



The Rank-Size Relationship in the Urban Settlement Network in the Turda - Alba Iulia Corridor

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ABSTRACT

When studying the rank-size relationship in the settlement system, principles like hierarchy, centrality, and specialization should be the prevailing instruments, whilst primacy should be considered just to a lower extent. According to the NPSP (National Plan for Spatial Planning) in the Turda - Alba Iulia Corridor there are settlements of rank II, III and IV, correspondingly municipalities as county capitals, other municipalities and towns. According to the NPSP, rank II may correspond to differently ranked localities, such as Alba-Iulia and Aiud. However, the first mentioned clearly has a larger size from the perspective of administration, service, and equipment facilities (hospitals, supermarkets). The relationships between the urban centers in the Turda - Alba Iulia Corridor can be grouped into four categories: county subordinate relationships, relationships of inter-county independence, relationships of local competition, and local collaboration relationships. The subordination relationships prevail in Alba County, as they are induced by the hierarchic position of its capital town, Alba Iulia, which is a classical case of administrative subordination. The independence relationships are developed between the urban settlements in Cluj County and those in Alba County. Relationships of competition appear mainly between the urban centers in the same county, both in Alba and Cluj. Relationships of collaboration are developed between Turda and Câmpia Turzii towns, although relations of competition were also identified between these two.

1. INTRODUCTION

Rank is the expression of present importance and immediate perspective of a settlement within the network from the administrative, political, social, economic, cultural etc. points of view as compared to the dimensions of the polarized area and with the level of decision which is implied in allocating resources.

Size on the other hand expresses the size of a city, especially from the demographic and territorial points of view.

In the study of the rank-size relationship established in a system of settlements, principles as hierarchy, centrality, specialization and less primacy are the main work instruments.

2. PRINCIPLES OF ANALYSIS IN ESTABLISHING RANK-SIZE RELATIONSHIP

Hierarchy presupposes the ascending or descending ordering of the settlements whether there are one or more indicators.

Hierarchies indicate a basic concern: what is the number of indicators that needs to be taken into consideration in order to obtain a hierarchy close to reality, because the extended number of indicators may lead to wrong results which have no connection with its purpose or reality.

In fact it is not the multitude of indicators that offers quality to hierarchy, but especially their relevance [1].

A set of indicators was taken into consideration in order to establish the hierarchy of the cities in Romania. These indicators cover five categories: geographic potential, economic potential, demographic potential, urban potential (city planning), social and cultural endowment.

A hierarchy of all cities was obtained, which allowed the delimitation of seven hierarchy levels.

Rank-size distribution was highlighted if on a graphic at logarithmic scale are being plotted two elements: the number of inhabitants and the rank position of each city within relatively stable territorial entity.

Rank is actually the position of the cities classified in descending order that reflects the history of urban development including competition between cities.

Thus we can make a distribution from large to small, more or less uniform.

When R. Vinning elaborated the rank-size distribution for the cities in USA, he noticed that the straight line which resulted from the distribution approximation approaches value 1.

Considering the idea of a scientifically proved rank-sized distribution, real models have been developed to establish hierarchies of settlements, generally using the correlation with other theories, like the one of central places theory (*the Bekman model, the Tinbergen model or the administrative hierarchy model*).

The optimization of the rank-size relationship is an important element in the management of national and regional settlement systems.

Centrality refers to the functional aspect that involves both vertical and horizontal ranking.

This determines the territorial orientation of substance, energy and information fluxes, to and from a coordinating centre.

Centrality is based on the territorial percentage of the convergent relationship between cities and rural settlements, on the texture of these relations. The general configuration of the relations determines the territorial system of settlements through their orientation and intensity [1].

Centrality can be fully explained from the perspective of central places theory as well as from the theory of domination and the theory of development poles.

The specialization is defined by the specific functions of the cities. Detailed and comparative studies have shown the importance of functional diversity in identifying the particularities of the settlements' systems.

The uneven distribution of specialised functions of the cities generates considerable differences in the systems of settlements which can be

of the same importance as the ones determined by hierarchy and centralization.

The most important specializations are founded based on the value of the favourable geographical position.

The primacy. According to the studies up to the present, it is proved that the politically organised territories have the most coherent and stable hierarchies.

The first city in a hierarchy (e.g. the capital or the regional centre in the federal states) stands out from the ones that are placed on the next levels. In some cases, it is 10 up to 15 times highly placed and more valuable than the city that is on the second place.

