METHODOLOGICAL SOLUTIONS FOR ANALYZING THE STRUCTURE OF MANAGEMENT INDICATORS IN TOURISM

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ABSTRACT: *The analysis of the structure and the respective changes that have occurred in the composition of economically complex performance indicators represents a constant opportunity for the management of commercial companies to substantiate both short-term and medium-to-long-term intervention decisions. The methodologies presented in this study provide a practical and scientifically grounded solution for achieving this goal, ensuring the formulation of consistent conclusions based on which administrators of economic and financial activities can correct unfavorable trends present in the dynamics of indicators that quantify economic results.*

Keywords: *tourism, Markov chain method, Average coefficient of structure change*

JEL Classification: *C63, L83, Z32*

1. INTRODUCTION

In the context of analyzing the dynamic and static situation of the indicators related to the physical and value-based volume of activities at the level of an economic entity, understanding the structure and structural changes is important. This is viewed through the lens of individualized component elements in sub-activities (production, trade, transportation, accommodation, leisure, catering, healthcare), as well as through the financial content of value-based indicators. It also considers the physical or assortment structure of economic activity outcomes, and the geographical location of economic activities within internal or international areas.

The objective of analysing the structure of management indicators is to highlight the magnitude and direction of changes that have occurred in the physical and value-based structure of economic results. It aims to identify the causes and consequences of structural changes on indicators of efficiency, financial performance, or economic and financial expression.

The methodology aimed at analyzing the structure of management indicators will be applied in the context of the activities of economic agents in the tourism sector, which exhibit distinct complexity. The utility of analyzing the structure of tourism services lies in the

imperatives of efficient management in the field of tourism. This involves adapting technical and environmental facilities to the requirements of service consumers, ensuring comfort facilities that align with tourist preferences, and diversifying the service offering under competitive qualitative conditions.

2. ANALYSIS OF THE REVENUE STRUCTURE USING THE 'PROFIT SPLIT METHOD"

In order to analyze the contribution of revenue obtained from different types of activities to the total change in turnover, we present the situation from Table 1 regarding the turnover achieved by a company providing tourist services

Table 1. The situation of the turnover achieved by a commercial company with tourism activity

Indicators	Base Period	Calculation Period	Deviations (±)
1. Total turnover (thousand lei) of which:	214.260	248.730	+34.470
2. Domestic tourism turnover (thousand lei)	154.000	178.500	+24.500
3.International tourism turnover (thousand lei)	60.260	70.230	+9.970

Source: made by the author

Using the "Profit Split Method," based on the statistical data presented in Table 1, it is observed that the total turnover realized in the calculation period exceeds that of the base period by 34,470 thousand lei, as a result of the increase in domestic tourism revenue by 24,500 thousand lei and international tourism revenue by 9,970 thousand lei. Each of these two influences will be assessed based on the possible causes that determined them, as well as the proportion that turnover by type of tourism represents in the total turnover.

Since the proportion of international tourism turnover in the total turnover for the calculation period (28.2%), [(70,230/248,730) * 100 = 28.2%], is lower than the proportion of the increase in international tourism turnover in the total increase (28.9%) [(9,970/34,470) * 100 = 28.9%], it is concluded that international tourism activity presents a structural advantage over domestic tourism.

This conclusion is further supported by the different magnitudes of the dynamics indicators calculated for the types of tourism:

- the dynamics index for domestic tourism turnover: 115.9%;
- The dynamics index for international tourism turnover: 116.5%.

The actions that can favor predominantly increasing the turnover from international tourism, which usually, due to the foreign exchange contribution it brings, demonstrates higher efficiency compared to domestic tourism, include:

- expanding or better utilizing the existing tourism capacity while ensuring appropriate functional conditions for all spaces and facilities;
- modernizing the tourist infrastructure and increasing the level of comfort;
- Implementing organizational improvements to meet the demands for promptness in providing tourism services, thereby enhancing the attractiveness for potential beneficiaries;
- training and professional development of all staff to cultivate a pronounced sense of politeness and attentiveness;

- increasing the complexity and quality of services;
- utilizing effective means of advertising the services and facilities offered.

