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Transport Accessibility as a Factor for Tourism Flow Augmentation. Case Study: The Romanian Health Resorts

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ABSTRACT

Romanian health tourism represents a major chance of economic increase because it has all the necessary premises for development and for registering some of the most efficient revenues. Therefore, by using a complex methodology, we first aimed to reveal the current situation of each of the Romanian health resorts in terms of transport accessibility. Each type of transport communication system (road, railway and aerial) was analyzed by taking into account the connections to the European and national roads, primary and secondary railways, airports, aiming to pinpoint to what extent the level of accessibility of a resort influences the tourist flow. The second goal was to reveal if transport accessibility could condition the tourist flow towards the Romanian health resorts, by operating several correlations between accessibility situation and tourist arrivals, overnights, tourist traffic density, and the net use index of accommodation capacity of each Romanian health resort. The results highlighted that health resorts situated in the Carpathian area presented the lowest level of transport accessibility. However, the influence on the tourist flow of Romanian health resorts proved very low, since the development of these resorts depended entirely on the health factors provided by the area and the historical circumstances, since the specific nature of health tourism requires a more secluded placement. The exceptions enumerate the resorts situated on the seaside of the Black Sea, Prahova Valley, Transylvania and Crişana areas.

1. INTRODUCTION

The main purpose of this paper is to investigate if transport accessibility has any influences on the tourist flow of Romanian health resorts. In order to achieve this result, using several indicators (road quality, distance from a European road, railway station, the annual number of passengers and the destinations served by an airport) we revealed the transport accessibility of each health resort taken under study. The next step was represented by performing several correlations between the values resulted from transport accessibility and indicators concerning the tourist flow, such as arrivals, overnights, tourist traffic density and the net use index of accommodation capacity. A similar study published in 2014, approached the influence of transport accessibility on accommodation structures of each Romanian resort [1]. Like the actual one, we outlined a method for revealing the level of transport accessibility by road, rail and air, then several correlations were made between the values resulted from level of accessibility and indicators regarding tourist accommodation structures (total number of accommodation units, total number of accommodation places, three and four star units, total number of hotels). The results showed that transport infrastructure has insignificant influence over accommodation base of a resort.

Regarding the actual situation of natural potential of Romania, namely the local bioclimate and mineral water springs diversity, landscape attraction, favorable placement of health resorts, the motivations

and preferences of patients as tourists and the actual lifestyle, health tourism holds the major chance of development [1].

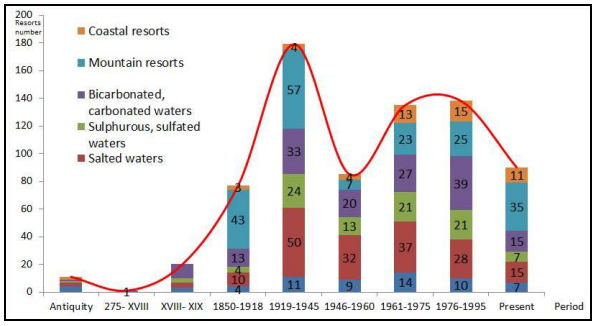

Fig. 1. Numerical evolution of Romanian health resorts, taking into account the therapeutic factor type [1].

Observing the history of Romanian health tourism, there can be noticed that Romans planned very well the tourism development, 11 health resorts appearing in their period. The affirmation is reinforced by the disappearance of these resorts, after Aurelian withdrawal, until 18th century, Băile Felix being the single exception [2]. The largest number of health resorts was developed in the interwar period (179), then after 1960 (138), when Romania met the last significant economic development [3], [4].

Nowadays, according to the Government Decision no. 852/2008, with the latest update, Romania has 41 national and 49 local resorts, the latest additions being Petroşani-Parâng, Târgu Neamţ, Piatra-Neamţ, Râşnov among national resorts and Vişeu, Baia Sprie within the category of local ones [5].

Analysing the territorial distribution of the Romanian health resorts, we can note a concentration along the Carpathian Mountains (48), in Transylvanian Plateau (7), Western Plain (8), Getic Sub-Carpathians (8), Moldavia Sub-Carpathians (5), the north-west part of the Romanian Plain (4) and the Black Sea (10) [1].

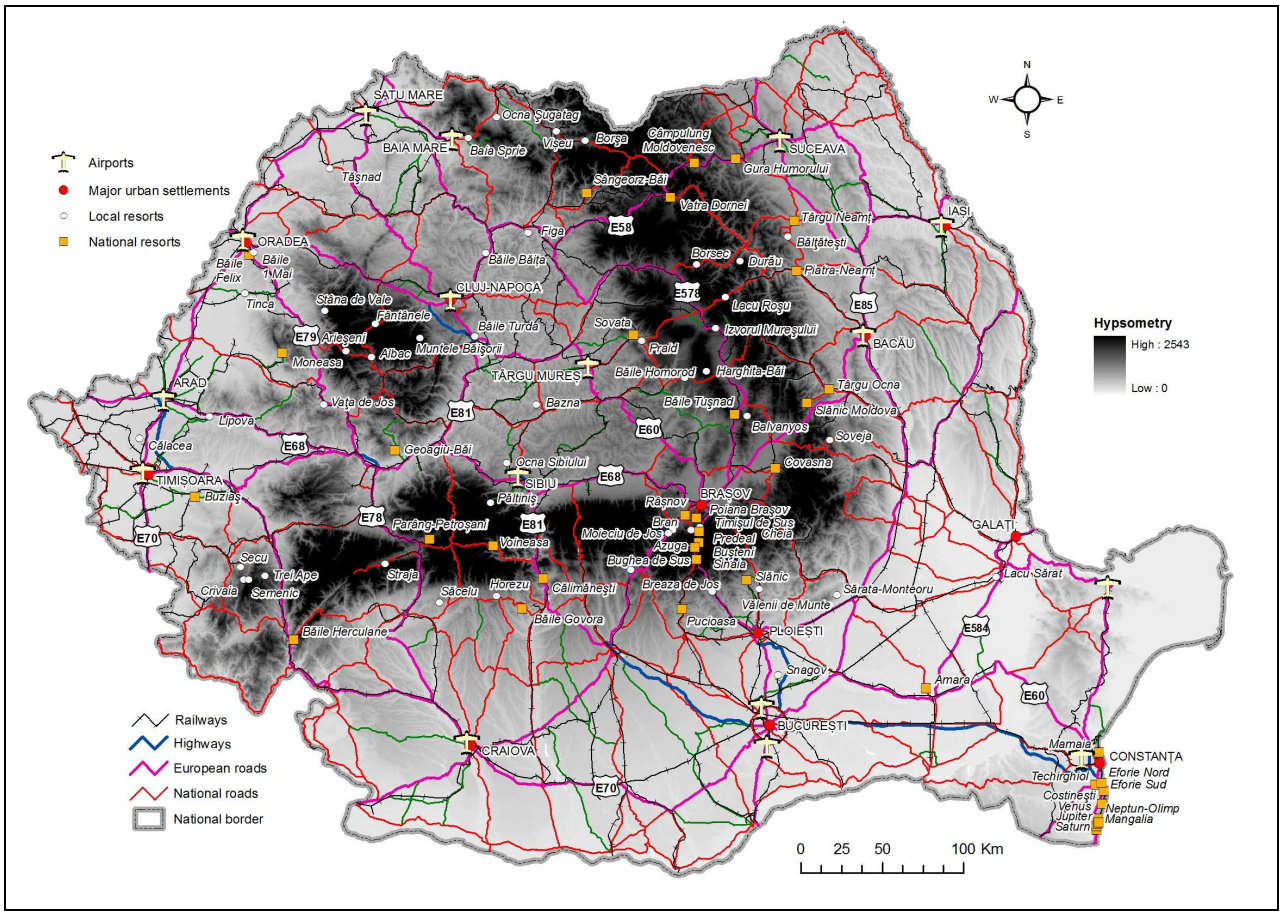

Fig. 2. Territorial distribution of Romanian health resorts.

