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USING THE FACTORIAL CORRESPONDENCES FOR ANALYZING TOURIST FLOWS

Empirical study

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Abstract

This study aims to analyze the distribution of each flow of non-residents tourists, coming from 33 countries, on the six main categories of touristic destinations in Romania, in 2015, and assumes that there are differences or similarities between the tourists origin country and the touristic destinations that they chose.

The performances recorded in Romania regarding the attraction of foreign tourists were relatively modest during the past three decades, from various reasons, starting with a poor access infrastructure and finishing with a deficient and, sometimes inadequate activity of tourism promotion.

The statistical method used is the factorial correspondences analysis. The data processing, the indicators significance testing and the graph representations were performed using SPSS statistical software.

We consider that the usage of this method allows the indirect knowledge of the tourist preferences and the results may be useful in developing a strategy for tourism promotion, customized for each country that sends tourists.

INTRODUCTION

Statistics show that, however, in the recent years, the growth rates of foreign tourists arrivals in Romania and, in particular those concerning the number of their overnight stays, began to go up, exceeding the average levels recorded in the EU countries. Thus, in 2015, Romania registered the highest growth rate in the number of overnight stays in the establishments of touristic reception with functions of touristic accommodation of all the EU-28 member states (+ 15.9%), while the average growth in these countries was only 3.2% (an increase of 3.5% for non-resident tourists and 3.0% for residents tourists). [10,11]

Also, in 2015, Romania, compared to other EU member states, was the country with the highest growth in non-residents tourists overnight stays, recording an increase of 18.3%, followed by Slovakia (+ 12.8%). Regarding the number of overnight stays of the residents, the increase in 2015, in Romania, was of 15.3%.). [10,11]

However, Romania remains the EU country with the lowest percentage of overnight stays registered by resident tourists, on a par with Poland (both with a percentage of only 19%), except that, in absolute numbers, Poland recorded a far greater number of non-resident overnight stays, 13.7 million, compared to only 4.5 million overnight stays registered in Romania. (Eurostat, 2016)

We believe that, in order to maintain these high growth rates of the number of foreign tourists attracted and their overnight stays in Romania, it would be appropriate to develop the promotional touristic activity on the market of different countries of the world, taking into consideration the tourist’s preferences for certain categories of destinations. In this context, we consider that, regarding the changes in the promotional activity, it has to be taken into account, especially the orientation towards the countries where it was noticed a strong demand for Romania's touristic offer.

MEASUREMENT INDICATORS FOR THE INCOMING TOURISM IN ROMANIA

The data used in the current study comes from the monthly statistical survey of the National Institute of Statistics of Romania (INS) on the "Frequentation of touristic establishments with accomodation function" (TOURISM 1A) for arrivals and overnight stays in establishments of touristic reception with functions of touristic accommodation, in accordance with Regulation no.692 of the European Parliament and of the European Council from 6 July 2011, regarding european statistics on tourism and concerning the abrogation of the Council’s Directive 95/57 / EC. (Eurostat, 2016)

In order to ensure a a correct understanding of the indicators used in this study, we considered it appropriate to make some remarks regarding their content.

The "arrival" of a tourist in establishments of touristic reception with functions of touristic accommodation is registered when a person entered the register of the respective unit, more precisely the document named „*Form of announcing the arrival and departure of the tourist*”, in order to be accommodated for one or more nights. In each establishment of touristic reception with functions of touristic accommodation it is considered one arrival/per tourist, regardless of the number of overnight stays, that results from his continuous stay.

The "Arrival" represent the measurement unit for foreign visitors registered at the borders. The number of arrivals of visitors is different than the number of people entering in the country. Thus, the same foreign person can travel several times in one country, during a period of time, being registered each time as a new "arrival". The following categories of "travelers": immigrants and emigrants; diplomats, consular representatives and members of the armed forces, when travelling to/from the place where they have to accomplish their missions, in another country; refugees and nomads are excluded from the "arrivals" of international visitors. The country of origin of the international visitor is determined according to the nationality stated in the visitor's passport.

In the current study we used the indicator ”number of non-resident tourists accommodated in the establishments of touristic reception with functions of touristic accomodation”, this indicator being different than the „number of foreign visitors registered when entering in Romania”. The difference between the two indicators (the number of arrivals of foreign visitors and the number of non-residents accommodated tourists), is represented by the „one day” visitors, also called „excursionists”, who don’t need accommodation not even for a single night.

The data used in the analysis is taken from the website www.insse.ro, from the press release on tourism of INS, No. 26 of February 3, 2016 and represents the values of the registered indicators at national level, in 2015. [10,11]The statistical method used is the factorial correspondences analysis. The data processing and the graphical indicators significance testing were performed using SPSS statistical software.

RESEARCH METHODOLOGY

The Factorial Correspondences Analysis is a descriptive method of multi-diversified data analysis, that characterizes the links between two non-numeric variables (categorial). In our study, these two variables (categories) are: the oigin country and the touristic destination.

