening the cooperation among the institutes and the universities	- unfavourable demographic trends - necessary adjustments on the road to the European Union - geopolitical events - threat of cheaper imported products

Source: Marković, 2018, p. 123

In the basic forces of Serbian agriculture, mainly natural, human and production factors stand out, while the main weaknesses are associated with structural problems. The main dangers arise from insufficient competitiveness of domestic producers, while chances include the development of some parts of agriculture that are the key to its

development and structural changes in production in the future (livestock and organic production).

Table 2: Production of agricultural goods in the Republic of Serbia, current prices (in millions of RSD)

Production of agricultural goods	2007.		2012.		2017.	
	Value	Participation	Value	Participation	Value	Participation
Crop production	217.274	67,74%	324.451	66,00%	357.056	67,38%
Animal production	103.482	32,26%	167.146	34,00%	172.834	32,62%
TOTAL	320.756	100%	491.597	100%	529.890	100%

Source: Statistical Office of the Republic of Serbia, 2019.

Observing Table 2, it can be seen that in analysed years, and practically it can be said in the entire period from 2007 to 2017, a stable relationship between crop and livestock production in the overall structure is evident. A slight improvement in the structure of agricultural production occurred in 2012. However, this improvement is the result of unfavourable climatic factors that have resulted in a drastic fall in crop production. The value of agricultural production has grown steadily in the analysed period. Crop production increased by 64.33% compared to the base year of 2007, and the value of animal production increased by 67.02%.

Regarding the region, only North Macedonia has more share of crop production in total agricultural production than in Serbia (Gajić, & Zekić, 2013, p. 77). In the countries of the European Union, the situation is also completely different in relation to the Republic of Serbia, because animal production is twice as high as the value of crop production. Crop production in the Republic of Serbia is mostly done in an open area, which increases the dependence on climate factors and makes it extensive.

Structure of crop and animal production in Serbia

In order to initiate serious changes in the structure of agricultural production, it is necessary to increase the participation of animal production, but also to encourage the production of certain groups of products within the framework of the crop production itself. The structure of crop production is shown exactly in Table 3.

Table 3: Structure of the value of crop production in the Republic of Serbia, current prices (in millions of RSD)

Parts of crop production	2007.		2012.		2017.	
	Value	Participation	Value	Participation	Value	Participation
Cereals (including seed)	90.749	41,77%	138.325	42,63%	113.760	31,86%
Industrial crops	26.549	12,22%	52.806	16,28%	58.444	16,37%
Forage plants	12.761	5,87%	18.693	5,76%	20.985	5,88%
Vegetables and horticultural products	22.585	10,39%	28.985	8,93%	32.538	9,11%

Potato	8.318	3,83%	12.342	3,80%	11.687	3,27%
Fruits	33.929	15,62%	53.932	16,62%	76.995	21,56%
Wine	21.796	10,03%	18.925	5,83%	42.112	11,79%
Olive oil	-	0%	-	0%	-	0%
Other crop products	587	0,27%	443	0,14%	538	0,15%
TOTAL	**217.274**	**100%**	**324.451**	**100%**	**357.056**	**100%**

Source: Statistical Office of the Republic of Serbia, 2019.

The key consideration is that the structure of plant production is improved, bearing in mind that the share of fruits and industrial plants has increased. These are the branches of agriculture that can be the bearers of structural changes and the increase in the value of final products, if the benefits of individual areas are used for their profitable production. However, although the share of cereals has been reduced, there is a problem because the absolute value of production of this most frequent branches of the crop production, in the total value of production, has also decreased. The production of wine is after a certain reduction, again from 2017 on the percentage of participation from 2007, which is a positive fact from the aspect of improving the structure of production with higher added value.

Table 4 gives an overview of the structure of animal production for selected years (2007, 2012 and 2017). Production of pigs and milk is dominated by animal production, while the structure of other segments is very stable over time. The participation of cattle production must be the backbone of the animal production development.