A common problem of the Romanian health resorts is that most of this kind of settlements from Carpathian Mountains are climateric, fully based on therapeutic valences of the local bioclimate, where pacient-tourists have the chance to practice aerotherapy, heliotherapy and terrain cure, but the health resorts which also benefit from therapeutic values of mineral and thermal water springs (Băile Felix, Băile 1 Mai, Geoagiu Băi, Băile Herculane) therapeutic lakes (Lacul Sărat, Lacul Amara), mofettas (Slănic Moldova), saline microclimate (Praid, Târgu Ocna), are not focused on climatic part, therefore it cannot be shaped the best efficient and diverse curative offer for patient-tourists [1].

Table 1. Administrative situation, major transport infrastructure, population, tourist arrivals and tourist overnights of each resort from Romania [6].

No.	Resort name	Freestanding or Urban/rural settlement belonging	Crossing street level	Population	Tourist arrivals (2004-2013)	Tourist overnights (2014-2013)
1.	Albac	Rural	National	2,089	616.6	1,745.6
2.	Albeştii de Muscel	Rural	County	1,578	201.0	330.0
3.	Amara	Urban	National	7,345	20,355.0	220,143.2
4.	Arieşeni	Rural	National	1,565	5,253.0	13,889.3
5.	Azuga	Urban	European	5,213	7,670.9	17,909.1
6.	Balvanyos	Freestanding	National	-	4,688.6	9,494.1
7.	Bazna	Rural	County	3,911	9,381.7	31,083.8
8.	Băile 1 Mai	Rural	European	9,572	118,992.2	847,549.7
9.	Băile Băiţa	Urban	European	20,982	2,853.4	4,905.0
10.	Băile Felix	Rural	European	9,572	118,992.2	847,549.7
11.	Băile Figa	Freestanding	County	-	1,037.7	3,710.6
12.	Băile Govora	Urban	County	2,449	15,057.2	148,556.3
13.	Băile Herculane	Urban	National	5,008	60,929.9	534,664.9
14.	Băile Homorod	Rural	National	73	3,869.3	10,312.2
15.	Băile Olăneşti	Urban	National	4,186	40,163.7	365,470.8
16.	Băile Turda	Urban	European	47,744	10,532.5	34,885.4
17.	Băile Tuşnad	Urban	European	1,641	17,315.8	112,282.0
18.	Bălţăteşti	Rural	National	4,182	6,782.9	81,201.8
19.	Borsec	Urban	National	2,585	1,210.7	2,865.5
20.	Borşa	Urban	National	27,611	6,654.7	12,457.8
21.	Bran	Rural	European	5,181	37,772.0	80,365.2
22.	Breaza	Urban	European	15,928	6,270.8	13,314.2
23.	Buşteni	Urban	European	8,894	49,219.3	141,157.5
24.	Buziaş	Urban	County	7,023	13,235.9	130,575.1
25.	Câmpulung Moldovenesc	Urban	European	16,722	16,658.9	27,938.3
26.	Cap Aurora	Freestanding	European	-	252,517.9	1,520,765.0
27.	Călacea	Rural	County	674	1,892.4	13,121.2
28.	Călimăneşti-Căciulata	Urban	European	7,622	78,606.9	464,115.4
29.	Cheia	Rural	National	362	19,347.1	26,612.3
30.	Costineşti	Rural	European	2,866	22,447.4	98,328.0
31.	Covasna	Urban	National	10,114	34,622.7	396,375.1
32.	Crivaia	Freestanding	County	-	6,008.6	12,385.4
33.	Durău	Freestanding	County	-	19,307.4	30,941.8
34.	Eforie Nord	Urban	European	9,473	123,342.7	621,934.0
35.	Eforie Sud	Urban	European	9,473	123,342.7	621,934.0
36.	Geoagiu Băi	Freestanding	County	-	22,812.0	129,064.6
37.	Gura Humorului	Urban	European	13,667	24,396.0	43,156.2
38.	Harghita Băi	Freestanding	County	-	32,271.9	63,973.5
39.	Horezu	Urban	National	6,263	2,274.6	3,035.0
40.	Izvorul Mureşului	Rural	European	801	3,834.8	13,486.7
41.	Jupiter	Freestanding	European	-	252,517.9	1,520,765.0
42.	Lacu Roşu	Freestanding	National		10,855.5	20,853.3
43.	Lacu Sărat	Rural	European	1,179	56,060.0	232,846.1
44.	Lipova	Urban	County	10,313	1,453.1	2,471.3
45.	Mamaia	Freestanding	European	-	-	-
46.	Mangalia	Urban	European	36,364	252,517.9	1,520,765.0
47.	Moieciu	Rural	European	4,892	28,484.0	64,948.6
48.	Moneasa	Rural	County	864	32,584.6	106,305.7
49.	Neptun-Olimp	Freestanding	European	-	252,517.9	1,520,765.0
50.	Ocna Sibiului	Urban	County	3,562	6,880.5	18,183.8
51.	Ocna Şugatag	Rural	County	3,853	5,318.7	33,754.1
52.	Pârâul Rece	Rural	County	560	146,145.1	314,073.3
53.	Păltiniş	Freestanding	County	-	-	513.5
54.	Poiana Braşov	Freestanding	National	-	-	601,088.6
55.	Praid	Rural	National	6,502	3,370.3	9,943.1
56.	Predeal	Urban	National	4,755	146,145.1	314,073.3
57.	Pucioasa	Urban	National	14,254	12,793.2	117,885.7
58.	Sângeorz-Băi	Urban	National	9,679	9,232.1	113,448.5
59.	Saturn	Freestanding	European	-	-	1,520,765.0
60.	Săcelu	Rural	County	1,542	1,862.1	15,582.3
61.	Sărata Monteoru	Rural	County	863	11,819.7	67,997.6
62.	Secu	Freestanding	-	-	6,008.6	12,485.4
63.	Semenic	Freestanding	-	-	-	-

