DETERMINATION OF THE AREA OF INFLUENCE OF PLOIEŞTI CITY
IN THE URBAN SYSTEM OF PRAHOVA COUNTY

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Résumé

La motivation de la réalisation de l’étude présente a été donnée par la multitude des notions et des acceptions rencontrées au niveau des autorités locales et régionales ou dans divers travaux de spécialité concernant la sphère d’influence, respectivement de coopération ou de complémentarité directe de la ville de Ploiești. Le but de ce matériel est de contribuer à cet aspect, en le clarifiant, et aussi d’intégrer la ville de Ploiești dans son contexte départemental, utilisant la même méthodologie (la formule Reilly-Converse) en double sens, à savoir essayant de déterminer aussi la sphère d’influence des autres villes faisant partie du système urbain du département de Prahova par rapport au siège de cette unité territoriale, la ville de Ploiești. En même temps, on a appliqué aussi la même méthode de détermination concernant les centres politiques-administratifs des départements voisins.

Mots clé: villes, population, sphère d’influence, zone métropolitaine, pôle de croissance, types de relations, distances.

I. Theoretical-methodological considerations

The determination of the area of influence of the towns/cities represents an intensely discussed, analysed and sometimes even controversial issue, which has preoccupied the specialists of different domains even since the 19th century. This is natural, seeing the particular theoretical and practical importance of such an approach, starting from political-administrative reasons to economic, social and demographic aspects. This explains the various definitions and synonyms present in the specialized literature and normative acts.

The term is defined in the Romanian legislation as well by the Law no. 351 / July 6, 2001 on the approval of the National Territory Arrangement Plan - Section IV – Locality network. In Annex no. 1 – Definition of the main terms used – at point (14) it is written: “Area/Sphere of influence – territory and localities surrounding an urban area and directly influenced by the evolution of the town/city and the interconditioning and cooperation relations developed along the line of the economic activities, of the food supply, of the access to social and trading facilities, of the endowment with infrastructure, recreational and tourist facilities. The dimensions of the sphere of influence are directly connected to the size and functions of the polarizing urban centre”. Important for this topic is also point (11), defining the term of metropolitan area – “area built through association, based on voluntary partnership, between large urban centres (Romania’s capital and its first rank county seats) and the urban and rural localities situated in its vicinity, at distances of up to 30 km, between which cooperation relations have developed on different levels.” At the same time,
Art. 7 point (1) of the above-mentioned law stipulates: “For a balanced development of the territory of the area of Romania’s capital and its first rank county seats, the main administrative-territorial units in these areas can associate in voluntary partnerships to create metropolitan areas pertaining to the urban area. This association will help reinforce the complementarities between these units and consolidate the decisional factors interested in the territorial development”, and point (3) states: “Metropolitan areas can function in an area independent from the administrative-territorial units’ boundaries, set by agreement by the local public administration authorities.”

In this case, we used the Reilly-Converse formula:\(^1\): Considering two towns, A and B:

\[
D_B = \frac{D_{AB}}{\sqrt{1 + \frac{P_A}{P_B}}}
\]

where,

- \(D_B\) – distance from B city to the outermost limit of its sphere of influence
- \(D_{AB}\) – distance between two cites (A and B)
- \(P_A\) – number of inhabitants of A
- \(P_B\) – number of inhabitants of B

This calculation formula is among the most used as it supposes accessible statistical data and allows for a concrete determination of the limits on the map. Moreover, the comparison to the survey method confirmed the proximity of the data obtained (Noin D., 1976, quoted by Ianoș I., 2000).

II. Analysis

Ploiești county seat is a first rank city – national county seat, potentially of European influence. Its population counts 227,194 inhabitants (Statistical Yearbook of Romania, 2012), representing 27.95% of the county’s total population\(^2\).

The information and the documents of the local and regional authorities or from different specialized works contain several variants of appreciation/delimination of the sphere of influence of Ploiești county seat (as definition and content – Table 1). Thus, the most frequently, one can encounter the notions of urban agglomeration, metropolitan area or growth pole, covering different which do not always agree with the scientific rigors or with the legislative regulations.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Territorial-demographic features(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Urban agglomeration(^4)</td>
</tr>
<tr>
<td>Area</td>
<td>102.96 km(^2)</td>
</tr>
<tr>
<td>Population</td>
<td>26,240 inhab.</td>
</tr>
<tr>
<td>Average density</td>
<td>254.8 inhab./km(^2)</td>
</tr>
</tbody>
</table>

Data source: Statistical Yearbook of Prahova County, 2010 and C.J. Prahova

\(^1\) An important practical role in delimiting the town’s sphere of influence goes to W. J. Reilly (1931), inventor of a gravitational model bearing his name inspired by Newton’s law of universal attraction (Ianoș I., 2000).