Table 4: Structure of value of animal production in the Republic of Serbia, current prices (in millions of RSD)

Parts of animal production	2007.		2012.		2017.	
	Value	Participation	Value	Participation	Value	Participation
Cattle	21.439	20,72%	29.059	19,37%	31.703	18,75%
Pigs	32.955	31,85%	48.768	32,51%	57.098	33,78%
Equines	128	0,12%	61	0,04%	77	0,05%
Sheep and goats	6.524	6,30%	9.315	6,21%	8.971	5,31%
Poultry	7.954	7,69%	15.572	10,38%	13.163	7,79%
Other animals	-	0%	-	0%	-	0%
Milk	25.352	24,50%	34.212	22,80%	37.310	22,07%
Eggs	8.288	8,01%	10.810	7,21%	15.507	9,17%
Other animal products	842	0,81%	2.226	1,48%	5.216	3,09%
TOTAL	**103.482**	**100%**	**150.022**	**100%**	**169.046**	**100%**

Source: Statistical Office of the Republic of Serbia, 2019.

The importance of animal production and structural changes

Factors that affect the state of well-being and movements in animal production are: its extensive character, low specialization and a combination of animal and crop

production, the collapse of cooperatives, privatization and deterioration of agricultural combines, as well as slaughterhouses and dairies (Mićić, 2016, p. 199). For the propulsive development of animal production, it is necessary to work on breeding quality breeds of cattle and to strengthen the processing capacities. On the other hand, Đekić (2010, p. 150) points out that the increase in the ability to pay is a prerequisite for higher animal production.

However, insufficient volume of investments in agriculture, and consequently low productivity, affects the permanent reduction of animal in the Republic of Serbia. On the basis of Table 5, there is a continuous decline in the number of cattle and pigs. The number of cattle decreased by 19.23% for the period from 2007 to 2018, while the number of pigs in the same period decreased by as much as 27.40%. Therefore, in addition to increasing imports of these products, there is a danger of falling export-oriented production.

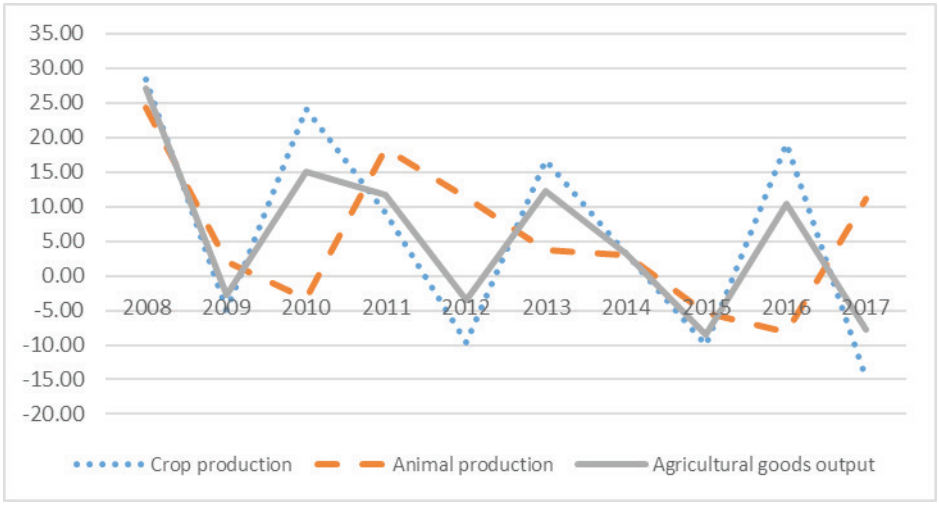
Table 5: Balance of livestock in the Republic of Serbia from 2007 to 2018 (end of the period)

Year	Cattle	Pigs	Sheep	Poultry
2007.	1087	3832	1606	16422
2008.	1057	3594	1605	17188
2009.	1002	3631	1504	22821
2010.	938	3489	1475	20156
2011.	937	3287	1460	19103
2012.	921	3139	1635	18234
2013.	913	3144	1616	17860
2014.	920	3236	1748	17167
2015.	916	3284	1789	17450
2016.	893	3021	1665	16242
2017.	899	2911	1704	16338
2018.	878	2782	1712	16232

Source: Statistical Office of the Republic of Serbia, 2019a.

