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Model of sustainable development of tourism industry in Kazakhstan (regional perspective)

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Abstract. *The given article reveals the essence and content of the concept of sustainable development of tourism. The concept is based on three main principles: environmental sustainability, social sustainability and economic efficiency. The authors presented the methodology and the study of the principles of modeling on the basis of available statistical data on indicators of sustainable development of tourism in Kazakhstan, which allowed creating a model of sustainable development of the tourist industry of Kazakhstan. This problem is actualized by the Resolution of the Government of the Republic of Kazakhstan on the development of the tourism industry.*

Nevertheless, there is a lack of sufficient experience in the management of the development tourism industry under the market conditions in today's Kazakhstan. Therefore, by studying this problem the authors provided a model of sustainable development of tourism in the region with a developed tourist sector.

Keywords: *tourism, the tourism industry, regional management, sustainable development of tourism, modeling PLS-PM*

Reikšminiai žodžiai: *turizmas, turizmo industrija, regioninis valdymas, darnus turizmo vystymasis, modeliavimas PLS-PM*

Introduction

The development of tourism has played an important role in the formation of the economy of post-industrial society. As a facilitator of the economic growth of Kazakhstan, tourism has a stimulating effect on the development of such sectors of economy as hospitality, catering and retail, consulting services, cultural and recreational, sporting and entertainment activities, construction and agriculture.

Based on the latest international practices of tourism development, there are several models of tourism development and approaches to tourism worldwide. They are associated with the stage of development in a country, reflecting the specificity of the supply and demand principle.

1. **Organic model of development.** This model is dominant in the developed tourist destinations that need a little or no support from the state (Gorshkova, 2006; Gorbunova, 2006). The main objective of these destinations is to maintain the interest of tourists, and thus, the focus is made on two general principles.
2. The traditional policy of **"non-intervention"** (free market competition) in the development of tourism involves minimal state intervention.
3. **"Enclave tourism development model**" has been used in different countries and has more recent use. This model simply means the development of tourism in 'closed and controlled oasis for international tourists' in designated attractive areas, in which international tourism standards are dominated (Vinokourov, 2007).
4. Taking into consideration the three main models of development, which cannot be applied in Kazakhstan due to the current state of tourism development, we propose the so-called **"from the center to the periphery"** (literally "node and spoke") distribution paradigm (model or network) as a basis for the development of tourism in the face of international competition (Friedmann, 1966).

From the perspective of development theory, this model is the most similar to the principle of the development with distribution. In this context, the distribution is understood as a process in which economic growth (tourism) extends from one place to another.

Distribution takes place in five stages, starting with the isolation in case of absence of development and completing with the creation of a new resort (destination) together with the necessary means of transport for access, increase in the number of resorts (destinations) and the further development of transport links as well as to overall saturation through a uniform distribution of resorts nationwide.

The tourist industry has the potential to substantially improve the environmental and socio-economic situation in all the centers and the countries in which the industry operates by using a culture of sustainable development of tourism.

Sustainability in tourism implies a positive overall balance of environmental, socio-cultural and economic impacts of tourism, as well as the positive impact of visitors on each other.

Methodological bases of management and functioning of the tourism industry in the context of sustainable development

Issues related to sustainable development of the tourism industry are embraced in the following works: G. A. Karpovoy (2010), E. M. Maksarovoy (2010), B. Bramwell (Bramwell, 1993; Lane, 1993), B. Farrel (Farrell, 1991; Runyan, 1991),

C. Gunn (1994), J.M. Harris (2000), A. Mathieson (Mathieson, 1982; Wall, 1982), M. Mowforth (Mowforth, 1998; Munt, 1998), P.E. Murphy (1985), R. Sharpley (2000), B. Wennergren (Wennergren, 1970; Nielsen, 1970) and others. These studies serve as the fundamental basis for development in the field of mathematical modeling of the development of tourism.

Methods of modeling of tourism and recreation industry are elaborated in the works by Ts. Bayasgalan (2006), N. V. Varachevoy (2001), M.J. Lemesheva (Lemeshev, 1985; Shcherbina, 1985), G.M. Romanov (2003), L.-J. Crampton (1965), J. B. Greenwood (2006), G. Demin (2013), G. Sanchez (Sanchez, 2012; 2013; Trinchera, 2013; Russolillo, 2013) and others.