The capital city of a state manifests its primary function through the concentration of functions (especially the political one) in one place, as well as through attraction, representation, integration, innovation and international cooperation.

3. THE PLACE OF THE URBAN SETTLEMENTS IN THE TURDA – ALBA IULIA CORRIDOR WITHIN THE NATIONAL SYSTEM OF SETTLEMENTS

According to the NPSP (National Plan for Spatial Planning) – Section IV – The network of cities – the national network of cities is composed of urban and rural settlements which are ranked as mentioned below:

a) rank 0 – The capital city of Romania, a municipality of European importance.

b) rank I – The municipalities of national importance, with potential influence at the European level.

c) rank II – Municipalities of inter-county importance, county importance or with significant balancing role in the network of cities.

d) rank III - towns;

The urban settlements in the Turda – Alba Iulia Corridor can be found in the hierarchy that was established by NPSP starting with rank II (Alba Iulia and Turda and also municipalities that are capitals of counties) and III (other municipalities and cities).

Table. 1. Urban settlements of rank II in the Turda – Alba Iulia Corridor (according to NPSP).

No.	City	City's status	County	No. of inhabitants on the 1 st of January 1999
1	Alba Iulia	municipality, capital of the county	Alba	72,615
2	Turda	municipality	Cluj	60,998
3	Câmpia Turzii	municipality	Cluj	29,852
4	Aiud	municipality	Alba	28,909

Table 2. Urban settlements of rank III in the Turda – Alba Iulia Corridor (according to NPSP).

No.	City	City's status	County	No. of inhabitants on the 1 st of January 1999
1	Ocna Mureş	town	Alba	15,697
2	Teiuş	town	Alba	7,338

4. THE RANK-SIZE DISTRIBUTION, ACCORDING TO NPSP SECTION IV IN THE TURDA - ALBA IULIA CORRIDOR

According to NPSP, rank II category includes cities of different size. Therefore, both Alba Iulia and Aiud are cities of rank II, although the first one clearly stands out through size and it administratively subordinates the latter through facilities and services (hospitals, supermarkets etc.) etc.

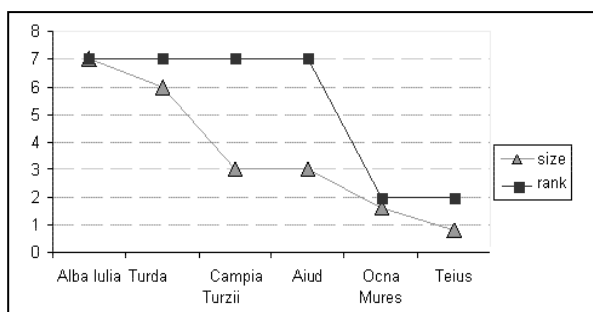


Fig. 1. The rank-size distribution, according NPSP.

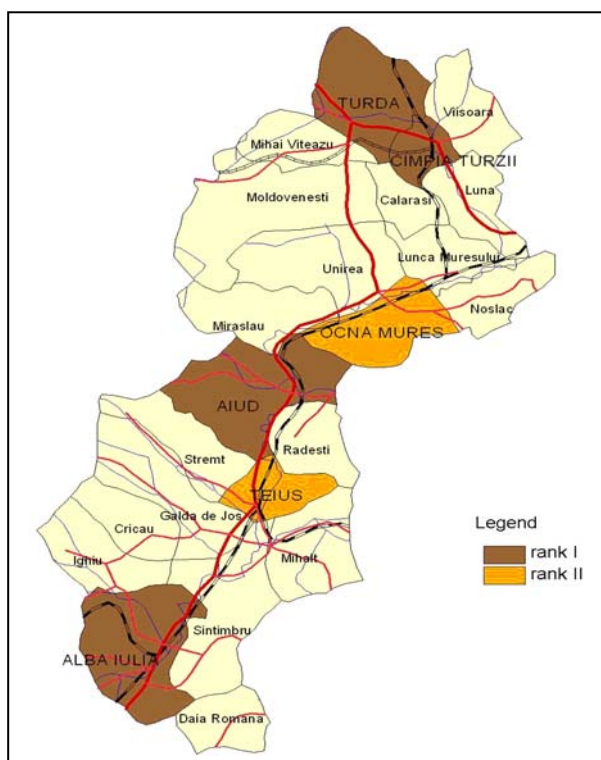


Fig. 2. The rank-size distribution, according NPSP section IV in the Turda – Alba Iulia corridor.