64.	Sinaia	Urban	European	10,411	188,141.5	451,245.5
65.	Slănic	Urban	County	6,034	6,774.8	67,073.7
66.	Slănic Moldova	Urban	National	4,198	28,960.9	116,987.6
67.	Snagov	Rural	National	7,272	2,733.4	3,953.9
68.	Sovata	Urban	National	10,385	73,926.4	294,969.7
69.	Soveja	Rural	National	2,159	810.7	3,476.1
70.	Stâna de Vale	Freestanding	County	-	4,968.3	11,240.2
71.	Straja	Freestanding	County	-	2,890.6	5,428.8
72.	Târgu Ocna	Urban	National	11,300	6,597.5	54,793.5
73.	Târșnad	Urban	National	8,631	6,455.6	10,451.6
74.	Techirghiol	Urban	European	7,292	9,202.0	104,704.6
75.	Timișu de Sus	Freestanding	European	-	146,145.1	314,073.3
76.	Tinca	Rural	County	7,793	1,279.5	20,794.4
77.	Trei Ape	Freestanding	County	-	3,680.8	10,897.4
78.	Vatra Dornei	Urban	European	14,429	42,757.1	204,187.3
79.	Vața de Jos	Rural	County	3,728	345.6	-
80.	Vălenii de Munte	Urban	National	12,257	3,402.5	7,409.9
81.	Venus	Freestanding	European	-	252,517.9	1,520,765.0
82.	Voineasa	Rural	National	1,455	12,584.0	54,755.1
83.	Fântânele Zone	Freestanging	National	-	6,729.8	11,860.4
84.	Muntele Băișorii Zone	Rural	County	1,940	6,364.0	14,337.6
85.	Râșnov	Urban	National	15,022	6,942.5	15,352.1
86.	Petroșani-Parâng	Urban	National	37,160	9,810.7	19,160.8
87.	Piatra Neamț	Urban	National	85,055	45,902.0	73,385.3
88.	Târgu Neamț	Urban	National	18,695	7,718.2	11,007.7
89.	Vișeu	Rural	National	15,037	3,853.8	6,377.1
90.	Baia Sprie	Urban	National	15,476	4,275.6	8,571.5

The first table reveals several indicators regarding the level of accessibility and tourist flow setting. Therefore, concerning the administrative situation, Romania has 28 resorts that belong to rural centers, 40 resorts that belong to urban centers and 22 that are independent. We used this indicator considering that tourist traffic density takes into account the local population of settlement, and in case of urban units, the accessibility is, most often, high.

Regarding the transport infrastructure, 25 of the Romanian resorts are crossed by county roads, 34 of them by national roads and the multidirectional penetrability of 29 resorts is provided by the European roads. It can be easily observed that the situation is balanced; most of the resorts that are crossed by county roads are located in mountain areas, and many of those that are traversed by European thoroughfare are situated in West Plane of Romania, Prahova and Olt Valleys.

In order to estimate the tourist traffic density, it was necessary to highlight the population of each settlement to which the resort belongs. Hence, Piatra-Neamț has the largest number of inhabitants, followed by Turda, Petroșani, Mangalia. The opposite values we found in Călacea, Pârâul Rece, Cheia, and Băile Homorod. It is obvious that those resorts administratively included in the territory of large localities, can provide tourist services for a larger group of tourists.

For a complete analysis of tourist flow, it is recommended to highlight the tourist arrivals and overnights. Thus, for each indicator we took into account the period between 2004 and 2013, then, through the operation of arithmetic mean, we calculated the average value. The resorts that registered large tourist arrivals are Băile Felix and Băile 1 Mai, Predeal, Eforie Nord and Eforie Sud, Mangalia, Costinești, Poiana Brașov, on the opposite end being finding resorts such as Albeștii de Muscel, Arieșeni, Soveja, Lipova and Vața de Jos.

Tourists who spent more nights, chose resorts such as: Vatra Dornei, Sovata, Poiana Brașov, Geoagiu Băi, Covasna, which are acknowledged for winter sports and for mineral and thermal water treatment. The less number of overnights was registered in Horezu, Albeștii de Muscel, Praid, Baia Sprie, Vișeu, Straja, Soveja, mainly because the tourist offer is not diversified and does not present same quality level as compared to the first mentioned.

The socio-economic development of each urban or rural settlement depends on the quality and quantity of transport network, because it dictates the direction and the quantity of material, informational and energy flows, following to be coagulated by every locality function [7].

There are plenty of scientific works that approach general aspects of transport infrastructure. For explaining the actual situation of this type of network and local, zonal, regional, national [8], [9], economic divergence [11], several authors insists on the development of roads, railway and airports, investments and their systematic nature [10].

An eloquent scientific paper, which reveals the importance of transports in the socio-economic development of territory, is *The theory and method of design and optimization for railway intelligent transportation systems (RITS) (2001),* where Wang Zhuo and Jia Li-min present the latest railway network that appeared in Japan, then in China, which utilizes synergistic technologies and system concepts for

achieving high security and efficiency, high safety and high-quality service, with the help of information technologies [12].

Once with the development of transport network, congestion, security and safety problems also appeared. This aspect was analysed in 2015 by Kjell Hausken and Jun Zhuang, the attention being centered on motorways and urban networks. The authors created a distributed model predictive control (DMPC) which seemed to be a feasible alternative for traffic control [13].

Besides these changes, the spread of transport corridors made researchers also focus on the environmental impact (Barrass, Madhavan, 1996), or on the environmental asessment (Farrington, Ryder, 1993). On the effects of transportation networks we mention the works of Quintana et al. (2010) who emphasized on the provision of information, authorities and local community collaboration and Groote et al. (1999), who underlined the economic issues implied by the extension of transportation networks.

2. THEORY AND METHODOLOGY

For reaching efficiency in tourism we need a qualitative transport infrastructure, especially nowadays when tourists travel long distances to destinations, because this represents the link between tourists and journey place. Unfortunately, this relationship is treated in few studies, because it is poorly understood and the attention of researchers doesn't center on it [18], [19].

Even thought the number of these studies is limited, they enriched the theoretical view of this phenomenon, analyzing not only the endogenous elements of tourism (primary and derived offer), but also the exgenous ones which conditionate it: geology (spa resorts' cases), soils, hypsometry, urban technical infrastructure (transports network, sewerage, electricity, water supply) [1].

The first scientific papers which centered its attention upon transport and tourism appeared at the late of 19th century and at the early of 20th century: *The theory of Transportation* by Cooley H. [20], *History and Economics of Transport* by Kirkcaldy A. and Dudley Evans [21], and *Imperial air routes* by Sykes F. By a great notoriety have enjoyed scientific papers like *The Tourist Movement* by Ogilvie I. (1933), *The tourist industry of a modern highway* by Eiselen E. (1945) [22], *The Geography of Air Transport* by Sealy K. (1966), and *On some patterns of international tourism flows* by Williams and Zelinsky (1970) [23]. Then, begining with 1987, researchers highlighted the unpreceeded development of these two indicators, which led to a stronger interdependence, transport services in tourism product becoming the most important, given the fact that tourists showed preferences on increasingly distant destinations (Chew, 1987) [24], (Becken, 2006) [25], (Hall, 2008) [26], (Lohmann, Pearce, 2012) [27]. Therefore, in general, it was demonstrated that the infrastructure base of a country is a determinant of the attractiveness of a tourism destination (Eilat & Einav, 2004) [28], (Inskeep, 1991) [29], *"transport playing an important role in the successful creation and development of new attractions as well as the healty growth of existing ones"* (Kaul, 1985) [30].

Lately, the attention focused on aerial transport, because it became a habit for tourists to travel by airplance, due to cheaper expenditure and the modernization of this conveyance type. Once with this changes, the environment issues also appeared, because airplanes represents the mean of transport that are the most polluting (Lumsdon & Peeters, 2009) [31].

The development of air travel led to the emergence of another impact, related to quality of visitors. Reducing transportation costs, the shaping of mass tourism and the raising if living standards could direct to a decreasing of visitors quality even in privileged destinations (Bieger & Wittmer, 2006) [32].