Today, tourism has a leading position in the international foreign economic relations and is recognized as one of the fastest growing and highly profitable sectors of the world economy. The forms and methods of travel are changing, so that the new types of tourism are emerging. As sources of information become more available and varied, tourists are more actively engaged in the process of preparing to travel. Among the latest world trends in tourism development, special importance is given to the concept of sustainable development of tourism.

The concept of sustainable tourism development

The concept of sustainable development makes it possible to resolve the growing contradiction between the need to meet the growing needs of consumers (tourists), leading to the rapid development of the tourism industry, and a limited number of natural, social and economic resources of host destinations in the deteriorating ecological environment situation.

In accordance with the concept of sustainable tourism development, it is necessary not only to create conditions for the development of tourism, but also to consider thoroughly the consequences of this process. The complex challenge has to be dealt with: reduction of the negative effects of tourism and maximization of the positive effects. First of all it is essential to take care of the local people, their working conditions and the environment, that is important to consider the social and environmental impacts of tourism development. The trinity of economic, environmental and social goals in the policies pursued by the state is the key to the success of tourist activities.

One of the main problems in the concept of sustainable tourism development is also the lack of mechanisms for implementation of sustainability principles in practice. Existing mechanisms do not allow developing sustainable tourism everywhere. Therefore, only a thoroughly planned management can yield positive results (Iskakova, 2011).

The development of the competitive tourist and recreational complex in the territory of Kazakhstan should be based on sustainable and innovative development with the use of the cluster approach. In the case of Kazakhstan, the selected initial model **"from the center to the periphery"** can lead to the successful development of the process of spreading tourism.

Model of sustainable development of tourism in the region with a developed tourism sector

Tourism policies in the Republic of Kazakhstan should be built based on the principles of sustainable tourism. The trinity of economic, environmental and social goals in the policies pursued by the state will be key to the success of tourist activity.

The mechanism of realization of tourism policy, in our view, should include the development of a model of sustainable tourism development, the concept of sustainable tourism development, target programs on sustainable tourism development, as well as the development of specific measures for their implementation. The main strategic directions of development of sustainable tourism must be defined in the model of sustainable development of tourism in the region.

Table 1. **Indicators for sustainable tourism development for the region with the developed tourist sector (Greenwood, 2006)**

Indicator	Description of an indicator	Designation in the model
Number of jobs in the tourist industry	The total number of jobs in the tourist industry for the calendar year	*TIE*
The wage fund	The wage fund of the tourist industry for the calendar year.	*TIP*
The cost of housing	The average cost of residential real estate (land not more than 10 acres + one-family house)	*HV*
Tax revenues from the tourism industry	The total amount of tax revenue from the tourist industry for the calendar year.	*LTR*
The number of children receiving subsidies for medical treatment	The number of children receiving subsidies for medical treatment per year	*NSC*
Public expenditure on social services for the population	The amount of public spending on health care, and others, social services per year	*HSE*
Unemployment rate, %	The ratio of the total number of unemployed to the economically active population	*UER*
Public expenditure on environmental protection	The amount of public expenditure on environmental protection for the calendar year	*EPE*
The share of jobs in the tourism industry, %	Share of jobs in the tourism industry in total number of jobs	*ERT*
The number of poor households	The number of households with incomes below the subsistence level	*FP*

Public expenditure for the protection of public safety	Amount of public expenditure for the protection of public safety (police, fire service, rescue service, etc.).	*PSE*
Government spending on economic development	The amount of public expenditure on planning and economic development (increasing employment and other)	EPD
Government revenues from public utilities	Amount of receipts from the population for public utilities	UR
Expenditures of public services	Amount of public expenditure on the provision of public utilities to the population	UE
The total volume of water consumed	Average daily volume of water consumed by the population from all available sources per the calendar year	TWU

Initial research model ("Units-Indicators") is presented below. Latent variables are represented by ovals, manifest variables (indicators from Table no. 1) – by rectangles. The relations of latent variables (units) are an internal part of the model system, the relations of latent variables (units) with manifest variables (indicators) - the external part of the model.