The method aims to describe the statistical links (the associations) between two non-numeric variables (categorial) and to highlight the similarities and the differences between the statistical units; the method also allows to identify the „responsible" variables for these approaches or oppositions between units, using a factorial axes system which, starting from a large data table, concentrates the initial information in a graphical form easy to read. (Everitt, B., Dunn, G., 2001)

FCA is applied in particular on the data presented in the form of contingency tables, which show the distribution of statistical units, according to the simultaneous variation of two categories of the same variable (in this case the distribution of "the number of non-residents tourists arriving in Romania", by their origin country and touristic destination).

Thus, the factorial correspondences analysis provides a description of the data contained in a contingency table, unraveling the latent structure (hidden) of data, by reducing the dimensionality and the geometric representation (visual) of the categories in a metric space. (Spircu, L., 2005)

The method involves the following steps:

• Calculating the categories profiles of the first variable (meaning the relative frequencies of the „origin country" category), process which shows the distribution of the other variable categories ("touristic destination") among the first variable categories. It has to be calculated, also, the mass of categories of the first variable and their marginal proportions, which indicates their percentage in the total of the observed units. The same process has to be done for the second variable;

• Calculating the distances between points, respectively the distances between the variables categories, represented in the same metric space;

• Looking for a multidimensional space that adjust best the points and the distances between them;

Each category of a variable (situated on the row or on the column) can be interpreted as a vector (or a point), in an area with so many dimensions as how many values has its profile (equal to the number of categories of the other variable), of whose coordinates are given by the values of its profile. For example, the "spas" category is represented by a vector with 33 values (corresponding to the 33 countries from which we have non-residents tourists accommodated in the establishments of touristic reception), thus forming their profile, which is a column profile."Germany" category is represented by a vector with 6 values (6 touristic destinations), thus forming its profile, which is a row profile. (Field, A. (2009)

The table of row profiles (Table 2), has as components, the partial relative frequencies ($f_{j/i}$), calculated as the ratio of the partial absolute frequencies (n_{ij}) and the marginal frequencies ($n_{i.}$), for each value of X variable (origin country). A row profile shows, for each x_i value (origin country), the percentage of statistical units on the y_j values of Y variable (touristic destination). Similarly, the components in the table of column profiles are defined as values ($f_{j/i}$), calculated as the ratio of the partial absolute frequencies (n_{ij}) and the marginal frequencies ($n_{i.}$), for each y_i value of Y variable (touristic destination). A column profile shows, for each y_i value, the percentage of statistical units on x_i values of X variable (origin country). Each row profile consists of a series of values $f_{j/i}$, where $f_{j/i} = \frac{n_{ij}}{n_{i.}}$ are relative for Y variable, depending on the X=x_i level.

A row profile can be represented as a x_{ij} point, in the Y variable space. x_{ij} points have a "mass" equal with the marginal frequency f_i, showing the proportions of statistical units, which records the x_i value of Y variable. The evaluation of the association between two row profiles (of two categories) is carried out by calculating the distance between the points they represent. To calculate the distance between two points, x_{ij} and $x_{i'j}$, the coordinates of x_{ij} points have to be transformed, in FCA, after the relation:

$$x'_{ij} = \frac{f_{j/i}}{\sqrt{f_{.j}}}$$

The distance between two categories is usually calculated, as achi-square distance, but, considering the transformation of coordinates, the distance χ^2 becomes an euclidean distance in R^p and is calculated as follows:

$$d^2\left(x'_{ij}, x'_{i'j}\right) = \sum_{j=1}^{p} \frac{1}{f_{.j}} \left(f_{j/i} - f_{j/i'}\right)^2$$

The gravity center of the row profiles cloud (Gi), which defines the average profile, is called centroid and is given by:

$G_i = \sum_i f_{i.} x'_{ij}$ (Pintilescu, C., 2007)

One of the objectives of the FCA method is to analyze the links between the two variables, in other words, of the associations between them. Two variables are considered independent if, for each value x_i, respectively y_j, the distribution of the statistical units by values of Y variable, respectively X variable, is performed in the same proportion.

Testing the hypothesis of independence or dependence between variables involves formulating the following statistical hypotheses: the null hypothesis, H_0, which admits that there is an independence between the considered variables (between the statistical variables there are no links) and the alternative hypothesis, H_1, which admits dependent variables (there are links between statistical variables). In order to test these hypotheses, χ^2 statistics is used. A calculated value of χ^2 statistics for an assumed risk and v = (m-1) (p-1) degrees of freedom, leads to a rejection of H_0 hypothesis. It can be considered, in this case, that there are links (associations) between X and Y variables. These associations are described by interpreting FCA results. (Baltagi, B. H. 2008)

The factorial correspondences analysis method involves the representation of a cloud of *n* Xi points in a vectorial space R^p, the points being the elements of the original data table. Each point has a mass, a n_i frequency. In the vectorial space R^p there are defined the distance between points, the total inertia (variance) of the cloud of points, the axes of inertia and are identified the responsible points for the formation of factorial axes. The distance between the row profiles, respectively the column profiles represents an approximation of χ^2 distance. Within the correspondences analysis, the concept of variance is defined depending on the distances χ^2 and is called inertia. The variance measures the dispersion of points around the average value. *The total inertia* measures the dispersion of the categories profile (row or column profiles) around the centroid. [7,8]