This globalization of transport network causes environment issue, not only in terms of aircraft flight, but also at destinations, because the number of tourists becomes too high for carrying capacity of journey place. When carrying capacity is exceeded, the territory in cause cannot cope all tourists needs, the best solution being rationalizing the number of visitors. Likewise, is expected that the main means of transport to be aircraft and private car (Speakman, 2007) [33].

In 2007, Weston and Davies used Delphi method within which were identified 90 experts in tourism and transports (bus and train companies, walking groups, cycling associations and motorcycle federations), from North-West of England, for giving details about their employment and proffesional interests in transport and tourism. For that, they had to respond to 66 questions regarding predicted number of tourist trips, future preferences of mode of transport used by tourists, effect of fuel prices and congestion, environmental issues. The responses showed that the number of inbound trips for holiday/pleasure will moderately increase alike the number of business trips made by visitors into the region from other parts of the UK, train will represent the main mode of transport for tourists, the following transport infrastructure will provide integrated facilities like Park and Ride (Weston & Davies, 2007) [34]. A paper that investingates the significance of transport infrastructure as a factor in destination development was done by Khadaroo and Seetanah in 2007, through which total number of tourist arrivals were modeled, the island of Mauritius being the case study. If in 1977 were registered 10300 arrivals, in 2005, a number of 761000 tourists arrived on the island, being mainly from Europe (65%), Africa

(25%), Asia (6.5%), Australia (1,7%), America (1,2%). Regarding the major source country for Mauritius, France is on the first place (30%), followed by UK (15%), Reunion (13%), Germany and South Africa (7%). The tourism phenomenon had such a development because local authorities understood that transport infrastructure in an important component for Mauritius. Through an equation, the authors identified the transport infrastructure being the main determinant of arrivals into the island, especially for tourists from Europe and US, followed by the distance coefficient. Therefore transport infrastructure of the island contributed positively to tourist numbers, but indicators like relative prices, distance and income in the origin countries had large influences on decision of tourists (Khadaroo& Seetanah, 2007) [35].

The same authors employed a gravity framework to evaluate the importance of transport infrastructure in determining the tourism attractiveness of destinations, through a case study of 28 countries over the decade 1990-2000, analysing the tourist arrvials per annum, income of origin (average real income per capita), relative prices (CPI of a destination country adjusted by the $ exchange rate), distance in kilometres between the capital cities of the origin and destination county, tourism infrastructure (number of hotel rooms available in the country), size of population, common language, common border, number of alternative destinations in proximity. At the same time, the transport infrastructure, three separate proxies were included: length of paved roads divided by the size of the country, number of terminals of each country's international airports, respectively the number of ports in each country. The results showed that Australia and Oceania possesed the biggest coefficient that illustrated the importance of roads airports and ports for tourism flows (Khadaroo & Seetanah, 2007) [36].

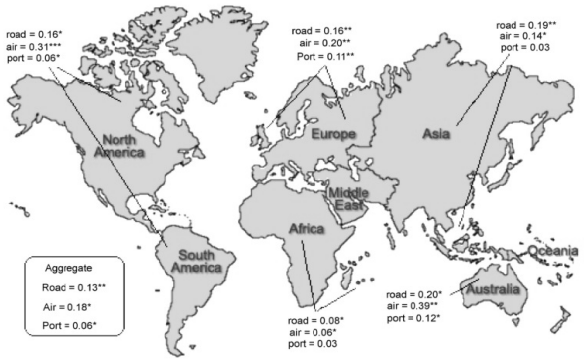

Fig. 3. Summary of estimated coefficients illustrating the importance of different types of transport for tourism flows to various continents [36].

For reaching the goal of this paper, were used several methods, including the analysis, cartographic, graphic, comparative, mathematical and statistical ones.

The analysis method centered on quantitative and qualitative aspects of transport and tourism flow (2004-2013) of each resort (road, railway, air, respectively tourist arrivals, tourist overnights, tourist traffic density, respectively net use index of accommodation capacity), on territorial repartition of Romania's resorts;

The cartographic method has a role which is becoming more and more important in the research and presentation of touristic phenomenon, representing a spatial and temporal synthesis of it. In what concerns this paper, the cartographic method was used for showing the territoral distribution of Romanian resorts, considering its local and national level, of transport infrastructure and for highlighting the accessibility level of each Romania's resort, by using a different interpolation operation from the previous study, (IDW-Inverse Distance Weighted), within ArcGis 9.3 software, which estimates cell values by averaging the values of sample date points in the neighborhood of each processing cell.

The graphic method holds an analytical character and hightlights, usually, the evolution and structure of touristic phenomenon. Within this paper, thanks to Microsoft Excell 2013 software, this method showed, through some charts, the correlation between level of accessibility and tourism flow, the accessibility influence on tourist arrivals, tourist overnights, tourist traffic density, respectively net use index of accommodation capacity.

The comparative method has an important role in the purpose of this paper, which aims to the examination of each resorts's accessibility level and tourist flow. Through this study was highlighted the resorts which are most accessible by route, railway, respectively by air, the tourist flow indicator which has the biggest influence upon the level of accessibility, and the resorts whose tourist circulation are most influenced by accessibility;

The mathematical method was used for calculating several distances like from a resort to closest European road, National road, railway station, airport, for highlighting the total number of accommodation units, places and hotels of each resort and for appraisal of final score which represented the level of accessibility. The statistical method consisted in revealing, National Statistical Institute, the average number of tourist arrivals, tourist overnights, tourist traffic density, respectively net use index of accommodation capacity between 2004-2013.

3. RESULTS AND DISCUSSION

As the references concluded, the accessibility of a resort could influence its fate. Therefore, the present paper tries to calculate the level of accessibility for each Romanian resort and to investigate if quantity

and quality aspects of transport network has any influence on tourist flow. Besides previous paper [1], the new method used to identify the transport accessibility of a health resorts took into account the roads quality also [2].

3.1. Determination of accessibility level

3.1.1. Road accessibility level

In this case, the main element is represented by European roads, but the analysis of entire network took into account County roads and National roads, also. Therefore it was agreed that the level of road accessibility of each resort must be directly proportional with the distance of the closest European road and conditioned by the other roads which are linked with these routes recognized at continental level.

Table 2. The road, railway, aerial, general accessibility situation of each Romanian health resort.