The demographic size of the cities and their rank are shown in the rank-size distribution graph (by assigning points, namely 7 points for the cities of rank II and 2 points for the ones of rank III).

We notice that there is a high degree of generalization in the NPSP hierarchy, there are many criteria taken into consideration, predominantly statistical and less qualitative. Furthermore, criteria such as polarization (administrative, economic, services), the attraction of the centre, the area of influence etc. were not taken into account.

Analyzing the NPSP ranking, we may conclude that there are independence relations between the cities of rank II although, in reality, there are mainly relations of subordination.

For example, between Alba Iulia and Turda cities there are independence relations, and relations of subordination are established between Alba Iulia and Aiud, Teiuş or Ocna Mureş cities.

5. THE RANKING OF THE URBAN SETTLEMENTS AND THE RANK-SIZE RELATION IN THE TURDA – ALBA IULIA CORRIDOR

Alba Iulia stands out from the other cities in the Turda – Alba Iulia corridor, through its history, and significance in the Romanian people’s minds and through the number of its residents, but especially through its functions, such as: the administrative function (county capital, the head quarter of The Central Development Region); the commercial and service function that results from the administrative one and others (commerce, expertise in different fields, hospitals etc.); the industrial function (building materials, food industry etc.); education and culture (universities, colleges, bishopric, theatre etc.).

The influence area of the Alba Iulia city extends mainly within the county, but also regional, at least from the administrative point of view at the level of the Central Development Region.

Turda – The second demographically largest and important city, has well developed industrial functions (building materials, food industry etc.), fact that determines the development of trade and services (local tourism – the Turda salt mine etc.); education and culture (university colleges, schools, theatre etc.).

However, the expansion of its influence area is limited to the neighbouring settlements except for the constructions field related to product distribution where the influence exceeds the county level.

Aiud - the municipality of Aiud stands out through education and culture (museums, colleges, schools); its influence is mainly local (limited to the constitutive settlements and to the immediately neighbouring ones).

Câmpia Turzii - stands out through its industrial dimension (metallurgy); the zonal influence of the city is given by the existence of the railroad.

Ocna Mureş - stands out through its industrial function (chlorosodic products), the local influence is limited to the constitutive settlements and to the immediately neighbouring ones).

Teiuş - a new city developed especially due to its favourable position, as a rail hub. In order to establish the hierarchy ranks, it has been devised a distinguishing algorithm with minimal criteria.

For each criterion grades from A to C have been assigned, but also combinations such as AB in case of a certain criterion a settlement fell neither in the A nor in the B groups.

For a certain criterion the maximum grade is B - the case of the regional influence of Alba Iulia, where the simple fact that it is the residence of Central Development Region doesn't allow for an A grade.

Table 3. A minimal algorithm for ranking the towns and cities in Turda - Alba Iulia Corridor.

The capital locality	The constitutive localities	No. of inhabitants	Functions				Area of influence			
			Administr.	Commerce and services	Industry	Education, Culture	Regional	County	Zonal	Local
Alba Iulia	<i>Alba Iulia</i>	59,364	A	A	A	A	B	A		
	Bărăbanţ	2,370								
	Miceşti	1,679								
	Oarda	2,078								
	Pâclişa	878								
Total		66,369					5A - 1B			
Turda	<i>Turda</i>	55,200	B	AB	A	AB		AB		
Total		55,200					1A - 3AB - 1B			
Aiud	<i>Aiud</i>	22,028	B	B	B	AB				C
	Aiudul de Sus	2,409								
	Ciumbrud	1,364								
	Gâmbaş	545								
	Gârbova de Jos	385								
	Gârbova de Sus	319								
	Gârboviţa	143								
	Măgina	597								
	Păgida	126								
	Sâncrai	862								
	Țifra	149								
Total		28,927					1AB - 3B - 1C			
Câmpia Turzii	<i>Câmpia Turzii</i>	27,565	B	B	AB	B			B	
Total		27,565					1AB - 4B			
Ocna Mureş	Cisteiu de Mureş	708	B	B	B	B				C
	<i>Ocna Mureş</i>	10,280								
	Uioara de Jos	1,296								
	Uioara de Sus	1,363								
Total		13,647					4B - 1C			
Teiuş	Beldiu	258	B	B	B	B				C
	Căpud	352								
	Coşlariu Nou	190								
	Petelca	202								
	Teiuş	6,277								
Total		7,279					4B - 1C			

The Alba Iulia municipality ranks first scoring only one B for the considered criteria, Turda ranks second place with an A and no C's, the municipality of

Câmpia Turzii is on the third place with no C's, and the municipality of Aiud together with Ocna Mureş and Teiuş are on the fourth place, each of them with a C grade.