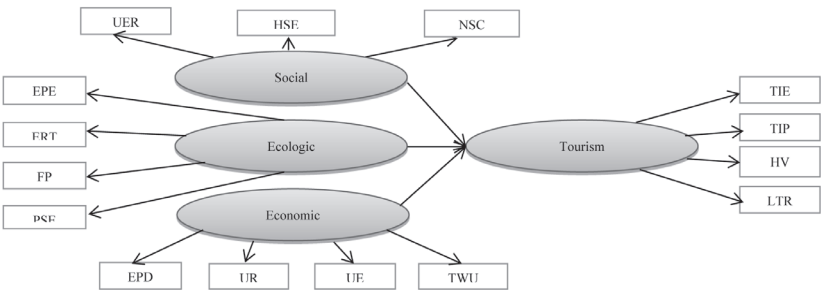

Figure 1. **Model of sustainable development of tourism in the region with a developed tourist sector**

*prepared by the authors.

If we present the internal and external system model analytically, the internal model can be represented by the following equation (1).

$$LV_{tourism}\beta_0+\beta_1 LV_{social}+\beta_2 LV_{ecologic}+\beta_3 LV_{economic}+error_{tourism} \quad (1)$$

where $LV_{tourism}$, LV_{social}, $LV_{ecologic}$, $LV_{economic}$ – latent variables, β_1, β_2, β_3 – «path» coefficients, that is coefficients of power and direction of relation among latent variables, β_0 - intercept, $error_{tourism}$ – error term.

External model is represented by the following system of equations (2):

$$\begin{cases} X_{TIE}=\lambda_{0TIE}+\lambda_{1TIE}LV_{tourism}+error_{TIE} \\ X_{TIP}=\lambda_{0TIP}+\lambda_{1TIP}LV_{tourism}+error_{TIP} \\ X_{UER}=\lambda_{0UER}+\lambda_{1UER}LV_{social}+error_{UER} \\ X_{HSE}=\lambda_{0HSE}+\lambda_{1HSE}LV_{social}+error_{HSE} \\ X_{EPD}=\lambda_{0EPD}+\lambda_{1EPD}LV_{economic}+error_{EPD} \\ X_{UR}=\lambda_{0UR}+\lambda_{1UR}LV_{economic}+error_{UR} \\ X_{EPE}=\lambda_{0EPE}+\lambda_{1EPE}LV_{ecologic}+error_{EPE} \\ X_{ERT}=\lambda_{0ERT}+\lambda_{1ERT}LV_{ecologic}+error_{ERT} \end{cases} \quad (2)$$

where X_{TIE}, X_{TIP}, …, X_{ERT} – manifest variables, λ_{1TIE}, λ_{1TIP}, …, λ_{1ERT} – coefficients of strength, λ_{0TIE}, λ_{0TIP}, …, λ_{0ERT} – intercept parameters, $error_{TIE}$, $error_{TIP}$, …, $error_{ERT}$ – error terms.

In the method of modeling of path coefficients by means of partial least squares there is also a concept of evaluation of a latent variable, which is a linear combination of (3) of the relevant manifest variables and is denoted as Y_j:

$$LV_j=Y_j=\Sigma_k W_{jk}X_{jk} \quad (3)$$

In our model, evaluation of latent variables can be represented by the following equations (4):

$$\begin{cases} \widehat{LV}_{tourism}=Y_{tourism}=W_{TIE}X_{TIE}+W_{TIP}X_{TIP}+W_{HV}X_{HV}+W_{LTR}X_{LTR} \\ \widehat{LV}_{social}=Y_{social}=W_{UER}X_{UER}+W_{HSE}X_{HSE}+W_{NSC}X_{NSC} \\ \widehat{LV}_{economic}=Y_{economic}=W_{EPE}X_{EPE}+W_{ERT}X_{ERT}+W_{FP}X_{FP}+W_{PSE}X_{PSE} \\ \widehat{LV}_{ecologic}=Y_{ecologic}=W_{EPD}X_{EPD}+W_{UR}X_{UR}+W_{UE}X_{UE}+W_{TWU}X_{TWU} \end{cases} \quad (4)$$

where W_{TIE}, W_{TIP}, …, W_{TWU} – outer weights of the model.

Statistical data served as input parameters for the modeling.

Stages PLS-PM modeling, related to the optimization of the model and the calculation of all the parameters, are implemented in a software environment R (Anon., 2010). The following tools were used in the analysis:

- package for the component analysis - Plsdepot (Sanchez, 2012);
- package for the analysis of the method of partial least squares - Plspm (Sanchez, 2013; Trinchera, 2013; Russolillo, 2013);
- Microsoft Excel files package- Excel.link (Demin, 2013).