No.	Resort name	RA	RWA	AA	GA	No.	Resort name	RA	RWA	AA	GA
1.	Albac	1.25	0.00	0.00	0.40	46.	Mangalia	3.00	3.00	3.00	3.00
2.	Albeştii de Muscel	2.00	0.50	0.00	0.80	47.	Moieciu	3.00	1.00	0.00	1.30
3.	Amara	2.00	0.50	0.00	0.80	48.	Moneasa	1.00	0.00	0.10	0.40
4.	Arieşeni	2.25	0.00	0.00	0.70	49.	Neptun-Olimp	3.00	3.00	3.00	3.00
5.	Azuga	3.00	3.00	0.00	2.00	50.	Ocna Sibiului	2.50	2.00	3.00	2.50
6.	Balvanyos	1.75	0.00	0.00	0.50	51.	Ocna Şugatag	1.25	0.00	2.10	1.10
7.	Bazna	2.00	0.75	2.10	1.60	52.	Pârâul Rece	1.50	0.00	0.00	0.50
8.	Băile 1 Mai	3.00	2.00	3.00	2.70	53.	Păltiniş	1.50	0.00	3.00	1.50
9.	Băile Băiţa	3.00	2.00	2.50	2.50	54.	Poiana Braşov	2.25	1.00	0.00	1.10
10.	Băile Felix	3.00	2.00	3.00	2.70	55.	Praid	2.50	2.00	2.10	2.20
11.	Băile Figa	1.75	0.75	0.50	1.00	56.	Predeal	3.00	3.00	0.00	2.00
12.	Băile Govora	2.50	1.00	0.10	1.20	57.	Pucioasa	1.50	2.00	0.50	1.30
13.	Băile Herculane	3.00	3.00	0.00	2.00	58.	Sângeorz-Băi	2.25	2.00	0.00	1.40
14.	Băile Homorod	2.50	1.00	0.10	1.20	59.	Saturn	3.00	3.00	3.00	2.80
15.	Băile Olăneşti	2.25	0.00	0.10	0.70	60.	Săcelu	2.00	0.50	0.00	0.80
16.	Băile Turda	3.00	2.00	2,50	2.50	61.	Sărata Monteoru	2.50	0.50	0.50	1.20
17.	Băile Tuşnad	3.00	2.00	0.00	1.70	62.	Secu	0.50	0.00	0.10	0.60
18.	Bălţăteşti	2.50	0.00	0.10	0.90	63.	Semenic	0.50	0.00	0.00	0.20
19.	Borsec	2.50	0.00	0.00	0.80	64.	Sinaia	3.00	3.00	0.00	2.00
20.	Borşa	1.00	0.50	0.00	0.50	65.	Slănic	1.75	2.00	0.50	1.40
21.	Bran	3.00	1.00	0.00	1.30	66.	Slănic Moldova	2.50	0.00	0.25	0.90
22.	Breaza	3.00	3.00	0.50	2.20	67.	Snagov	2.50	3.00	3.00	2.80
23.	Buşteni	3.00	3.00	0.00	2.00	68.	Sovata	2.50	2.00	2.25	2.30
24.	Buziaş	2.00	2.00	2.25	2.10	69.	Soveja	0.75	0.00	0.00	0.30
25.	Câmpulung Moldovenesc	3.00	2.00	0.10	1.70	70.	Stâna de Vale	0.75	2.00	0.10	1.00
26.	Cap Aurora	3.00	3.00	3.00	3.00	71.	Straja	0.75	0.00	0.00	0.30
27.	Călacea	2.00	0.50	3.00	1.80	72.	Târgu Ocna	3.00	2.00	2.25	2.40
28.	Călimăneşti-Căciulata	3.00	2.00	0.10	1.70	73.	Tăşnad	3.00	2.00	3.00	2.70
29.	Cheia	1.50	0.00	0.00	0.50	74.	Techirghiol	3.00	3.00	3.00	3.00
30.	Costineşti	3.00	3.00	3.00	3.00	75.	Timişu de Sus	3.00	3.00	0.00	2.00
31.	Covasna	1.50	0.00	0.00	0.50	76.	Tinca	1.00	2.00	2.10	1.70
32.	Crivaia	1.75	0.00	0.00	0.60	77.	Trei Ape	0.75	0.00	0.00	0.30
33.	Durău	0.25	0.00	0.00	0.10	78.	Vatra Dornei	3.00	2.00	0.10	1.70
34.	Eforie Nord	3.00	3.00	3.00	3.00	79.	Vaţa de Jos	3.00	2.00	0.00	1.70
35.	Eforie Sud	3.00	3.00	3.00	3.00	80.	Vălenii de Munte	2.50	2.00	0.50	1.60
36.	Geoagiu Băi	2.00	1.00	0.10	1.80	81.	Venus	3.00	3.00	3.00	3.00
37.	Gura Humorului	3.00	3.00	2.10	2.70	82.	Voineasa	2.25	0.00	0.10	0.80
38.	Harghita Băi	3.00	3.00	0.00	2.00	83.	Fântânele Zone	2.00	0.00	2.50	1.50
39.	Horezu	2.25	0.00	0.10	0.80	84.	Muntele Băişorii Zone	2.00	0.00	2.50	1.50
40.	Izvorul Mureşului	3.00	2.00	0.00	1.70	85.	Râşnov	3.00	2.00	0.00	1.60
41.	Jupiter	3.00	3.00	3.00	3.00	86.	Petroşani-Parâng	2.00	0.00	0.00	0.60
42.	Lacu Roşu	2.50	0.00	0.00	0.80	87.	Piatra Neamţ	2.25	2.00	2.10	2.10
43.	Lacu Sărat	3.00	3.00	0.00	2.00	88.	Târgu Neamţ	2.25	2.00	2.10	2.10
44.	Lipova	3.00	3.00	3.00	3.00	89.	Vişeu	1.00	2.00	0.10	1.00
45.	Mamaia	3.00	3.00	3.00	3.00	90.	Baia Sprie	2.50	2.00	3.00	2.50

(RA=road accessibility; RWA=railway accessibility; GA=general accessibility).

For calculating the road accessibility of each Romanian resort, were accounted several conditions. According to the distance between resort and the closest European road, the ratings were given thus: three points (0 km), two points (1-50 km) and one point (>50 km). Regarding the connection with the European road, were given 0.5 points for those resorts which are connected with an European road through a National one with a good quality, 0.25 points with acceptable quality and 0 points for poor quality, only in case if the distance between the health resort and European road measures 15-50 km.

At the same time, were decreased 0.5 points for those resorts which have as a link a County road

with poor quality, 0.25 points with acceptable quality and 0 points with good quality. In case of the link consists of a National and a County road, the score remains the same.

The threshold of 50 km was chosen in most cases because it is equivalent with almost one hour of travel in Romania's case. Moreover, the methodology proved to be more severe in case of County roads, because, in most cases, an European or National road with acceptable quality is better than a County road with the same attributes.

After reckoning those results, the attention was centered on ArcGis 9.3 software where it was created a point theme which consisted in all Romanian resorts digitizing, followed by inserting these results for each this kind of settlements. Afterwards, using this information through IDW interpolation GIS operation, was created a map which showed the areas of resorts which presented a low or a high level of road accessibility.

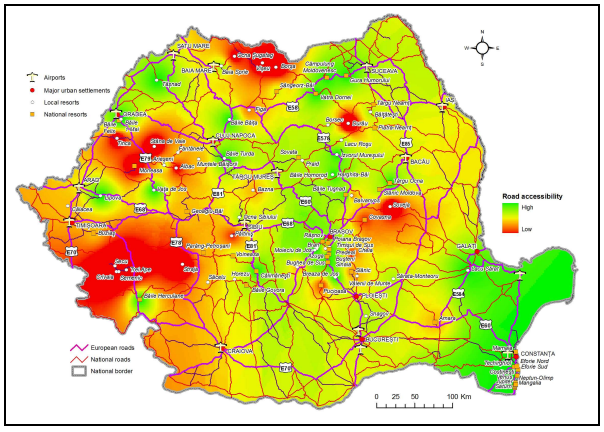

Fig. 4. Road accessibility of Romania's health resorts.