3. THE ANALYSIS OF THE REVENUE STRUCTURE USING THE 'AVERAGE COEFFICIENT OF FULFILLMENT OF THE OPTIMAL OR PLANNED STRUCTURE OF SERVICES'

When aiming to quantify, through a synthetic numerical expression, the degree of deviation of the actual structure of services from an optimally precalculated or programmed structure based on estimated specific conditions, one proceeds to analyze the structure of tourism services using the '**Average Coefficient of Fulfillment of the Optimal or Planned Structure of Services**'.

The average coefficient of fulfillment of the optimal or planned structure of services (Ks) is determined as follows:

$$Ks = \frac{\text{The turnover achieved according to the optimal or programmed structure.}}{\text{The achieved turnover}} \cdot 100$$

The numerator of the ratio - *the turnover achieved according to the optimal or programmed structure* - is obtained by comparing the turnover achieved by types of activities with the recalculated turnover based on the optimal or programmed structure of component activities, following the principle of non-admittance of compensations.

The recalculated turnover based on the optimal or programmed structure is determined by applying the optimal or programmed proportion of turnover by types of activities to the total turnover achieved.

In the case of a perfect correspondence between the structure of the turnover by activities achieved and the precalculated (optimal or programmed) one, the average coefficient of fulfillment of the optimal or programmed structure of services is equal to unity or 100%, if expressed in percentage.

Any change that occurs in the structure of the tourism services provided, compared to the precalculated structure, due to the existence of different rhythms in achieving the optimal or programmed levels by types of activities, leads to a subunitary magnitude of the coefficient.

The exemplification of how to calculate and interpret this coefficient is done based on the data in Table 2.

Table 2. The situation of turnover by types of tourist services

Indicators	Programme	Achievements	Planned Structure of Turnover	Actual Structure of Turnover	Turnover Recalculated to Planned Structure	Turnover achieved according to the planned structure
Total turnover (thousand lei), of which:	800.000	740.000	1, 0000	1, 0000	740.000	709.200
– accommodation activity	416.000	400.000	0, 5200	0, 5405	384.800	384.800

Indicators	Programme	Achievements	Planned Structure of Turnover	Actual Structure of Turnover	Turnover Recalculated to Planned Structure	Turnover achieved according to the planned structure
– public catering activity	336.000	280.000	0, 4200	0, 3784	310.800	280.000
– other activities	48.000	60.000	0, 0600	0, 0811	44.400	44.400

Source: made by the author

Based on the data presented in table 2, it can be inferred:

$$Ks = \frac{709.200}{740.000} \cdot 100 = 95{,}8\%.$$

Therefore, the planned structure of tourism services was not fulfilled by 4.2%, considering a total turnover that was lower by 7.5%., $\left[\frac{740.000}{800.000} \cdot 100 - 100 = -7{,}5\%\right]$, compared to the planned level.

By types of activities, the turnover shows different dynamics indices, which have influenced the change in the overall turnover structure as follows:

- the turnover from accommodation activity was lower by 3.8% $\left[\frac{400.000}{416.000} \cdot 100 - 100 = -3{,}8\%\right]$, compared to the planned, a decrease lower than the level of total turnover non-fulfillment, which was -7.5%. This led to an increase in the proportion of this indicator from the planned 52.00% to the achieved 54.05%;

- the turnover from public catering activity recorded a decrease of 16.7%, $\left[\frac{280.000}{336.000} \cdot 100 - 100 = -16{,}7\%\right]$, which significantly exceeds the average level of non-fulfillment of turnover (-7.5%), resulting in a decrease in the proportion of turnover for this activity, from the planned 42.00% to the achieved 37.84%;

- Lastly, the turnover related to other activities shows an exceeding of 25.0%., $\left[\frac{60.000}{48.000} \cdot 100 - 100 = +25{,}0\%\right]$, compared to the planned level, thus resulting in an increase in the proportion of this turnover from the planned 6.00% to the achieved 8.11%.

The change in the structure of services provided compared to the programmed structure can only occur within certain limits, as it is closely interdependent with the structure of the capacity to offer tourist services.

An identical structural analysis, from a methodological standpoint, can also be carried out for the turnover in accommodation activity differentiated by categories of comfort.