\(^2\) Prahova County totals 812,844 inhabitants, out of whom 408,646 (50.27%) live in the urban area.

\(^3\) Without Ploiești City.

\(^4\) It includes the communes Brazi, Blejoi and Bărcănești.

\(^5\) It includes the communes Ariceștii-Rahtivani, Bărcănești, Berceni, Blejoi, Brazi, Bucov, Păulești and Târgșorul Vechi.

\(^6\) It includes the towns Bâicoi, Boldești-Scăeni, Plopeni and the communes Ariceștii-Rahtivani, Bărcănești, Berceni, Blejoi, Brazi, Bucov, Dumbrăvești, Păulești, Târgșorul Vechi and Valea Călugărească.
By applying the formula presented above, in a double sense, namely both for Ploieşti in relation to the other towns of Prahova County, and for each of those towns in relation to Ploieşti, we will try to obtain a synthetic and integrated analysis on the level of the urban system (network) of the county. At the same time, carrying out the calculations for the county seats of the neighbouring counties, an evaluation in a regional context will also be possible.

Table 2 presents the population of the towns of Prahova County, according to the latest statistical data available (www.insse.ro), the distance between them and Ploieşti and the dimension of their sphere of influence.
A. During a first stage, we calculated, based on the Reilly-Converse formula, the distance up to which the influence of each town in Prahova County can be felt in relation to Ploieşti.

Example of calculation for Câmpina, the second-largest city of Prahova County:

\[
D_{\text{Câmpina}} = \frac{35}{\sqrt{1 + \frac{227,194}{36,842}}} = \frac{35}{2.67} = 13.10
\]

<table>
<thead>
<tr>
<th>No.</th>
<th>City/Town</th>
<th>No. of inhabitants</th>
<th>Distance to Ploieşti</th>
<th>Radius of the sphere of influence towards Ploieşti</th>
<th>Radius of the sphere of influence of Ploieşti towards Town</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ploieşti (county seat)</td>
<td>227,194</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Câmpina (county seat)</td>
<td>36,842</td>
<td>35 km</td>
<td>13.10 km</td>
<td>32.71 km</td>
</tr>
<tr>
<td>3</td>
<td>Azuga</td>
<td>4,902</td>
<td>78 km</td>
<td>11.35 km</td>
<td>77.22 km</td>
</tr>
<tr>
<td>4</td>
<td>Băicoi</td>
<td>19,588</td>
<td>22 km</td>
<td>6.23 km</td>
<td>21.35 km</td>
</tr>
<tr>
<td>5</td>
<td>Boldeşti-Seâni</td>
<td>11,372</td>
<td>12 km</td>
<td>2.62 km</td>
<td>11.76 km</td>
</tr>
<tr>
<td>6</td>
<td>Breaza</td>
<td>17,390</td>
<td>41 km</td>
<td>3.20 km</td>
<td>39.80 km</td>
</tr>
<tr>
<td>7</td>
<td>Buşteni</td>
<td>9,998</td>
<td>74 km</td>
<td>15.19 km</td>
<td>72.54 km</td>
</tr>
<tr>
<td>8</td>
<td>Comarnic</td>
<td>12,955</td>
<td>52 km</td>
<td>12.09 km</td>
<td>50.98 km</td>
</tr>
<tr>
<td>9</td>
<td>Mizil</td>
<td>16,080</td>
<td>35 km</td>
<td>9.02 km</td>
<td>33.98 km</td>
</tr>
<tr>
<td>10</td>
<td>Plopeni</td>
<td>9,422</td>
<td>15 km</td>
<td>2.99 km</td>
<td>14.70 km</td>
</tr>
<tr>
<td>11</td>
<td>Sinaia</td>
<td>11,563</td>
<td>65 km</td>
<td>14.31 km</td>
<td>63.41 km</td>
</tr>
<tr>
<td>12</td>
<td>Sălănic</td>
<td>6,543</td>
<td>39 km</td>
<td>6.53 km</td>
<td>38.61 km</td>
</tr>
<tr>
<td>13</td>
<td>Urlaţi</td>
<td>11,363</td>
<td>22 km</td>
<td>4.80 km</td>
<td>21.48 km</td>
</tr>
<tr>
<td>14</td>
<td>Vălenii de Munte</td>
<td>13,434</td>
<td>29 km</td>
<td>6.85 km</td>
<td>28.32 km</td>
</tr>
</tbody>
</table>