The graph representation of the row and column profiles is realized in an Euclidean space of reduced dimensions, providing a perceptual map, in which categories with similar distributions are placed in close positions, while categories with different distributions are placed in distant positions. This situation shows that the proximity between two row profiles (column profiles) indicates an association between them. The interpretation of this proximity has to be made with caution because a closeness of the points doesn’t always show significant linkages. Categories are represented as points in a reduced dimensional space, and the factorial axes are ordered (ranked) in descending order according to their contribution (their importance) in explaining the total variance of the obtained cloud of points. (Spircu, L., 2005)

DATA, RESULTS AND DISCUSSIONS

For the *factorial correspondences analysis*, on what is concerning the number of non-resident tourists accommodated in the establishments of touristic reception in Romania, in 2015, we are going to include, also, in the analysis, two non-numeric variables: the origin country and the touristic destination. Following the processing of the data, there were obtained the statistical indicators calculated fot the row points and the column points, as well as the graph representation of these points in the factorial axes system. (Field, A., 2009)

Table 1 presents the distribution of non-resident tourists arriving in Romania, by the main categories of touristic destinations and by their origin country, in 2015.

The values presented in Table 1 reveal the fact that most non-resident tourists come from Germany (266 934), Israel (219 307) and Italy (211 201), while thefewest come from in India, Australia and Slovenia.

The data presented in Table 2 indicates the distribution of non-resident tourists coming from a certain country, by touristic destinations. As we can see in the same table, at global level („mass” row), the majority of non-resident tourists chose as destination „Bucharest and the county residence towns”, respectively 1,549,791 arrivals (representing 76.1 % of the total number of arrivals), the other touristic destinations being situated very far in the tourists preferences. Thus: „other localities and touristic routes” were chosen by 11.9% of the foreign tourists; for the „mountain resorts” opted 7.9%, for „spas” – 2.1% , for the „seaside, excluding Constanta town”- 1.3% and for the „Danube Delta, including Tulcea” - 0.8%.

These values indicate the percentage of foreign tourists preferences from each analyzed country, for the destinations from Romania (row profile). For the main origin countries of non-resident tourists, the situation is as follows:

- Germany, the country which gave the highest number of tourists had the following structure: 76,3% of tourists had as touristic destinations „Bucharest and county residence towns”, 12,9% chose „other localities and touristic routes”, 6,3% - „mountain resorts”, 1% - „spas”, 1.8% - „seaside, excluding Constanta town” and 1,7% „Danube Delta, including Tulcea”;
- Israel, the second country in terms of number of non-resident tourists, has the following structure: 73,2% of tourists had as touristic destinations „Bucharest and county residence towns”, 3.8% chose „other localities and touristic routes”, 19,5% - „mountain resorts”, 2,8% - „spas”, 0,5% - „seaside, excluding Constanta town” and 0,2% „Danube Delta, including Tulcea”;
- Hungary presents the following structure: 49.2% of tourists had as touristic destinations „Bucharest and county residence towns”, 36.7% chose „other localities and touristic routes”, 4,6% - „mountain resorts”, 8,9% - „spas”, 0,4% - „seaside, excluding Constanta town” and 0,2% „Danube Delta, including Tulcea”;

- the Republic of Moldova presents the following structure: 47.7% of tourists had as touristic destinations „Bucharest and county residence towns", 10,4% chose „other localities and touristic routes", 16,9% - „mountain resorts", 22,4% - „spas", 2,3% - „seaside, excluding Constanta town" and 0,3% „Danube Delta, including Tulcea";

- Bulgaria, the country that joined the EU in the same year as Romania, presents the following structure: 69,6% of tourists had as touristic destinations „Bucharest and county residence towns", 7,3% chose „other localities and touristic routes", 21% - „mountain resorts", 0,6% - „spas", 0,7% - „seaside, excluding Constanta town" and 0,7% „Danube Delta, including Tulcea".

A statistical association between two countries (two row profiles) indicates a similar distribution (a similar structure) of the number of non-resident tourists, by the touristic destinations they chose. For example, the analysis of Table 2 data reveals the fact that Italy, France and the Netherlands are characterized by similar distributions, regarding the „number of non-resident tourists, by touristic destinations": 81% in „Bucharest and county residence towns", 10-12% in „other localities and touristic routes", 4-6% in „mountain resorts", 0,5-0,8% in „spas" and so on. The points representing these countries, which present a strong association, will be situated at a very small distance, one from another, in the factorial axes system. (Everitt, B., Dunn, G., 2001). When the distributions are different (the structures are not similar), the points (countries) will be situated far away from each other. As an example of countries from Table 1, which presents differencies regarding the distribution of tourists by touristic destination, it can be mentioned the one between the Russian Federation and the Republic of Moldova. The registered values are: 76,2% for the Russian Federation and 46,7% for the Republic of Moldova for the destinations „Bucharest and county residence towns", 6,1% and 10,4% for the destinations „other localities and touristic routes", 1,3% and 22,4% for „spas", and so on.

By grouping the analyzed countries, according to the similar distribution (similar structure) of the percentage of non-resident tourists, by touristic destinations, it is realized, in fact, a segmentation of the tourism market. This aspect allows us to identify the main segments of countries with similar structures and to choose or establish different strategies, but adequate to the structure of preferences of each targeted segment.