The non-compliance with the optimal or programmed structure of revenues by types of activities can influence the total level of turnover, the expenses incurred per 1000 lei of turnover, as well as the profitability of the company's overall operations. This is due to the

disparities that exist in the magnitude of revenues and expenses per physical unit of service provided.

If necessary, one can also proceed to understand the change in the structure of production indicators in terms of types of products or assortments manufactured. This can provide management with some useful explanatory elements regarding the financial state of the company.

4. THE ANALYSIS OF THE STRUCTURE OF VALUE ADDED USING THE 'AVERAGE COEFFICIENT OF STRUCTURE CHANGE'

When analyzing a value-based indicator, such as value added related to turnover, from the perspective of its financial structure, a similar methodology to the ones presented earlier is applied.

For illustration, we will use the "*Average Coefficient of Structure Change*" method, employing the conventional scenario from Table 3.

The average coefficient of change in the financial structure of value added in the calculation period, compared to the base period (Ks), is in this case 97.9%:

$$Ks = \frac{347.695}{355.200} \cdot 100 = 97,9\%.$$

The value of the coefficient "Ks" allows us to appreciate that there is a certain structural difference in the value added between the two compared periods, but the deviation of 2.1% for this difference is relatively small *(100.0% - 97.9% = 2.1%).* However, there are noticeable unfavourable structural shifts regarding personnel expenses, with their share increasing by 1.8 percentage points *(82.1% - 80.3% = + 1.8%)* simultaneously with a decrease in the share of operating profit associated with the indicator used to calculate value added, by 2.1 percentage points *(15.3% - 17.4% = - 2.1%).*

Table 3. The financial structure of added value

Indicators	Achieved in the base period.	Achieved in the current calculation period	Structure of value added in the base period (%)	Structure of value added in the current period (%)	The value added achieved in the current period recalculated to the structure of the base period.	The value added achieved in the current period according to the structure of the base period.
Value added (thousand lei), of which:	312.400	355.200	100,0	100,0	355.200	347.695
– Personnel expenses	250.700	291.600	80,3	82,1	285.226	285.226
– Adjustments related to tangible and intangible fixed assets	5.400	6.800	1,7	1,9	6.038	6.038
– Expenses for other taxes, duties, and similar charges	1.800	2.500	0,6	0,7	2.131	2.131
– Operating profit related to the indicator based on which value added (turnover) was calculated	54.500	54.300	17,4	15,3	61.805	54.300

Source: made by the author

5. ANALYSIS OF THE STRUCTURE AND PREDICTION OF THE TURNOVER STRUCTURE USING THE "MARKOV CHAIN METHOD"

For the analysis and prediction of changes in the structure of complex indicators, the "**Markov Chain Method**" is often employed. This method is based on the logic of probabilistic dependence of the structure of complex indicators observed in a specific time interval on the structure in the preceding time interval. With this purpose in mind, we will present the methodology for analyzing the changes in the structure of turnover over the course of three successive years and forecasting the turnover structure in the next time interval (year 4) for three categories of activities, using the data from Table 4. Since structural changes are more prominently noticeable over longer time intervals, calculations may also take into account structural states of complex indicators located at distances of 3, 4 or 5 years.

Table 4. The dynamics of the turnover structure by types of activities

Indicators	**The turnover structure (%)**		
	Year 1	**Year 2**	**Year 3**
Total turnover, of which:	100, 00	100, 00	100, 00
a) accommodation activity	42, 60	56, 10	54, 05
b) public catering activity	52, 28	40, 08	37, 84
c) other activities	5, 12	3, 82	8, 11

Source: made by the author

The preliminary stages of calculating the predictive structure involve determining a number of *n - 1 transition matrices (in our case: 3 - 1 = 2)*, as follows:

*I * The transition matrix (1) is calculated, which expresses the change in the structure of turnover by activities from year 1 to year 2:*

Transition matrix (1)

	a	b	c	Year 1	Decreases in year 2 compared to year 1:
a	42, 60			42, 60	
b	12, 20	40, 08		52, 28	12, 20
c	1, 30		3, 82	5, 12	1, 30
Year 2	56, 10	40, 08	3, 82	100, 00	
Increases in year 2 compared to year 1:	13, 50				

Note: To simplify the representation of transition matrices, the following notations were used in the table for the types of activities contributing to the turnover: a) for accommodation activity; b) for public catering activity; and c) for other types of activities.