Another reason contributing to animal production is its lower instability compared to crop production. This means that a greater degree of continuity in satisfying domestic and foreign demand can be achieved. Low level and incomplete application of agro-technical measures in crop production, a small percentage of irrigated areas, insufficient genetic potential and unbalanced livestock nutrition have significant effects on oscillations in crop and animal production (Strategy of Agriculture and Rural Development of the Republic of Serbia 2014-2024, 2014, p. 21). This is especially characteristic for crop production. Chart 1 testifies to this.

Chart 1: Rates of change in the value of crop, animal and production of agricultural goods in the Republic of Serbia (producer prices of the current year)



Source: Authors' presentation based on the data of the Statistical Office of the Republic of Serbia, 2019.

The need for favouring animal production is also due to the fact that it is a product that achieves a significantly higher value on the market. The ability to create greater added value through their processing is an essential element in increasing the degree of finalization of agricultural products. Livestock produce food, provide security, enhance crop production, generate cash incomes for rural and urban populations, provide fuel and transport, and produce value added goods which can have multiplier effects and create a need for services (Seré, Steinfeld, & Groenewold, 1996, p. 2).

In addition, animal production requires significant investments in equipment, construction of auxiliary facilities and the like, so it is also related to the development of other activities. It is a capital intensive branch of agriculture. Without the development of livestock, Serbian agriculture will remain an exporter of cheap raw materials, which from the aspect of the needs of the development of the food industry is an unacceptable solution (Post-crisis model of economic growth and development of Serbia 2011-2020, 2010, p. 32). Crop production mostly relies on arable land as a basic resource in agriculture, which leads to cheap production and exports. This will produce at a macro level a poor production-export structure, as well as a deterioration of the balance of payments. On the other hand, at the micro level, the majority production of primary products will cause a bad economic status of farmers. In this way, small farms will not have the ability to borrow in the form of loans. Livestock diversify production and income, provide year-round employment, spread risk, and also form a major capital reserve of farming households (Seré, Steinfeld, & Groenewold, 1996, p. 2).

Intensification will provide better production results: yields will be higher, more land will be irrigated and become arable (Alexandratos, 1995). In addition, it is necessary to adjust the assortment and specialize the production of farms. In developed countries, this can be seen today through the development of large, specialized animal production units in broiler, dairy or pork production (which contrast with the more traditional mixed crop-animal farms) (Chavas, 2001, p. 266).

Agricultural policy, which will stimulate the change of crop production structure, respecting, support for investing in more intensive production (truck farming, fruit growing, viticulture), as well as increasing the total livestock, is necessary, in order to get greater effects by agriculture (Kuzman, Đurić, Mitrović, & Prodanović, 2017, p. 524). Because of the character of agricultural production, these changes and adjustments cannot be implemented in the short term, so that the creators of agrarian policy must take this into account when working in this field.

Conclusion

Structural changes in agricultural production are important both for the development of the agri-food sector, as well as for overall economic growth and development, as they increase competitiveness and improve the balance of payments situation. Through the achievement of livestock breeding, sustainable growth of agricultural production will be enabled, which, in addition to the economic effect, will also have social and demographic effects, and will result in overall socio-economic development. Long-term measures of agrarian policy must not neglect animal production, as was the case in the past.

The dominant share of crop production in the structure of agricultural production (around 66%) is an indicator of the still underdeveloped agriculture in which the natural production and fragmentation of landholdings. The intensification of agricultural production should enable greater production of meat, milk and other animal products. The emphasis on higher relative share of animal production should not mean a reduction in crop production, but also its absolute growth in order to increase the total value of agricultural goods. For that purpose, investment in refrigerators, dryers and silos, as well as product standardization, can play a major role (Simonović, Mihailović, & Janković, 2017). Cereal production should have an upward trend in view of the built position in the foreign market. The fruit production is rising due to the increase in the level of technology being applied. In accordance with the goals of sustainable agricultural development, it is necessary to increase the organic production share, primarily organic animal production.

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ECONOMICS of Sustainable Development = Економика одрживог развоја / editor-in-chief Dragoljub Simonović. - Vol. 3, br. 2 (2019)- . - Niš : Society of Economists "Ekonomika", 2019 - (Niš : "Medivest"). 58 стр. - 24 cm

Dva puta godišnje.
ISSN 2560-421X = Economics of Sustainable Development