From the values presented in Table 3, which shows us the distribution of the „non-resident tourists number" by each origin country and by each main category of touristic destinations in Romania, it can be noticed that:

- If we analyze the total number of accommodated non-resident tourists, in other words, those who chose as touristic destination „Bucharest and county residence towns", we have the following structure: 13,1% are coming from Germany, 10,4% from Israel, 11,2% from Italy, 7% from France, 7% from U.S.A., 6,9% from U.K., 3,8% from Hungary, 4,4% from Spain and so on. These percentages reflect the structure of the touristic destination „Bucharest and county residence towns" (its specific profile), by the origin country of the foreign tourists arriving in Romania;
- For the next touristic destination – „mountain resorts": from the total number of non-resident tourists 10,3% are coming from Germany, 26,5% from Israel, 3,4% from Hungary, 7,3% from Bulgaria, 5,4% from the Republic of Moldova. The analysis may continue, in the same way, also for the other four touristic destinations.

These percentages, presented in Table 3, reflect the structure for each main category of touristic destinations in Romania, by the origin country of foreign tourists. The data from this table is useful for another segmentation of the tourism market. It should be mentioned that, this structure helps us, in our study, to define its specific profile, in other words, to appreciate the attraction exerted by each touristic destination on foreign tourists, depending their origin country.

A similar distribution (close structures) indicates a statistical association between two or more column profiles, respectively, touristic destinations. Taking into consideration, on one hand, the fact that the highest number of non-resident tourists (of 1.549.791, see Table 1) was recorded for the destination „Bucharest and county residence towns", which represents 76,1% from the total number of „arrivals", and, on the other hand, the large number of analyzed countries (33), it is quite difficult to identify similar distributions regarding touristic destinations, in order to make assesments concerning the intensity of the association between them.

In order to apply the factorial correspondences analysis, it is necessary to test the hypothesis of independency between the study's variables: the origin country and the touristic destination. Testing this hypothesis is based on the calculation of the χ^2 statistics value and requires the formulation of the following statistical hypotheses: the null hypothesis, H_0 – the hypothesis of independent variables (there are no links between the origin country and the touristic destination) and the alternative hypothesis, H1- hypothesis of dependent variables (links exist between the origin country and the touristic destination). (Baltagi, B. H. 2008).

The calculated value of the test statistics, presented in Table 4, the Chi Square column χ^2=364066.460 is higher than the value critical value $\chi^2_{0.05;160}$ (for a risk of 0,05 and v=160 degrees of freedom), which shows that the hypothesis H_0 is rejected. Thus, with a probability of 95%, it can be assured that, regarding the number of non-resident tourists accommodated in Romania, there are certain links between the considered variables, namely between: the origin country and the touristic destination.

The links between these variables will be described by the results achieved following the factorial correspondences analysis, for both row and column profiles.

On what is concerning the factorial analysis, the main objetive is finding the ax that indicates the biggest differences between the statistical units, in terms of the registered variables. The first factorial ax is the one for which it was obtained a maximum value of inertia (scattering) of the point cloud, explained by this ax. Basically, this ax gathers the units with the greatest scattering. Each factorial ax is ranked in the descending order of the individuals projections dispersions on these axes.[5,6]

Eigenvalues represent the variance explained by each factorial ax and the vectors associated with these values define the factorial axes. The highest eigenvalues (*Inertia* column) shows the variance of the first factorial ax, while the sum of eigenvalues measures the total inertia of the point cloud. For the output shown in Table 4, the highest eigenvalues (*Inertia* column) is 0.094.

The sum of eigenvalues is 0,179 (total variance). The Inertia (variance), explained by each factorial ax is presented in *Proportion of Inertia column.*The first ax explaines 52,5% of the total variance. The selection of the number of factorial axes is realized, in FCA, according to the Benzécri criterion: will be selected those axis that explaines at least 70% of the total variance. In our case, we are going to need two factorial axes, that explain, together, 82,8% of the total variance. (Benzecri, J. P., 1992)

For each category of variables (origin country and touristic destination) we will calculate the coordinates on the factorial axes and the contributions of the points to the axes inertia.

A. FCA results regarding the „origin country" variable (Overview Row Points output)

The coordinates of the points on the two factorial axes (*Score in Dimension column*) show the position of the points in the axes space.

The analysis of the points coordinates on the factorial axes of Table 5 highlights which are the origin countries of the non-resident tourists between which there are the biggest differences, regarding their choise for a touristic destination, namely: Hungary, the Republic of Moldova, Israel and Bulgaria. These points will be situated at the extremities of the graph.

The contribution of a point to the explained inertia of a factorial ax (*Contribution Of Point to Inertia of Dimension column*) shows us the category's contribution (the origin country) to the dispersion of the factorial ax. The points with a high contributions on a factorial ax (higher than 1/m=1/33=0,03) are those which contribute to the formation of this ax (*Contribution* column, from Table 5). They are called explicatve points of the formation of the ax, being the ones that exert the most important influence in defining the touristic destination's or the origin country's profile (structure). [5,6]

Thus, the first factorial ax is explained in a percentage of 48,4% by the Republic of Moldova and in a percentage of 36,7% by Hungary. FCA method allowed us to identify these two countries as being the most distinguishable among the 33 anayzed countries, regarding the touristic destination's structure.