Analyzing the map above, the health resorts which present a low road accessibility are situated in Maramureş Depression, in the west part of Romania, excepting West Plain (Apuseni, Poiana Ruscă, Banat Mountains), in Curburii Sub-Carpathians, Ceahlău Massif in Oriental Carpathians and in the western part of Meridional Carpathians.

The health resorts which dispose of a high degree of road accessibility are positioned in Prahova Valley, Romanian Plain, East Transylvania, North of West Plain and Black Sea seashore.

3.1.2. Railway accessibility level

In order to estimate the railway accessibility of each resort, it was taken into account several features. Were given three points for the resorts which have access to a primary railway, two points for those which have access to a secondary railway, one point for those resorts that are less 15 km away from a railway and if the road connection is European or National one, 0,75 points if the connection road is European or National with good conditions, 0,5 point for those resorts that are less 15 km away from a railway and if the road communication is a County one or is in poor conditions, and no point for those which don't have access to any kind of railway.

It was chosen the limit of 15 km for railway accessibility level, because after a train travel, a bigger mileage with another transport means could can lead to dissatisfaction.

After the mathematical analysis resolution, like in the previous situation, was created a map through the same IDW interpolation operation.

Analyzing the map above, the resorts which present a low railway accessibility are positioned in Apuseni, Poiana Ruscă and Banat Mountains, in West of Meridionali Carpathians, North part of Oltenia region, Oriental Carpathians, Moldavia Plateau, Transylvania and Maramureş Depression, Curburii Carpathians and Sub-Carpathians, South-West part of Romania.

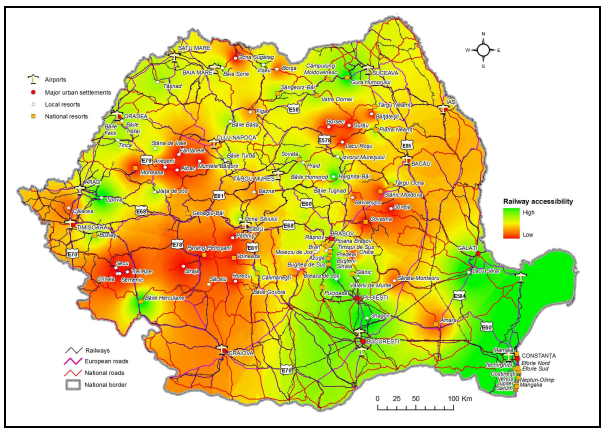

Fig. 5. Railway accessibility of Romania's health resorts.

The resorts which dispose of a high degree of railway accessibility are situated in Western Plain, Prahova Valley, the central part of Romanian Plain and Dobrogea.

3.1.3. Air accessibility level

The air accessibility level consists in the distance of the closest airport and in the connection road type with that airport. In order to calculate the air accessibility of each resort, it was taken into account several conditions. it were given three points for the resorts from which the closest airport is situated at a distance of 0-30 km, two points for those from which the closest airport is situated at a distance of 31-60 km, and no point for a distance larger than 60 km.

If the distance between a health resort and the closest airport is less that 60 km, and that airport registers annually at least 1 million passengers and has at least 30 served destinations, are added 0,5 points; if

the airport receives annually at least 500,000 travelers and has at least 15 served destinations, are added 0,25 points; if the airport counts annually at least 100.000 passengers and has 1-9 served destinations, are added 0,1 points.

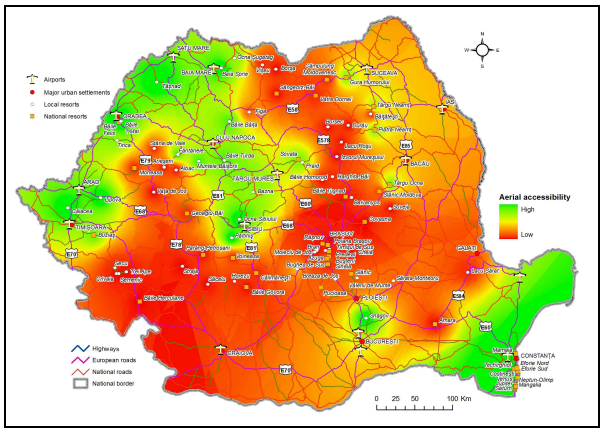

Fig. 6. Aerial accessibility of Romania's health resorts.

In this case it was chosen the limit of 30 km, because the flight duration is shorter and the travel time with another transport means to destination can be longer than in railway's case. Therefore, all these aspects summarize at tourist's time travel. The longer time transportation is, the higher level of dissatisfaction could appear.

Analyzing the upper map, the health resorts that present low air accessibility are located in the central part of Apuseni Mountains, Poiana Ruscă and Banatului Mountains, the western and eastern part of Meridionali Carpathians, the North part of Oltenia, Maramureş Depression, Oriental Carpathians, Curburii Carpathians and Sub-Carpathians, Bărăgan Plain. Practically almost the entire territory of Romania posesses a low aerial accessibility.

The resorts which dispose of a high degree of air accessibility are positioned in West Plain, North-West part of Romania, West of Transylvania Depression, the West part of Moldavia Plateau, the central part of Romanian Plain and the seashore of Black Sea.

3.1.4. The general accessibility level

The general accessibility level of each Romanian resort was obtained by using the arithmetic mean between road, railway and air accessibility values.