For the preliminary test of the model we have conducted component analysis using Plsdepot package. Figure no. 2 shows the visualized correlations of manifest variables with the first two principal components:

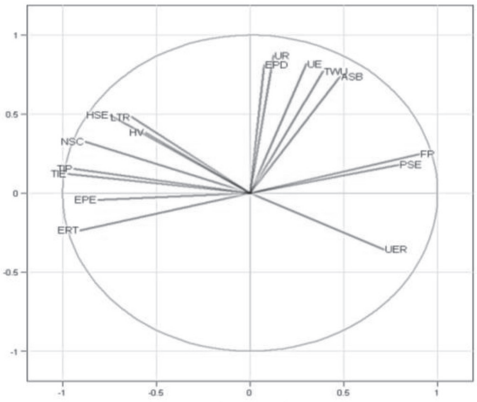

Figure 2. **Correlation of manifest variables with the first principal components**

*prepared by the authors.

Component analysis confirms the validness of breakdown of variables by sectors (tourism - society - environment - economy).

Analysis of the model by means of Plspm package includes the following steps: verification of internal consistency in the units; verification of the significance of the variables in the external model; verification of cross-correlations of variables of a unit with latent variables of other units; verification of the internal model; quality control of the model on the consistency index of the model to the data; optimization of the model.

The first step: verification of internal consistency in the units. The following criteria are used to check the internal consistency in the units in Plspm package:

- Cronbach's alpha coefficient.
- Dillon-Goldstein's ρ coefficient.
- The values of the eigenvalues of the correlation matrix of manifest variables.

Table 2 shows the results of the verification of the internal consistency in the units:

Table 2. **Verification of the internal consistency in the units**

Unit	Cronbach's Alpha, α_K	Dillon-Goldstein's Po, P_{DG}	Eigenvalue, λ_1	Eigenvalue, λ_2
Economics	0,88	0,91	3,41	0,72
Ecology	0,00	0,00	2,98	0,73
Society	0,00	0,58	2,37	0,38
Tourism	0,85	0,90	2,84	0,70

*prepared by the authors.

The table shows that the two units ("Economy" and "Tourism") have high values of α_K and ρ_{DG} coefficients, while "Ecology" and "Society" units have poor internal consistency (α_K <0,7 и ρ_{DG} < 0,7).

Figure 3 presents the correlation coefficients of manifest variables and latent variables (by units):

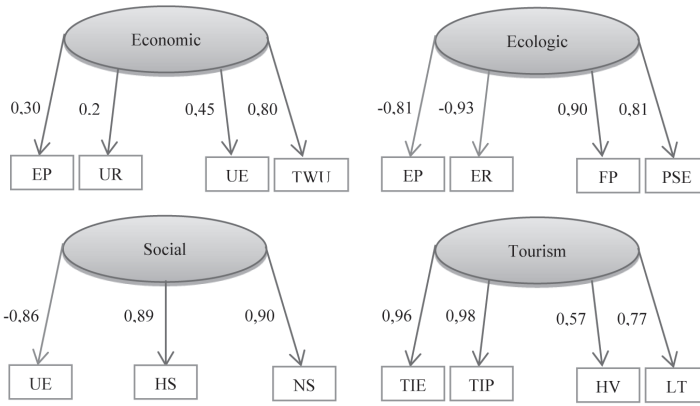

Figure 3. **The coefficients of the variables in the external model**

*prepared by the authors.

As can be seen from the Figure 3, two variables (ERT and EPE) are negatively correlated with the latent variable in the "Ecology" unit. In the "Society" unit there is also a variable with a negative correlation (UER). This leads to the internal inconsistency in the units. After modification of variables (FP, PSE, UER) the obtained values of consistency of the external models are presented in Table 3.

Table 3. **Verification of the internal consistency of the units after the modifications**

Unit	Cronbach's Alpha, α_K	Dillon-Goldstein's Po, P_{DG}	Eigenvalue, λ_1	Eigenvalue, λ_2
Economics	0,88	0,91	3,41	0,72
Ecology	0,88	0,94	1,78	0,22
Society	0,85	0,93	1,74	0,26
Tourism	0,85	0,90	2,84	0,70

*prepared by the authors.