At the same time, FCA allowed us, on one hand, to note that the two countries present similarities regarding the structure on touristic destinations, and on the other hand, to notice the fact that between them and the other analyzed countries there are important differences.

The first factorial ax is the one that explaines the most important differences between the statistical units. For the current study, we consider that the interpretation of the second factorial ax wouldn't bring significant information, aditionally, than those related within the first factorial ax analysis. (Spircu, L., Calciu, M., Spircu, T., 1994)

B. FCA results regarding the „touristic destination" variable (Overview Column Points output)

The analysis of the values of the points coordinates on the factorial axes, reveals which are the categories of touristic destinations between which there are the biggest differences.

From Table 6 it can be noticed that the biggest differences are registered regarding the number of arrivals between the „spas"(3,227) and the „Danube Delta" (-0,322), respectively „Bucharest and county residence towns" (-0,217).

The interpretation of these values leads us to conclude that tourists who come in „spas" are not attracted to visit nor the „Danube Delta, nor „Bucharest and county residence towns". There is a logical explanation of this fact, namely that tourists, having as motivation the desire to enjoy spa treatments, they need longer stays of 12 days or more, during which they can do daily therapy/treatment (possibly with breaks only on Sundays), which does not allow them to travel to other destinations, without affecting the smooth running of the treatment they receive.

Another interpretation of these values is that on the tourism market, each of the three segments of tourists, formed after their option for a certain touristic destination, may not be considered as a

„potential tourist", in order to create possible touristic packages offers, by combining these three categories of touristic destinations: „spas", the „Danube Delta" and „Bucharest and county residence towns".

Based on the results obtained and presented in Table 6 (*Score in Dimension 1* column: -0,217 for „Bucharest and county residence towns" and -0,322 for „Danube Delta, including Tulcea"), we may say that, similarities do exist between non-resident tourists who chose the two destinations mentioned above. However, this interpretation has its limits, taking into account the big difference between the number of tourists registered in this two analyzed categories (according to the values in Table 1: 1.549.791 tourists in „Bucharest and county residence towns", respectively 15.345 tourists in the „Danube Delta, including Tulcea").

Also, analyzing the results obtained and presented in Table 6, we can appreciate that, on one hand, the touristic destinations categories „other localities and touristic routes" and „mountain resorts" contribute to the formation of the second factorial ax (the second group regarding the scattering) with 45,1%, respectively with 51,9% (*Contribution of Point to Inertia of Dimension 2*) and on the other hand, between the two categories of destinations exists a corelation *(Score in Dimension 2* column: 0,614, respectively 0,354), meaning that many of them opt for one destination and choose the other one. After the interpretation of these results, we can say that, in developing and promoting of touristic packages/offers, it should be taken into consideration the fact that these two touristic destination categories can support mutually, so that if we address the segment of tourists that, for example, are attracted by the category „other localities and touristic routes", they can be also considered as potential tourists for the destination "mountain resorts" and the reciprocal is also, valid.

CONCLUSIONS

The graph representation (Figure no.1) of row and column profiles in the factorial axes system presents a synthetic image of the original data table (Table 1). The distance between the row profiles (the origin countries) and the column profiles (the touristic destinations), which represents an approximation of χ^2 distance, shows the differentiation or the proximity between points. Thus, the points distribution may indicate an association between them, or, contrary, an obvious differentiation. The interpretation of this association has to be done with great caution, due to the fact that an association of these points, does not always show significant links between the row and column profiles. The only situation in which this association can be interpreted, without any reserves, is for two profiles that have their categories situated at the extremities of the graph. (Pintilescu, C., 2007)

Thus, from the graph representantion, regarding the associations, it can be noticed that „non-resident tourists arriving in Romania" from the Republic of Moldova are much more oriented towards „spas", those from Israel towards „mountain resorts", those from Hungary towards „other localities and touristic routes" and those from Bulgaria towards „Bucharest and county residence towns, excluding Tulcea" and „mountain resorts".

The preferences of tourists from the Republic of Moldova for „spas" in Romania can be explained due to the absence of similar offers (for spas) in their country, compared to the numerous and diverse offers of spas in Romania. Tourists from Israel prefer the mountain resorts of Romania, where they come mainly for winter sports and summer hiking. To be remembered that many of them are Romanian speakers, being born in Romania and gone a few decades ago, or they are descendants of the first category mentioned above.

Hungarian tourists are opting for the destination "other localities and touristic routes", especially in counties located in Transylvania, where ethnic Hungarians are concentrated. The situation is different regarding Bulgarian tourists orientation, who, although they have in their country a touristic offer comparable with the one in Romania (seaside, mountain, etc.), they are attracted, however, not only by the destination „Bucharest and county residence towns, excluding Tulcea", but also, somehow surprisingly, by the „mountain resorts" in Romania.

On what is concerning the differences, it can be noticed that the biggest distance between the points represented by the column profiles (touristic destinations) is being registered between „spas" and the „Danube Delta", while the biggest distance between row profiles (origin countries) is being registered between the tourists coming from the Republic of Moldova and Greece.