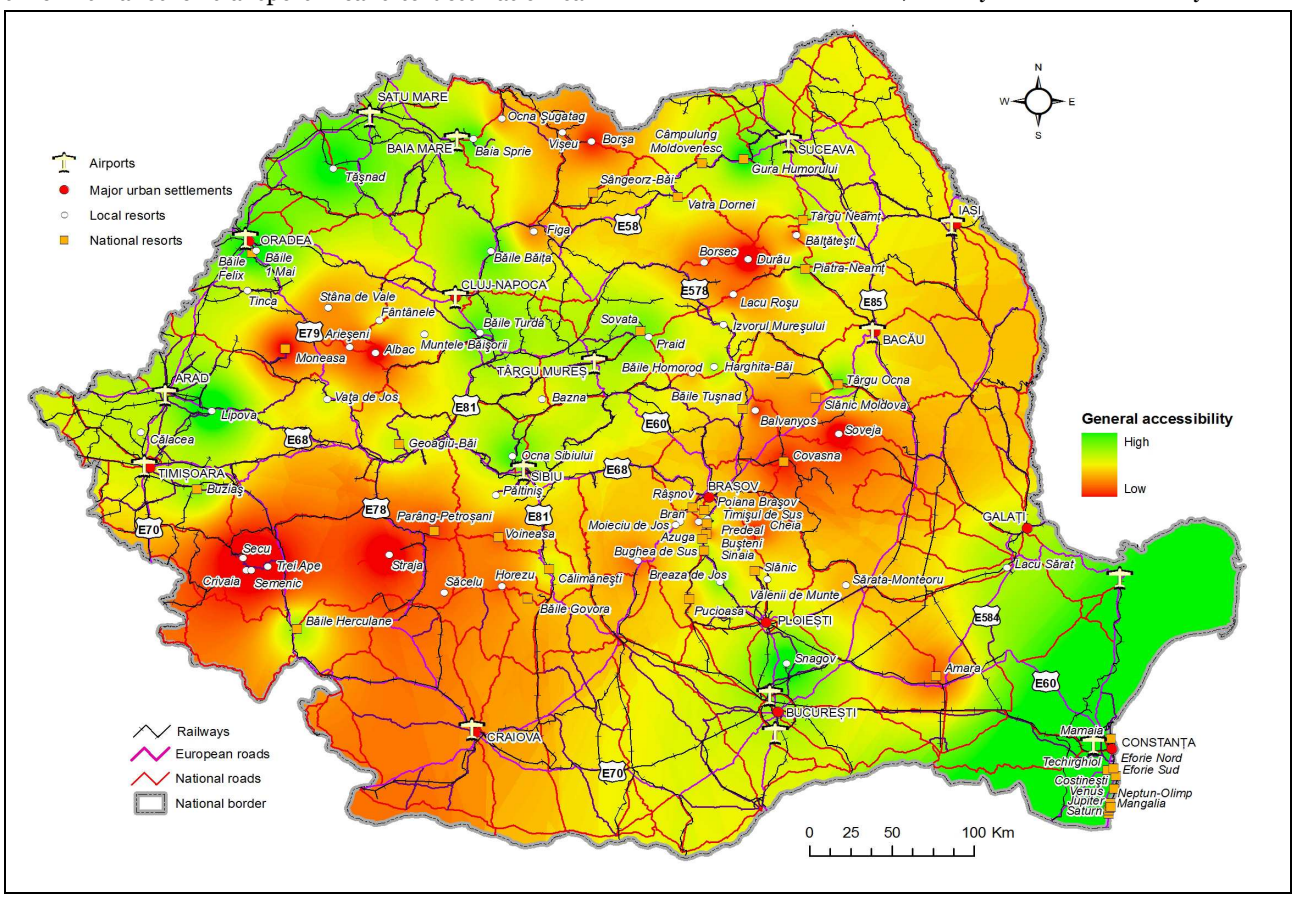

Fig. 7. General accessibility of Romania's health resorts.

Observing the situation which is evidenced by the upper map, the low-accessible resorts are positioned in Apuseni, Poiana Ruscă, Banat Mountains, in the West and East part of Meridionali Carpathians, in

Curburii and Moldavia Sub-Carpathians, central part of Eastern Carpathians, West part of Romanian Plain, and West part of Moldavia Plateau.

The resorts with a high transport accessibility level are located in West Plain, in West part of Transylvania Plateau, in North part of Moldavia Plateau, in center and East part of Romanian Plain, and in Dobrogea.

3.2. The accessibility level influence on tourism flow of Romanian resorts determination

In a logical meaning, the accessibility level of each resort should be one of the decisive elements in tourist flow. Therefore, the present paper aimed to highlight every connection than could exist between tourist flow indicators (tourist arrivals, tourist overnights, tourist traffic density, respectively net use index of accommodation capacity) and general level of accessibility of each resort.

3.2.1. Tourist arrivals

According to the obtained information from National Statistical Database website with reference to tourist circulation for each resort, registered in 2004-2013 interval, the average number of tourist arrivals in Romanian resorts is approximately 23,932 visitors, Sinaia being the resort which registered the largest average number of tourist arrivals (188,141), while Snagov, Săcelu, Tinca, Lipova Voineasa, Tinca, Lipova were at the opposite situation. It is almost the same ranking in the case of accommodation units.

By using the graphic method, and Microsoft Excell 2010 instrument, it was attempted to establish a correlation between the accessibility level results and the average number of tourist arrivals for each resort.

By processing this information, was revealed a chart which showed a correlation coefficient by 0,3305, through which it was demonstrated that in Romania is almost no common element between a resort general accessibility and the number of tourist arrivals.

Nevertheless, there are some exceptions like Eforie Nord, Costineşti, Mamaia, Sinaia, Predeal, Băile Felix, Bran, Câmpulung Moldovenesc, Lacul Sărat, Vatra Dornei, Slănic Moldova, Târgu Ocna.

For example, both Eforie Nord and Eforie Sud registered between 2004-2013, an average number of 123342,6 tourist arrivals and their accessibility level is maximum, this seaside resort being crossed by E87 road, 800 main railway and having the nearest airport at a distance of 30 km.

In contrast, Băile Băiţa holds an average number of 2,853.4 tourist arrivals for the same period, even if it is crossed by European road E576, by 401th railway and the closest airport is situated at a distance of 30 km.

Therefore, Romania holds resorts with low accessibility level but with large tourist arrivals (Durău, Pucioasa, Geoagiu Băi, Amara), but in the same time with high accessibility level and less tourist arrivals (Băile Băiţa, Horezu, Vălenii de Munte, Praid, Râşnov).

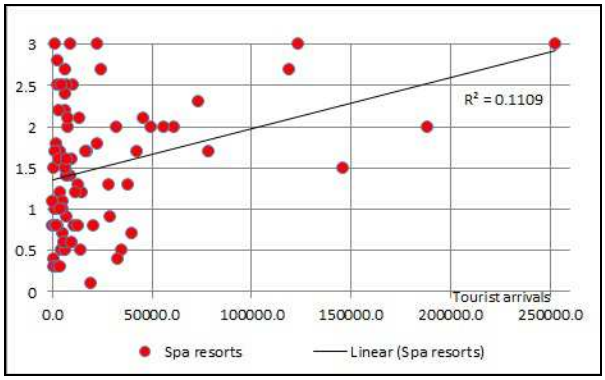

Fig. 8. The correlation result between each health resort general level of accessibility and the average number of tourist arrivals (2004-2013).

According to the upper chart, the coefficient of determination between level of transport accessibility and tourist arrivals of each health resort is 0.1109,what follows that only 11,1% of health resorts that have a favorable accessibility receives larger number of tourists than national average, respectively of those health resorts that have a low accessibility and registered less number of tourist than national average.

3.2.2. Tourist overnights

Studying the same information source, it was calculated that the average number tourist overnights of all Romanian health resorts between 1994-2013 is approximately 120,035. Noteworthy is that Băile Herculane is the most visited resort, enumerating 534,664 tourist overnights. At the opposite it can be found Albeştii de Muscel, Păltiniş, Snagov, Horezu, Lipova, Băile Figa.

After processing this data, resulted a chart which showed a correlation coefficient by 0,2952, lesser than in the first situation, but both of them have too modest values in Romania's resort case. Like in the first situation, there are some exceptions like Seaside and Prahova Valley resorts, Băile Turda, Gura Humorului, Târgu Ocna, Sovata.

A positive example is represented by Băile Felix and Băile 1 Mai which registered an average number of 847,549 tourist overnights, and their accessibility level has a value of 2.7 (it is crossed by E79 road, the 314 main railway and the nearest airport is situated at a distance of 8 km). A negative example is Băile Băiţa, registering only 4,905 tourist overnights.

Regarding the value of determination coefficient, resulted that only 8% of health resorts from Romania disposes, in the same time, by a high

accessibility level and tourist overnights, respectively by a unfavorable accessibility and less tourist overnights than national average.

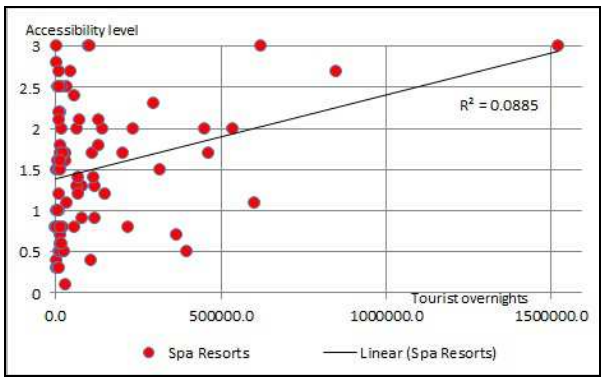

Fig. 9. The correlation result between each health resort general level of accessibility and the average number of tourist overnights (2004-2013).