At the intersection of the rows and columns for the three types of activities, the smallest value of the turnover share is recorded, obtaining the *"diagonal of fidelity"*. Next, the relative structural sizes from the column - *year and the row - year* 2 are compared with those on the diagonal of fidelity, noting the differences within the matrix. This is done in order to verify the totals for the three states horizontally and vertically

Therefore, it is observed that the share of turnover from accommodation activity increased by 13.50 percentage points in year 2 compared to year 1, at the expense of a decrease in the share of turnover from public catering activity by 12.20 percentage points and a 1.30 percentage point increase in the share of turnover from other activities.

*II * The transition matrix (2) is calculated, which expresses the change in the structure of turnover in year 3 compared to year 2:*

Transition matrix (2)

	a	b	c	Year 2	Decreases in year 3 compared to year 2:
a	54, 05		2, 05	56, 10	2, 05
b		37, 84	2, 24	40, 08	2, 24
c			3, 82	3, 82	
Year3	54, 05	37, 84	8, 11	100, 00	
Increases in year 3 compared to year 2:			4, 29		

The second transition matrix highlights that in year 3 compared to year 2, the proportion of turnover from other activities increased by 4.29 percentage points, while the proportion of turnover generated from accommodation and public catering activities decreased by 2.05 and 2.24 percentage points, respectively.

*III * With the successive transition matrices known, in the next stage of calculations, the total transition matrix is determined by adding the elements from transition matrices (1) and (2).*

Total transition matrix

	a	b	c	Total
a	96, 65		2, 05	98, 70
b	12, 20	77, 92	2, 24	92, 36
c	1, 30		7, 64	8, 94
Total:	**110, 15**	**77, 92**	**11, 93**	**200, 00**

Since the diagonal of fidelity was disturbed, over the course of the three years analyzed, in contradicting directions of change in the turnover structure, as shown by transition matrices (1) and (2), in the total transition matrix, the diagonal of fidelity is no longer constituted by the smallest elements of the totals written on the row and column.

It is noted that the existence of the smallest values on the diagonal of fidelity in the total transition matrix is only possible in the case of a dynamic with a consistent direction of change in the relative structural sizes.

*IV * The matrix of transition probabilities is calculated by relating each element in the row to the total of the row (for increased projection precision, the results of the ratios will be recorded with at least five decimal places).*

$$\begin{Bmatrix} 0,97923 & 0,00000 & 0,02077 \\ 0,13209 & 0,84366 & 0,02425 \\ 0,14542 & 0,00000 & 0,85458 \end{Bmatrix}$$

*V * The projection of the turnover structure in year 4 for three types of activities is calculated by multiplying the transpose of the matrix of transition probabilities by the vector of relative structural sizes from the last year of the analyzed period (year 3).*

$$\begin{Bmatrix} 0,97923 & 0,13209 & 0,14542 \\ 0,00000 & 0,84366 & 0,00000 \\ 0,02077 & 0,02425 & 0,85458 \end{Bmatrix} \cdot \begin{Bmatrix} 54,05 \\ 37,84 \\ 8,11 \end{Bmatrix} = \begin{Bmatrix} 59,11 \\ 31,92 \\ 8,97 \end{Bmatrix}$$

The calculation of the projected structure vector was performed as follows:

(0,97923 x 54,05) + (0,13209 x 37,84) + (0,14542 x 8,11) = 59,11
(0,00000 x 54,05) + (0,84366 x 37,84) + (0,00000 x 8,11) = 31,92
(0,02077 x 54,05) + (0,02425 x 37,84) + (0,85458 x 8,11) = 8,97

Based on the obtained results, it is projected that in year 4, the turnover structure by activities will be as follows: 59.11% from accommodation, 31.92% from public catering, and 8.97% from other activities.

IN CONCLUSION: estimating the future structure of turnover by activities provides managers with the decision-making support for conducting general actions related to the procurement of necessary material resources, as well as for the modernization or development of technical facilities associated with activities whose share is predictably increasing.

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