We consider that using FCA method gave us the possibility to draw up the following observations:

- we can tell, with a probability of 95%, that, regarding the number of non-resident tourists accommodated in Romania, there are links between the considered variables, namely between: the origin country and the chosen touristic destination;
- we were able to identify the origin countries of non-resident tourists, between which there are the biggest differences, regarding the destinations they have opted for;
- we have identified, by analyzing the values of the points coordinates on the factorial axes, the categories of touristic destinations between which exist the biggest differences;

- we have highlighted that, among the 33 analyzed countries, some of them present similarities regarding the distribution of non-resident tourists, by touristic destinations. Also, it has been observed that between these countries and the other ones, there are important differences concerning the structure on touristic destinations categories;

- we observed that, by grouping countries with similar distribution (similar structure) of the percentage of non-resident tourists, by touristic destinations, in fact, it was realized a segmentation of the tourism market. This aspect allowed us to identify the main country segments with similar structures, so that it could be developed similar or identical strategies for promoting each segment;

- we have identified segments of tourists, depending on their option for a certain touristic destination, who can be seen as potential tourists for other categories of touristic destinations. Also, as a consequence of this segmentation of the tourism market, it has been observed that certain categories of touristic destinations support each other, while others exclude each other.

We believe that approaching the flow of foreign tourists (quantitative), by the origin country, but also according to their orientation towards the main categories of tourist destinations, can be a starting point to get to know better the particularities of the touristic demand from the main countries that sends tourists to Romania. In the same time, we believe that this approach may be useful for the proper structuring of touristic offer, as well as for the promotion activity on the market of each country, depending on the preferences or attraction of tourists towards the main categories of Romanian touristic destinations.

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Table 1. Correspondence table of non-resident tourists arriving in Romania, by the main categories of touristic destinations and by their origin country, in 2015

Correspondence table

Origin country	Touristic destinations						
	Bucharest and county residence towns, excluding Tulcea	Other localities and touristic routes	Mountain resorts	Spas	Seaside, excluding Constanta town	Danube Delta, including Tulcea	Active Margin
Germany	203601	34454	16712	2781	4892	4494	266934
Israel	160590	8232	42831	6116	1169	369	219307
Italy	172923	26162	8715	1135	1184	1082	211201
France	109073	13624	7023	717	2430	1601	134468
U.S.A	108091	12975	5593	636	2749	157	130201
United Kingdom	107033	8940	7213	583	1309	511	125589
Hungary	59122	44152	5566	10744	425	230	120239
Spain	67945	13732	8833	353	403	685	91951
Poland	59877	15693	11023	1464	2003	1576	91636
Austria	44507	7091	2733	618	559	601	56109
Bulgaria	38959	4107	11775	329	413	371	55954
Netherlands	43791	5696	3341	452	703	197	54180
Republic of Moldova	24587	5346	8733	11562	1170	155	51553
Turkey	44137	4940	1143	115	671	90	51096
Greece	38772	1754	1181	175	288	205	42375
Belgium	26745	3683	2837	317	842	244	34668
Ukraine	18569	4366	1588	627	746	62	25958
Switzerland	20351	2238	1421	178	366	363	24917
Czech Republic	19517	2717	1436	562	340	99	24671
Russian Federation	18588	1488	3044	307	944	13	24384
Japan	17223	1752	1992	44	55	122	21188
China	17512	1420	902	510	366	179	20889
Canada	16530	2341	984	226	416	81	20578
Sweden	16912	1865	661	199	308	110	20055
Serbia	15539	1931	578	447	44	12	18551
Slovakia	13069	2592	690	409	89	77	16926
Norway	11243	1652	336	89	282	1084	14686
Portugal	10285	1362	540	38	52	365	12642
Denmark	9036	2350	435	81	183	100	12185
Ireland	9364	1114	588	67	189	36	11358
India	9829	447	146	3	59	14	10498
Australia	8619	860	446	104	96	41	10166
Slovenia	7852	1470	486	96	102	19	10025
Active Margin	1549791	242546	161525	42084	25847	15345	2037138

Source: Elaborated using SPSS programme.

Table 2. Table of row profiles regarding tourists destinations, by their origin country (Row Profiles output)