3.2.3. Tourist traffic density

This indicator was chosen to demonstrate if tourist traffic density of Romanian health resorts is directly proportional with the level of accessibility also.

By reason of a rigorous analysis of these quantitative information, was noticed that the average percent of tourist traffic density regarding Romanian spa resorts is about 637%, Băile Homorod (5300%) and Albeştii de Muscel (13%) being situated at rank extremities.

After processing this data resulted a chart which have revealed a correlation coefficient of -0.1235, the realised calculations showing that the total number of accommodation units is the indicator which is the most influenced by the level of accessibility in what concerns a Romanian resort, but regarding its share, it is insignificant. In this case, the situation is different.

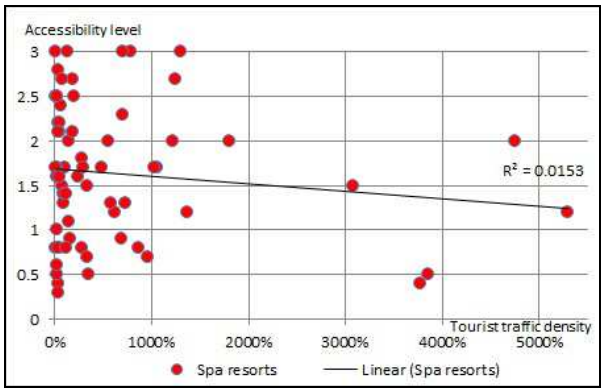

Fig. 10. The correlation result between each health resort general level of accessibility and the average number of tourist traffic density (2004-2013).

There are only few health resorts whose tourist traffic density is influenced by accessibility situation, like seaside ones and Băile Băiţa. In the same time, the health resorts that met a high tourist traffic density, despite the low accessibility, are: Horezu, Călacea, Câmpulung Moldovenesc, Băile Govora, Băile Figa, Pucioasa.

Regarding the upper chart, the determination correlation is about 1%, which shows that tourist traffic density is not influenced by level of accessibility.

3.2.4. Net use index of accommodation capacity

Analyzing the same information source, the average net use index of accommodation capacity of Romanian resorts is 26%, Băile Tinca (88%), Covasna (58%), Slănic Prahova (54%), Bălţăteşti (53%) being at the pozitive extremity , and Borsec (3%), Horezu (4%), Albac (5%), Băile Băiţa, Praid (6%), Moieciu (7%), being at the opposite situation.

Using Microsoft Excell 2011 software, it was created a chart which revealed a correlation coefficient of 0,152071, being the second indicator as importance until now, but insignificant like others, regarding the general situation. Like in the last cases, it were found some exceptions like seaside resorts, Buziaş, Sovata, Băile Herculane, Băile Felix and Băile 1 Mai. Specific for health resorts, in Romania exists many that despite of low transport accessibility, registered high net use index of accommodation capacity between 2004-2013, eloquent in this sense being Bazna, Băile Govora, Bălţăteşti, Călimăneşti, Covasna, Geoagiu Băi, Lacul Sărat, Moneasa, Pucioasa, Sângeorz Băi, Slănic Prahova, Tinca, Soveja, Vişeu.

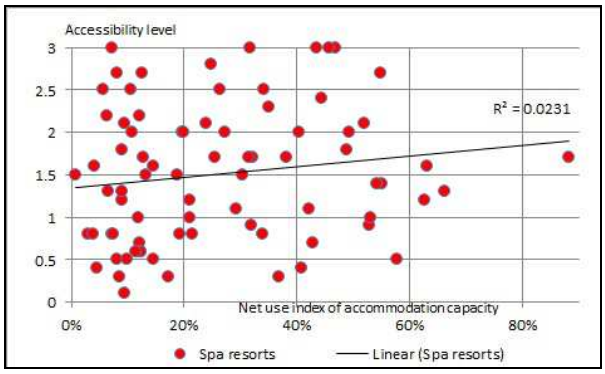

Fig. 11. The correlation result between each health resort general level of accessibility and the average net use index of accommodation capacity (2004-2013).

From all indicators, this one seems to be the most conclusive for health resorts specificity, given the fact that they appearance accounted the contextualization of natural therapeutic factors.

4. CONCLUSION

The study regarding transport accessibility as a factor for accommodation base development showed

that indicators like accommodation places, number of hotels, number of three and four stars units were not influenced by transport accessibility, demonstrating that health resorts are specific by their appearance.

The present study continued the research of the first one, revealing the fact that neither tourist flow wasn't influenced by level of transport accessibility.

Regarding the similarities of these two studies, an example is that most of health resorts that present impairments regarding general accessibility, are situated in Carpathian Mountains (Apuseni, Banat, Poiana Ruscă Mountains, East Carpathians, Curburii Sub-Carpathians, Maramureş Depression) because of orograhic features, and in Moldavian, Getic Plateau, North and South part of Oltenia because of ineffective transport infrastructure repartition. On the other side, health resorts that disposes by high level of accessibility are situated in West Plain because they are crossed by 200th, 900th main railways and E70 European Road, in Prahova Valley thanks to E60, E68, E578, E574 European Roads and to 200, 300, 400 main railways, in Romania's seashore due to 800 main railway and E87 major road. Moreover, the correlation results emphasized the idea that quality of transport infrastructure was not a decisive factor for health resorts development.

The differences between these studies, after several changes regarding the method of transport accessibility setting, showed that Bărăgan Plain, South-East and North part of Transylvania, East part of Romania Plain were also included in low accessibility areas.

Through this paper was proved that the aerial accessibility represented the major lack of Romanian transport infrastructure's integrity, because most of resorts which presents low aerial accessibility have the largest territory spread, like Carpathian Mountains, Moldavian Plateau, entire Romania Plain, excepting Bucharest zone, entire Sub-Carpathians excepting Moldavian ones.

Analyzing the results, a strong argument is that Romanian health resorts appeared and have developed different than other type of resorts. In many cases, the development of a health resort determined the construction of a transport link, better located health resorts being able to develop faster. Therefore, a health resort developed due to high values of their therapeutic factors.

Therefore, the present study achieved his goal, highlighting the influence of accessibility level upon infrastructure base of each health resort. Even if it seems quite normal to be a true influence in this sense, the Romania's health resorts represent a special case of which less than 1/3 of these settlements face with a normal situation.

Even if quality and quantity of transport infrastructure doesn't represent a decisive factor over accommodation base and tourism flows, an eventual modernization process should not be abandoned, because in the future, transport services will have a larger influence upon tourist' decisions, due to the fact that the travels on long distances and to hard accessible places will become a priority on their preferences.

Therefore, the obtained results regarding the accessibility level of each Romanian resort and the correlation coefficient with tourism flow, correspond to reality and present a logical structure following the observations on cartographic materials and correlation charts realised.

These studies reflected also the health priority for pacient-tourists and the therapeutic values of treatment factors from health resorts, that are more important than infrastructure base or level of accessibility.

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