After the modifications all three consistency criterion satisfy the required conditions (α_K>0,7, ρ_{DG}>0,7, ,λ_1>1, λ_2<1). Figure no. 4 shows the correlation scheme:

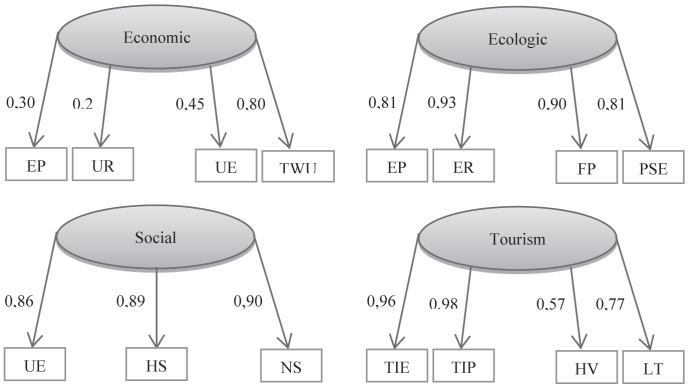

Figure 4. **The coefficients of the variables after modification**

*prepared by the authors.

The second step: verification of the external model. The results are presented in the Table 4:

Table 4. **The values of the coefficients of the external model**

Unit	Variable	Outer weight, W_j	Strength, λ_{ij}
Economics	UR	0,53	0,28
	TWU	-0,34	0,84
	UE	-0,45	0,45
	EPD	0,36	0,31
Ecology	ERT	0,34	0,93
	EPE	0,30	0,81
	-FP	0,29	0,90
	-PSE	0,23	0,81
Society	HSE	0,34	0,90
	NSC	0,42	0,91
	1-UER	0,36	0,86
Tourism	TIP	0,38	0,98
	LTR	0,23	0,78
	HV	0,12	0,57
	TIE	0,40	0,96

*prepared by the authors.

Variables are considered significant if the coefficient of strength λ_{1j} is greater than 0.7. As a result of the verification the following variables should be excluded from the model: UR, UE, EPD, HV.

The results of the verification of the external model after excluding the insignificant variables are presented in Table 5:

Table 5. **The values of the coefficient of the model after modifications**

Unit	Variable	Outer weight, W_j	Strength, λ_{1j}
Economics	TWU	0,39	0,91
Ecology	ERT	0,33	0,93
	EPE	0,30	0,81
	-FP	0,29	0,90
	-PSE	0,23	0,81
Society	HSE	0,34	0,90
	NSC	0,42	0,91
	1-UER	0,36	0,86
Tourism	TIP	0,41	0,99
	LTR	0,22	0,77
	TIE	0,44	0,97

*prepared by the authors.

After checking the λ_{1j} coefficients, i.e. after verification of the relations of manifest variables with latent variable of the corresponding unit, it is necessary to check cross weighting that is to determine the strength of relationship between manifest variables and latent variables of other units.

Table 6 shows the values of the cross weighting of the coefficients.

Table 6. **The values of the cross weighting coefficients**

Unit	Variable	Unit			
		Economics	Ecology	Society	Tourism
Economy	TWU	0,91	-0,50	-0,09	-0,13
Ecology	ERT	-0,49	0,93	0,58	0,81
	EPE	-0,33	0,81	0,58	0,73
	-FP	-0,63	0,90	0,65	0,72
	-PSE	-0,48	0,81	0,64	0,56

Society	HSE	-0,04	0,58	0,90	0,69
	NSC	-0,11	0,75	0,91	0,84
	1-UER	-0,08	0,52	0,86	0,72
Tourism	TIP	-0,24	0,84	0,80	0,99
	LTR	0,09	0,43	0,68	0,77
	TIE	-0,29	0,89	0,85	0,97

*prepared by the authors.

The table shows that the strength of the relationship of all the manifest variables with the latent variables of corresponding units is higher than with the latent variables of other units that is, all variables are "loyal" to their units.

Let us proceed too the fourth stage – verification of the quality of the internal model. Figure no. 5 shows a graphical representation of an internal model with the values of "path" coefficients.