Summing up the A, AB, B, and C grades for each town, the following rank-size relation is configured: rank I (regional, county) – Alba Iulia; rank II (zonal, county) – Turda; rank III (zonal) – Câmpia Turzii; rank IV (local) – Aiud, Ocna Mureș and Teiuș.

6. THE RELATIONS BETWEEN THE URBAN SETTLEMENTS IN THE TURDA - ALBA IULIA CORRIDOR

Generally, the relations between the cities in the Turda - Alba Iulia corridor can be classified into four categories: county subordinate relations inter-county independence relations, local competitive relations and local cooperative relations.

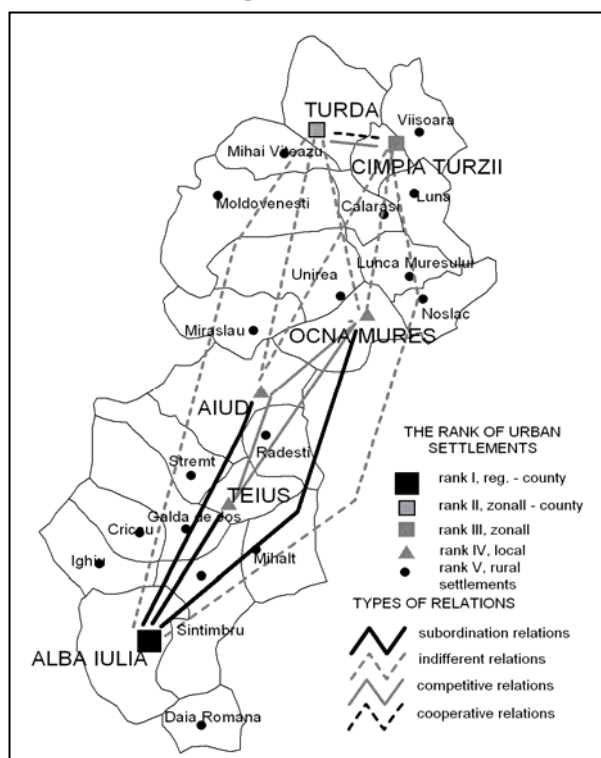


Fig. 3. Types of relations and the rank of the urban settlements in the Turda – Alba Iulia corridor.

The subordinate relations take place at the county level of Alba, through the position of Alba - Iulia in the hierarchy, only if we take into consideration the administrative subordination.

There are subordinate relations between: Alba Iulia and Aiud; Alba Iulia and Ocna Mureș; Alba Iulia and Teiuș

The independence relations are established at the inter-county level between Cluj and Alba.

There are independence relations between: Alba Iulia and Turda; Alba Iulia and Câmpia Turzii; Turda and Aiud; Turda and Teiuș; Turda and Ocna Mureș, Câmpia Turzii and Aiud; Câmpia Turzii and Ocna Mureș, Câmpia Turzii and Teiuș

The competitive relations are to be found in every county, in Alba and in Cluj, respectively between: Turda and Câmpia Turzii; Aiud and Teiuș, Aiud and Ocna Mureș; Ocna Mureș and Teiuș

Cooperative relations are established between Turda and Câmpia Turzii. Even if there are competitive relations between the two cities (e.g. separate administrative entities), there are also cooperative relations from the economic and social point of view.

REFERENCES

- [1] Ianoș, I., Humeau, J-B. (2000), *Teoria sistemelor de așezări*, Editura Tehnică, București.
- [2] Neguț, S. (1997), *Modelarea matematică în geografia umană*, Editura Științifică, București.
- [3] *** PATN, *Secțiunea a IV-a, Rețeaua de localități*.
- [4] www.insse.ro
- [5] www.cjalba.ro
- [6] www.cjcluj.ro
- [7] www.aiud.ro
- [8] www.apullum.ro
- [9] www.wikipendia.ro
- [10] www.turda.ro
- [11] www.andr-c.ro