Row profiles

Origin country	Touristic destinations						
	Bucharest and county residence towns, excluding Tulcea	Other localities and touristic routes	Mountain resorts	Spas	Seaside, excluding Constanta town	Danube Delta, including Tulcea	Active Margin
Germany	.763	.129	.063	.010	.018	.017	1.000
Israel	.732	.038	.195	.028	.005	.002	1.000
Italy	.819	.124	.041	.005	.006	.005	1.000
France	.811	.101	.052	.005	.018	.012	1.000
U.S.A	.830	.100	.043	.005	.021	.001	1.000
United Kingdom	.852	.071	.057	.005	.010	.004	1.000
Hungary	.492	.367	.046	.089	.004	.002	1.000
Spain	.739	.149	.096	.004	.004	.007	1.000
Poland	.653	.171	.120	.016	.022	.017	1.000
Austria	.793	.126	.049	.011	.010	.011	1.000
Bulgaria	.696	.073	.210	.006	.007	.007	1.000
Netherlands	.808	.105	.062	.008	.013	.004	1.000
Republic of Moldova	.477	.104	.169	.224	.023	.003	1.000
Turkey	.864	.097	.022	.002	.013	.002	1.000
Greece	.915	.041	.028	.004	.007	.005	1.000
Belgium	.771	.106	.082	.009	.024	.007	1.000
Ukraine	.715	.168	.061	.024	.029	.002	1.000
Switserland	.817	.090	.057	.007	.015	.015	1.000
Czech Republic	.791	.110	.058	.023	.014	.004	1.000
Russian Federation	.762	.061	.125	.013	.039	.001	1.000
Japan	.813	.083	.094	.002	.003	.006	1.000
China	.838	.068	.043	.024	.018	.009	1.000
Canada	.803	.114	.048	.011	.020	.004	1.000
Sweden	.843	.093	.033	.010	.015	.005	1.000
Serbia	.838	.104	.031	.024	.002	.001	1.000
Slovakia	.772	.153	.041	.024	.005	.005	1.000
Norway	.766	.112	.023	.006	.019	.074	1.000
Portugal	.814	.108	.043	.003	.004	.029	1.000
Denmark	.742	.193	.036	.007	.015	.008	1.000
Ireland	.824	.098	.052	.006	.017	.003	1.000
India	.936	.043	.014	.000	.006	.001	1.000
Australia	.848	.085	.044	.010	.009	.004	1.000
Slovenia	.783	.147	.048	.010	.010	.002	1.000
Mass	.761	.119	.079	.021	.013	.008	

Source: Elaborated using SPSS programme.

Table 3. Table of column profiles regarding tourists destinations, by their origin country (Column Profiles output)

Column Profiles

Origin country	Touristic destinations						
	Bucharest and county residence towns, excluding Tulcea	Other localities and touristic routes	Mountain resorts	Spas	Seaside, excluding Constanta town	Danube Delta, including Tulcea	Mass
Germany	.131	.142	.103	.066	.189	.293	.131
Israel	.104	.034	.265	.145	.045	.024	.108
Italy	.112	.108	.054	.027	.046	.071	.104
France	.070	.056	.043	.017	.094	.104	.066
U.S.A	.070	.053	.035	.015	.106	.010	.064
United Kingdom	.069	.037	.045	.014	.051	.033	.062
Hungary	.038	.182	.034	.255	.016	.015	.059
Spain	.044	.057	.055	.008	.016	.045	.045
Poland	.039	.065	.068	.035	.077	.103	.045
Austria	.029	.029	.017	.015	.022	.039	.028
Bulgaria	.025	.017	.073	.008	.016	.024	.027
Netherlands	.028	.023	.021	.011	.027	.013	.027
Republic of Moldova	.016	.022	.054	.275	.045	.010	.025
Turkey	.028	.020	.007	.003	.026	.006	.025
Greece	.025	.007	.007	.004	.011	.013	.021
Belgium	.017	.015	.018	.008	.033	.016	.017
Ukraine	.012	.018	.010	.015	.029	.004	.013
Switserland	.013	.009	.009	.004	.014	.024	.012
Czech Republic	.013	.011	.009	.013	.013	.006	.012
Russian Federation	.012	.006	.019	.007	.037	.001	.012
Japan	.011	.007	.012	.001	.002	.008	.010
China	.011	.006	.006	.012	.014	.012	.010
Canada	.011	.010	.006	.005	.016	.005	.010
Sweden	.011	.008	.004	.005	.012	.007	.010
Serbia	.010	.008	.004	.011	.002	.001	.009
Slovakia	.008	.011	.004	.010	.003	.005	.008
Norway	.007	.007	.002	.002	.011	.071	.007
Portugal	.007	.006	.003	.001	.002	.024	.006
Denmark	.006	.010	.003	.002	.007	.007	.006
Ireland	.006	.005	.004	.002	.007	.002	.006
India	.006	.002	.001	.000	.002	.001	.005
Australia	.006	.004	.003	.002	.004	.003	.005
Slovenia	.005	.006	.003	.002	.004	.001	.005
Mass	1.000	1.000	1.000	1.000	1.000	1.000	

Source: Elaborated using SPSS programme.

Table 4. The calculated value of χ^2 statistics, eigenvalues and its inertia, explained by each factorial ax (Summary output)

Summary

Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value	
					Accounted for	Cumulative	Standard Deviation	Correlation 2
1	.306	.094			.525	.525	.001	.090
2	.233	.054			.303	.828	.001	
3	.135	.018			.102	.930		
4	.095	.009			.051	.981		
5	.058	.003			.019	1.000		
Total		.179	364066.460	.000[a]	1.000	1.000		

a. 160 degrees of freedom

Source: Elaborated using SPSS programme.