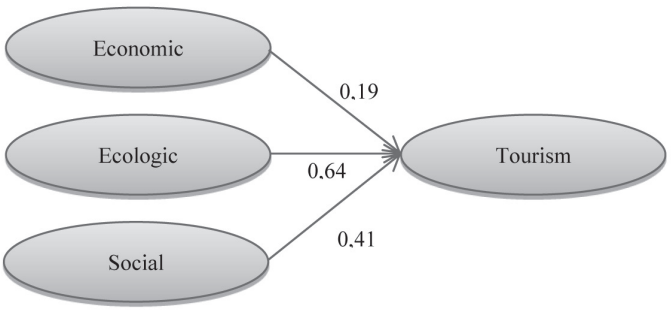

Figure 5. **Internal model with "path" coefficients**

*prepared by the authors.

Table 7 presents the evaluation of β_i from the structural model equation, as well as the results of the t-statistics:

Table 7. **Statistics of the internal model**

	β_1	**Standard error, $SE_{\beta i}$**	**t-statistic**	**Pr(>|t|)**
Intercept	2,1628E-17	0,085354054	2,53403E-16	1
"Economics"	0,19028279	0,119057102	1,598248144	0,1249264
"Ecology"	0,64313833	0,167063135	3,849672335	0,00093012
"Society"	0,41436382	0,139606488	2,968084329	0,00733725

*prepared by the authors.

The t-statistic is performed for the units of "Ecology" and "Society" ($Pr(>|t|)<0,05$), but not for the "Economics" ($Pr(>|t|)>0,05$). At this stage of optimization the given unit can be excluded from the model.

Table 8 shows the summary statistics on the structural model:

Table 8. **Summary statistics of the internal model**

Unit	R^2	Reproducible variability, BC	Average variance extracted, AVE
Economics	0,00	0,89	0,89
Ecology	0,00	0,74	0,74
Society	0,00	0,79	0,79
Tourism	0,85	0,84	0,84

*prepared by the authors.

Indicator R^2 for "Tourism" target unit is higher than 80%. Share of reproducible variability characterizes the share of unit's variability, which is reproduced by latent variable of the unit. For all units, the values are much higher than 50%, which positively characterizes the studied model. The last column represents the measure of the proportion of variance extracted (average share of dispersion of indicators of the unit, explained by the latent variable of the unit, containing measurement error in total variance). AVE indicators for all the units exceed 50%, so in terms of the given criterion the internal model is also considered satisfactory.

The fifth step includes calculation of a single coefficient of conformity of quality of data model - GoF (Goodness-of-Fit). The coefficient characterizes the quality of both internal and external model of the system, and serves as an indicator of prognostic reliability of the model. The prognostic reliability of the model is considered high if GoF ratio exceeds 70%. For the model studied in the given paper the GoF ratio is 82%.

The sixth step: optimization of the model. All the criteria that characterize the quality of the model are performed, except for the criterion of the t-statistic for the "Economics" unit in the internal model (see Table 8). Let us try to exclude the "Economics" unit from the system and perform all the steps of verification for the updated model, the internal (structural) part of which is shown in Figure no. 6.

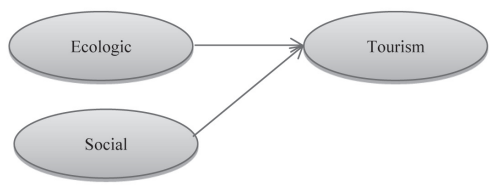

Figure 6. **Internal model (after excluding the D unit)**

*prepared by the authors.

The first step: verification of the internal consistency in the units. The results of the first step are shown in Table 9:

Table 9. **Verification of the internal consistency in units (after optimization)**

Unit	Cronbach's Alpha, α_K	Dillon-Goldstein's Po, P_{DG}	Eigenvalue, λ_1	Eigenvalue, λ_2
Ecology	0,88	0,92	2,98	0,73
Society	0,87	0,92	2,37	0,38
Tourism	0,90	0,94	2,53	0,45

*prepared by the authors.

Figure 7 shows the correlation circuits after the exclusion of block D.

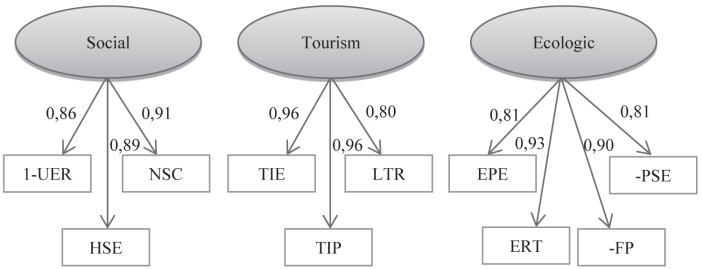

Figure 7. **The coefficients of the variables in the external model (after optimization)**

*prepared by the authors.

