



**Centrul de Cercetare a Mediului și Efectuarea Studiilor de Impact**

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## Annual scientific report

*Developing a model of integrated planning regarding the public and private  
services accessibility in metropolitan areas*



**M.Acc.Net**

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**Stage 2018**

*UEfiscodi*





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## 1. Level of fulfillment

### Stage 2018: Establishing the general framework for evaluating public and private services in metropolitan areas – Part I

Implementation period: 10.10.2018 – 31.12.2018

#### Planned activities

Label	Obtained results	Level of fulfillment
A1.1. Evaluation of the functionality of metropolitan areas in Romania	1. Identification of existing metropolitan areas and those in progress or with implementation projects;	100%
	2. Identification of demographic and spatial characteristics for active metropolitan areas;	
	3. Calculation of fundamental functionality indicators: <ul style="list-style-type: none"> <li>- Shape index (<math>F_i</math>);</li> <li>- Concentricity index (<math>I_{conc}</math>);</li> <li>- Homogeneity index (<math>I_{omg}</math>);</li> <li>- Absolute size index (<math>I_{ma}</math>);</li> <li>- Average slope;</li> <li>- Altitude difference.</li> </ul>	
	4. Identification of strengths and weaknesses regarding the degree of functionality for active metropolitan areas in Romania.	

#### Results

Provided	Accomplished	Status
Participation in 1 national conference	1. <b>Gavriliidis A.A.</b> , Popa A.M., Niculae I.M., Niță M.R., (2018), <i>Urban green infrastructures: the challenging path from concept to implementation/Infrastructuri verzi urbane: calea de la concept la implementare</i> , <b>Geography in the Romanian centenary - Challenges of Environment and Human Dimension</b> , 17 noiembrie, București	Result achieved
1 annual report	1. <b>Annual scientific report for Stage 2018</b>	Result achieved

## 2. Establishment of the general framework for the evaluation of public and private services in metropolitan areas (Stage 1 - part I)

### 2.1. Evaluation of the functionality of the metropolitan areas in Romania - Activity 1.1.

In the case of the Romanian metropolitan areas, the functionality criteria were not a priority or a serious concern at the time of their declaration. Among the fundamental criteria of functionality are: *shape, concentricity, homogeneity, size, fragmentation terrain and specific altitude difference*. These indicators are related to the degree of coverage with different infrastructures and the operating costs of the metropolitan area.

The results show that the metropolitan areas of Oradea and Cluj register  $F_i$  values lower than 0.5, meaning that their shape is closer to the circular one. At the opposite pole we have the metropolitan areas Constanța ( $F_i = 0.64$ ), Botoșani, Brașov, Craiova (all with  $F_i = 0.62$ ) which are characterized by more irregular shapes.

$I_{conc}$  values that record values close to 0 indicate a higher concentricity of the metropolitan area. We can see in addition to the simplified shape of the metropolitan areas and their arrangement in relation to the cardinal points. The metropolitan areas of Iași and Constanța have a longitudinal arrangement (N-S) because they are on the eastern border, respectively in the coastal region. The concentricity index highlighted the fact that the Cluj Napoca metropolitan area ( $I_{conc} < 0.5$ ) is the most concentric of the 9 areas studied, a situation strengthened by its disposition on its 8 cardinal directions.

Metropolitan areas with a high degree of homogeneity of the territory should register  $I_{omg}$  values equal to 1. Index values less than 1 or negative are translated by a low degree of homogeneity of the territory and those above 1 are translated by the presence of a territory homogeneous with rectangular shapes.

Our results showed that the metropolitan area with the most homogeneous territory is Oradea ( $I_{omg} = 0.63$ ), the counterexample being the metropolitan area Craiova ( $I_{omg} = -0.19$ ) which is characterized by a sprawling shape.

The lower the  $I_{ma}$  value, the more the area of the metropolitan area has the potential for more efficient management. The obtained results highlight the fact that out of the 9 metropolitan areas analyzed, the one of Brașov has the most adequate surface from the perspective of efficient



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management. On the other hand, the Oradea metropolitan area can be considered to have an unsustainable surface.

Another criterion designated for assessing the functionality of metropolitan areas is related to land fragmentation. The results obtained are predictable and show that the metropolitan areas located in the plain regions have lower average slope values as opposed to those in the hill and mountain areas.

The last criterion considered for determining the degree of functionality of metropolitan areas is the altitudinal gap. This is represented by the difference between the maximum and the minimum altitude in the analyzed metropolitan area. The higher it is, the greater the complexity of the landscape in the analyzed metropolitan area. On the one hand, this aspect is a positive one because a greater complexity of the landscape implies a wider range of ecosystem services provided, access to various resources and a greater degree of attractiveness. From the perspective of functionality, however, a complex landscape in terms of the typologies encountered also requires a complex management with a higher local economic impact. This does not mean that a metropolitan area with a high-altitude gap is less functional but makes it more vulnerable to planning errors or inconsistencies. As expected, the metropolitan areas with a large altitudinal gap are Brașov and Baia Mare (1916 m, respectively 1195), at the opposite pole being the metropolitan areas in the coastal and plain regions.

An overview of the criteria chosen for evaluating the functionality of the Romanian metropolitan areas shows that there is no metropolitan area that excels in all 6 fundamental functionality indices. Among the metropolitan areas with good scores at these indices is the Oradea metropolitan area (the best score at 2/6 indices). On the other hand, the metropolitan area of Constanța has the most negative values recorded (the weakest score at 2/6 indices).



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## Conclusions

The completion of the first Stage I of the MAccNet project meant providing preliminary results, necessary to achieve the project objectives. The evaluation of the functionality of the Romanian metropolitan areas leads to the correct elaboration of an integrated planning model regarding the accessibility of public and private services in the Romanian metropolitan areas. The calibration of the methods and indices proposed in the development stages of the project will be done permanently using as case studies the metropolitan areas with legal status in Romania, as was the case in this first stage of implementation. Once the methodological framework is finalized, the elaboration of the model will be done using as a case study one or more metropolitan areas proposed or being approved in Romania. Thus, in addition to increasing the visibility of Romanian research in the field at national and international level and the scientific substantiation in the field of the project director by achieving the results proposed in the project, the applicability of the project results will be strengthened. In this way, the reduction of discrepancies between the Romanian scientific environment and local and regional decision-makers and urban planning policies is envisaged.