B. During a second stage, we tried to evaluate the sphere of influence, based on the same type of calculation, in a regional context, in relation to the county seats of the neighbouring counties. The results obtained were:

- influence of Ploieşti in relation to Bucharest - \( D_{\text{Ploieşti}} = 19.48 \) km
- influence of Ploieşti in relation to Buzău - \( D_{\text{Ploieşti}} = 56.00 \) km
- influence of Ploieşti in relation to Braşov - \( D_{\text{Ploieşti}} = 73.64 \) km
- influence of Ploieşti in relation to Târgovişte - \( D_{\text{Ploieşti}} = 42.73 \) km
- influence of Ploieşti in relation to Slobozia - \( D_{\text{Ploieşti}} = 116.36 \) km

Conversely, the influence of these cities on Ploieşti can be felt up to the following distances:

- Bucharest in relation to Ploieşti – 57.14 km
- Buzău in relation to Ploieşti – 42.68 km
- Braşov in relation to Ploieşti – 81.34 km
- Târgovişte in relation to Ploieşti – 26.59 km
- Slobozia in relation to Ploieşti – 55.41 km

By analyzing Figure 2, we can note a series of aspects:

\( \Rightarrow \) first of all, one can note a hardly balanced repartition of the towns in the county: high density of the cities/towns along Prahova Valley and north of Ploieşti, while large areas elsewhere contain no town at all. For the south of the county, the explanation is given by the low distance to the Capital, the latter exerting a very high influence and pressure, which, along with the existence of Ploieşti City, make the existence of any other town/city in this area feel superfluous;
AREA OF INFLUENCE OF THE CITIES
IN THE URBAN SYSTEM OF PRAHOVA COUNTY

LEGENDA
- Town
- County seat
- Limit of the administrative-territorial unit
- Sphere of influence of the towns in relation to Ploiești
- Radius of the sphere of influence of Ploiești
- Superposition of the spheres of influence

Fig. 2
very limited sphere of influence for the towns/cities situated near Ploiești, a phenomenon explainable by the pressure the latter exerts on them, a pressure limiting the force of gravity of these small towns;

- a larger sphere of influence of the resort towns in the north-west of the county, despite their limited demographic size – a fact explainable by their remoteness from Ploiești and, on the other hand, by their more diverse functions, especially the tourist one. Actually, respectively for Sinai and Bușteni, and for Bușteni and Azuga there appears as well a situation of superposition and interpenetration of the spheres of influence. Another aspect to be noticed here, resulting from the calculations from B., is that the respective towns/cities experience the influence of Brașov county seat much stronger than the influence of Ploiești – the stronger connections with Ploiești being rather political-administrative than functional;

- concerning the sphere of influence of Ploiești in relation to the towns of Prahova County, the following situations can be highlighted:
  a. low, where the sphere of influence of the county seat does not intersect/overlap the sphere of influence of the town/city – Mizil, Vălenii de Munte, Plopeni, Breaza;
  b. balanced, where the sphere of influence of the county seat extends beyond the border of the sphere of influence of the town/city – Sinaia, Slănic, Câmpina;
  c. overlapping, where the sphere of influence of the county seat overlaps to a certain extent the sphere of influence of the town/city – Azuga, Bușteni, Comarnic, Băicoi, Boldești-Scâeni and Urlați.

III. Conclusions

Despite its large number of towns/cities (for a long while, Prahova County was the only county to occupy the first position in this sense in Romania), there are large areas that are not in the sphere of influence of any town/city because of the way they are positioned. At the same time, although being the county with the largest number of inhabitants in the Romania, the urban population only slightly goes over the threshold of 50% (Catană Monica Carmen, 2012).

The role of the means of communications, of the possibilities of access in general, is highlighted in the case of Ploiești county seat as well by the fact that, although its sphere of influence covers the entire area of Prahova County, in some areas, along some communication axes, it even goes beyond the limits of the county.

The urban system of Prahova County is relatively unbalanced, seeing the functioning of the types of relations it relies upon – political-administrative, economic, demographic and service-related. Its stability is “threatened” - in point of these functions - in the north-west by the county seat of Brașov and in the south by Bucharest, which both exert centripetal forces in relation to Ploiești. Although it may seem surprising at first sight, Bucharest does not represent a “danger” (although its influence in relation to Ploiești goes beyond the limits of Prahova County), because south of Ploiești there are no other towns in Prahova County.

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