The second step: verification of the values of the variables in the external model. The results are shown in Table 10.

Table 10. **The values of the coefficient of the model (after optimization)**

Unit	Variable	Outer weight, W_j	Strength, λ_{1j}
Ecology	ERT	0,33	0,93
	EPE	0,30	0,81
	-FP	0,29	0,90
	-PSE	0,23	0,81
Society	HSE	0,34	0,90
	NSC	0,42	0,91
	1-UER	0,37	0,86
Tourism	TIP	0,39	0,98
	LTR	0,27	0,80
	TIE	0,42	0,96

*prepared by the authors.

The third step: checking the cross-correlations of variables of the unit with the latent variables of the other units. The results are presented in Table 11.

Table 11. **The values of the cross weighting coefficients (after optimization)**

Unit	Variable	Unit		
		Ecology	Society	Tourism
Ecology	ERT	0,93	0,58	0,80
	EPE	0,81	0,58	0,73
	-FP	0,90	0,65	0,71
	-PSE	0,81	0,64	0,55
Society	HSE	0,58	0,90	0,69
	NSC	0,75	0,91	0,84
	1-UER	0,52	0,86	0,73
Tourism	TIP	0,84	0,80	0,98
	LTR	0,43	0,68	0,80
	TIE	0,89	0,85	0,96

*prepared by the authors.

The fourth step: verification of the internal model. Statistics of the internal model is presented in Tables 12 and 13.

Table 12. **Statistics of the internal model (after optimization)**

	β_1	Standard error, $SE_{\beta i}$	t-statistic	Pr(>|t|)
Intercept	1,7726E-17	0,090808067	1,95203E-16	1
“Ecology”	0,433665664	0,127880991	3,391165947	0,002626084
“Society”	0,54539304	0,127880991	4,264848383	0,000315956

*prepared by the authors.

Table 13. **Summary statistics of the internal model (after optimization)**

Unit	Type of the unit	R^2	Reproducible variability, BC	Average variance extracted, AVE
Ecology	Exogenous	0	0,743174071	0,743174071
Society	Exogenous	0	0,787916914	0,787916914
Tourism	Endogenous	0,818585688	0,84015712	0,84015712

*prepared by the authors.

The fifth step: quality control of the model on an index of compliance with data models: GoF indicator in the new model is 86%.

Thus, all the required conditions for the quality of the model are performed. Let us analyze the obtained results.

The internal model of the system can be written as the following equation (5):

$$LV_{tourism}=0,55LV_{social}+0,43LV_{ecologic}+error_{tourism} \quad (5)$$

Evaluations of the latent variables can be presented in the following equation set (6):

$$\begin{cases} \widehat{LV}_{tourism}=0,42X_{TIE}+0,39X_{TIP}+0,27X_{LTR} \\ \widehat{LV}_{social}=0,37(1-X_{UER})+0,34X_{HSE}+0,42X_{NSC} \\ \widehat{LV}_{ecologic}=0,3X_{EPE}+0,33X_{ERT}-0,29X_{FP}-0,23X_{PSE} \end{cases} \quad (6)$$

The results can be represented in the form of the graph shown in Figure no. 8, in which the path coefficients are specified on the arrows of the internal model, and the external weights are on the arrows of the external model:

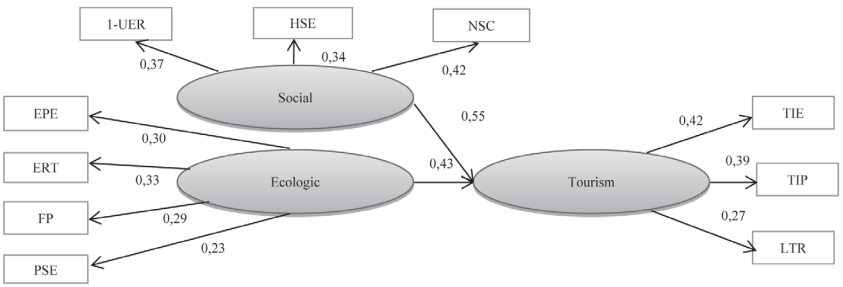

Figure 8. **The final model of sustainable tourism development in the management of the region**

*prepared by the authors.