Table 5. FCA results regarding the „origin country of the foreign tourists arriving in Romania" variable

Overview Row Points[a]

Origin country	Mass	Score in Dimension		Inertia	Contribution				
					Of Point to Inertia of Dimension		Of Dimension to Inertia of Point		
		1	2		1	2	1	2	Total
Germany	.131	-.119	-.169	.003	.006	.016	.185	.283	.469
Israel	.108	.074	.970	.026	.002	.436	.007	.921	.928
Italy	.104	-.233	-.248	.004	.018	.027	.427	.368	.795
France	.066	-.269	-.112	.002	.016	.004	.707	.093	.800
U.S.A	.064	-.291	-.135	.003	.018	.005	.527	.087	.614
United Kingdom	.062	-.351	.052	.003	.025	.001	.743	.012	.755
Hungary	.059	1.380	-1.024	.051	.367	.266	.674	.282	.956
Spain	.045	-.080	-.071	.001	.001	.001	.064	.038	.101
Poland	.045	.167	-.026	.004	.004	.000	.108	.002	.110
Austria	.028	-.148	-.218	.001	.002	.006	.336	.549	.884
Bulgaria	.027	-.048	.847	.007	.000	.085	.003	.660	.662
Netherlands	.027	-.208	-.056	.000	.004	.000	.738	.040	.778
Republic of Moldova	.025	2.422	.988	.056	.484	.106	.807	.102	.909
Turkey	.025	-.371	-.238	.002	.011	.006	.529	.165	.694
Greece	.021	-.494	.015	.003	.017	.000	.567	.000	.567
Belgium	.017	-.153	.040	.000	.001	.000	.382	.020	.403
Ukraine	.013	.150	-.280	.001	.001	.004	.133	.354	.487
Switserland	.012	-.274	-.041	.000	.003	.000	.691	.012	.702
Czech Republic	.012	-.038	-.063	.000	.000	.000	.046	.099	.146
Russian Federation	.012	-.146	.469	.001	.001	.011	.055	.436	.492
Japan	.010	-.285	.190	.000	.003	.002	.585	.196	.781
China	.010	-.161	.024	.001	.001	.000	.163	.003	.165
Canada	.010	-.176	-.159	.000	.001	.001	.369	.228	.597
Sweden	.010	-.275	-.157	.000	.002	.001	.480	.119	.599
Serbia	.009	-.095	-.171	.000	.000	.001	.051	.126	.177
Slovakia	.008	.057	-.328	.000	.000	.004	.028	.719	.747
Norway	.007	-.306	-.427	.005	.002	.006	.045	.067	.112
Portugal	.006	-.309	-.224	.001	.002	.001	.285	.113	.399
Denmark	.006	-.038	-.562	.000	.000	.008	.005	.917	.923
Ireland	.006	-.270	-.084	.000	.001	.000	.681	.050	.730
India	.005	-.560	-.065	.001	.005	.000	.556	.006	.562
Australia	.005	-.277	-.062	.000	.001	.000	.542	.020	.562
Slovenia	.005	-.107	-.288	.000	.000	.002	.118	.650	.767
Total	1.000			.179	1.000	1.000			

a. Symmetrical normalization

Source: Elaborated using SPSS programme.

Table 6. FCA results regarding the „touristic destination of the foreign tourists arriving in Romania" variable

Overview Column Points[a]

Touristic destinations	Mass	Score in Dimension		Inertia	Contribution				
					Of Point to Inertia of Dimension		Of Dimension to Inertia of Point		
		1	2		1	2	1	2	Total
Bucharest and county residence towns, excluding Tulcea	.761	-.217	.009	.013	.117	.000	.850	.001	.851
Other localities and touristic routes	.119	.614	-.939	.043	.146	.451	.318	.566	.884
Mountain resorts	.079	.354	1.234	.038	.033	.519	.081	.743	.824
Spas	.021	3.227	.515	.072	.702	.024	.920	.018	.938
Seaside, excluding Constanta town	.013	-.042	-.013	.004	.000	.000	.002	.000	.002
Danube Delta, including Tulcea	.008	-.322	-.427	.009	.003	.006	.027	.037	.064
Total active	1.000			.179	1.000	1.000			

a. Symmetrical normalization

Source: Elaborated using SPSS programme.

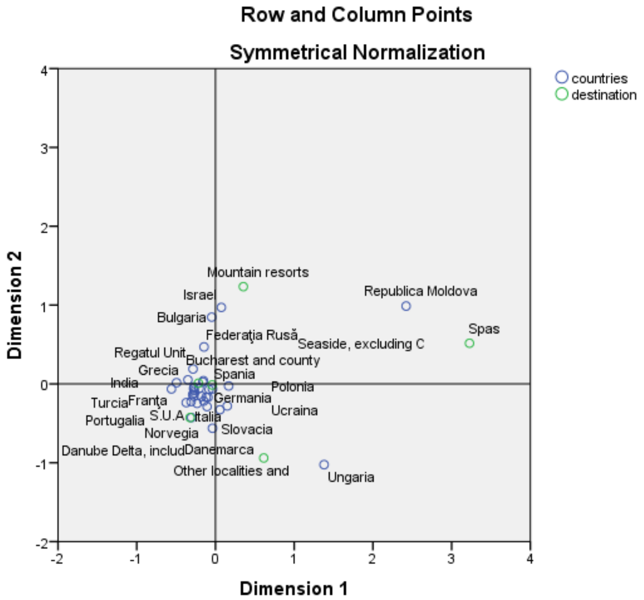

Figure 1. Row and columns profiles in the factorial axes system