Two characteristics have a significant impact on the level of tourism development in the management of the region with the developed tourist sector: "The level of social comfort" and "The level of readiness of community to engage in environmental protection" with the significance level of 0.55 and 0.43 respectively. In addition, this study revealed a rather weak influence of the level of economic development on the development of tourism. It can be assumed that sustainable development of tourism is possible not only in economically developed regions, but also in developing ones.

According to the results, the assessment of the level of social comfort can be performed based on the following three factors:

– employment rate (the proportion of people with permanent jobs, the total
– number of economically active population);
– the amount of public spending on health and other social services;
– the number of children receiving subsidies for medical treatment.

The level of formation of the ecological system of values in society based on four factors:

– the amount of public spending on the environment;
– the share of jobs in the tourist industry in total employment;
– the number of families with incomes below the subsistence minimum (negative correlation);
– the amount of public spending on the protection of public safety (negative correlation).

The assessment of the level of tourism development depends on three factors:

– the number of jobs in the tourist industry;
– wage fund in the tourist industry;
– the amount of tax revenues from the tourist industry.

On the basis of the final model we can calculate the latent indexes for each year and create a simulator to predict future values. Sustainability of development can be stated by comparison of the values of the unit's estimates for different periods. There are two options:

– The values of implicit variables / units (Economics, Ecology, Society) of the current period shall not be less than the estimates of the prior period. If this condition is satisfied for a unit, it is considered stable.
– There can be defined the starting point (base level) for each unit. It can include the value of the year, when the profitability of the tourism sector / environmental quality / level of social comfort (depending on the unit) is considered acceptable for further development. If the estimate of the unit in the current year is below the previous year, but higher than the reference value (base level), the development can be considered sustainable.

I. Conclusions on model for sustainable development of tourism industry in Kazakhstan

Thus, the basic principles of modeling, the aim of which is to obtain estimates of latent variables to implement further procedures of forecasting system development are defined.

1. The main stages of modeling have been formulated and analyzed:
– identification of variables in the model, the search for the required statistical data;
– construction of a model (internal and external part);
– calculation of the outer weights (iterative process), path coefficients and strength of the external model;
– optimization of the model during the verification of the required conditions (consistency in the blocks, the significance of variables of external model, absence of "traitor variables", verification of the internal model, the correspondence of the model on the total index);
– prediction of value estimates of latent variables on the basis of the data parameters of domestic and foreign models.
2. In world practice, there are three main elements in the mechanism of the development of sustainable tourism - sustainable destinations, sustainable businesses, and responsible tourists, that, in fact, means the sustainable management, sustainable production of tourist services and sustainable consumption. Responsibility for the sustainable development of tourism must be shared within these elements.
3. Tourism can and should be developed on the principles of a model of sustainable development of the region. Moreover, it should be treated as an integral part of the country's economy, which depends on the sustainable development of all other sectors.
4. The model of sustainable development of the tourist industry of Kazakhstan has been elaborated for additional considerations, recommendations and to illustrate the principles of modeling based on the available statistical data on indicators of sustainable development of tourism.

The above described analysis of the model can be successfully recommended and implemented to address the challenges of sustainable development of tourism industry of Kazakhstan.

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Darnaus turizmo industrijos vystymosi modelis Kazachstane (regioninė perspektyva)

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Anotacija

Šiame straipsnyje atskleidžiami esminiai darnaus turizmo vystymosi aspektai. Koncepcija remiasi trimis esminiais principais: ekologine ir socialine pusiausvyra, ekonominiu efektyvumu.

Autoriai pristatė metodologiją ir atliktą tyrimą remiantis šių principų modeliavimu ir esamais statistiniais duomenimis, atskleidusiais Kazachstano darnaus turizmo vystymąsi ir suteikusiais galimybę sukurti Kazachstano darnaus turizmo vystymosi modelį. Darnaus turizmo industrijos vystymosi problema išreikšta ir Kazachstano Respublikos Vyriausybės rezoliucijoje, orientuotoje į turizmo industrijos vystymąsi.

Tačiau vis dar stinga vadybinės patirties siekiant užtikrinti turizmo industrijos vystymąsi šiandieninės Kazachstano rinkos sąlygomis. Todėl analizuodami šią problemą autoriai pateikė darnaus turizmo vystymosi modelį regione, kuriame turizmo sektorius yra pakankamai išvystytas.

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