Approaching the role and hierarchy of the spatial network in Greece

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Abstract

Given the general problem at the European level regarding the spatial network hierarchy, but also given the fact that the process of designing and using classifications must be attempted in a way that allows their constant updating and feedback depending on the dynamics of relationships developed in urban systems, This proposal identifies the differences in classification between the first (2003–2004) and the second generation (2018–2019) of regional spatial plans, in accordance with the General Spatial Plan.

In addition, using evaluation criteria belonging to the three main thematic areas; population, geographical location, services, and infrastructure, the paper proposes a new categorization of Greek spatial network that reflects the existing relationships and trends, as well as a picture of the spatial dynamics and intra-regional reach of the classified cities. Furthermore, the criteria used refer to population size, geopolitical location, accessibility, regional services, production infrastructure, research and technology infrastructure, and higher and technical education.

From all of the above, it is appropriate to expand the methodology and criteria for prioritizing the spatial network at both the national and regional level. For further research, more criteria will be added from literature, complementing new thematic units of social life and forming a multifactorial system of variables on the basis of which the residential network will be re-examined and, of course, will require a new prioritization at a later stage.

Keywords

Spatial network, criteria, system of hierarchy, regional spatial plans, spatial policy

1. Introduction

1.1 Aim and scope

To study, examine and classify issues related to the hierarchy of spatial networks in Greece and the criteria on which it is based. This work aims to identify the differences in the hierarchy of the spatial network as it results in 15 years from the institutionalization between the first and the second generation of regional spatial planning frameworks and, moreover, a new assessment with additional criteria, the introduction of a new dimension of the typology of Greek cities, for its more accurate hierarchy of the spatial network.

As part of a broader research project, this paper offers insights into the need to review and improve the spatial network criteria in order to apply them to current and ongoing urban and regional policies, both at the national and European levels.

1.2 Methodology

The proposal is based on bibliographic research and available data from the spatial network categories as captured in the General Spatial Plan, the twelve new generation Regional Spatial Plans, for the first three levels.

2. Conceptual framework

A spatial network is defined as the set of interdependent settlements that are included in a region, in a country, or a set of countries (Angelidis, 2000).

The specific definition given itself contains the three basic concepts, which are studied below. First, the concept of "network" refers to both the hierarchy and a wider system of levels of settlements. Then, there is the concept of interdependence. There is talk of the existence of relationships and correlations both within and outside the environment of the network itself. These relationships can be either competitive or complementary. Finally, the spatial scope of each settlement, whether intra-regional or national, gives another weight to the third basic concept, that of the "administrative level". Therefore, the spatial network can be approached from a physical, functional, and administrative perspective. Consequently, the spatial distribution, size, and location and the socio-economic function are two basic components of the description and organization of the spatial network (Gemenetzi, 2011).

A spatial network is defined in the model as a linked set of cities that share ideas and across which commuters move readily. In a sense, a network is just like a city, but with weaker links (Glaeser et. Al., 2015). The first urban networks emerged to facilitate the trade in goods. Networks came before mega-cities because of high transport costs. As argued by Christaller's (1933) Central Place Theory, historically farmers would only travel as far as small market towns to sell, and then merchants brought those goods to regional centers and great national cities. Europe and the eastern United States urbanized when transport costs were high, and so dispersed smaller cities remain.

In the field of urban and regional planning and spatial analysis, the interest for complex networks has noticeably increased recently. The activity on complex networks has been extended to the using of weighted criteria (De Montis et. Al., 2007). This model allows the consideration of features pertaining to the dynamics and traffic flows occurring on networks, adding another dimension in the description of these systems.

From time to time, many attempts have been made to prioritize cities and settlements in Greece (some of them important for their time, and some others to maintain their value to this day), which, however, are based on methods considered obsolete for decades (Theodora & Loukakis, 2011).

3. The hierarchy of spatial network in Greece through regional planning tools

As a spatial network policy proposal, it was formulated for the first time in Greece, by Doxiadis in 1945, as Deputy Minister of Reconstruction, based on a 20-year housing policy plan for the country that linked the development process with the spatial planning organization (Economou, 2009).

There were various approaches to this policy, until 1983 and the "Proposals of Spatial Organization" of the then Ministry of Spatial Planning, Settlement and Environment, which included a general policy for the spatial network, from the level of the prefecture capital down, creating essentially, five levels of the urban network, which depended on the existence of certain public sector functions. This was the last effort to focus on the spatial network policy.

In the Regional Spatial Plans which developed in the second half of the 1990s but enacted in 2003-2004, there is a reference to the spatial network, but this is not a new policy. In the table below, is presented the evolution of the spatial network policy in Greece.

Cities	**Regional Spatial Plans** (2003-2004)	**General Spatial Plan** (2008)	**Regional Spatial Plans** (2018-2019)
Athens	1st level	Metropolis	1st level
Thessaloniki			
Large cities	2nd level	Primary national poles	2nd level
Medium cities	3rd level	Secondary national poles	3rd level
Small cities	4th level	Other national settlements	4th level
Settlements	5th level	Other urban centers with population > 10,000 hab.	5th level

Table 1: The evolution of the spatial network policy in Greece as today.
Source: Economou (2009), Own processing.

The purpose of the General Spatial Plan (2008) is to determine the strategic development directions for the integrated spatial development and sustainable organization of the national territory until 2023.

The General Spatial Plan is heavily influenced by the European Cohesion Policy, the logic of regional development, and, in particular, the elimination of inequalities between regions; it also adopts the philosophy of polycentric organization of national space, through the creation of a network of development poles and axes, which ensures socio-economic cohesion and strengthens the country's international competitiveness.

The concept of the growth pole is based on the theory of Perroux (1955), who attributed this concept to the concentration of economies and/or businesses that will lead to the development of the economy as a whole. This has a similar application when it comes to a pole and the development of a geographical area.

In general, the multicentre structure of the network is sought, i.e. the existence of many important growth poles, which will become increasingly competitive in the international environment. However, there are no clear criteria for the hierarchy and typology of the national space. In no case is the size of the population and administrative structure enough to prioritize the country's spatial network. Besides, the weight of cities sometimes exceeds their geographical and administrative limits (Theodora & Loukakis, 2005).

However, these two parameters are the result of socio-economic and political processes, respectively, i.e., the population size is the result of urbanization, while the administrative division is the result of centralization of power from the central administration and frequent changes in the administrative structure (Programs "Kapodistrias," "Kallikratis," and "Klesthenis I").

The goal of the country's multicentre development, therefore, does not seem to have been achieved so far, and now, it may be considered doubtful whether it will be achieved eventually, because, on the one hand, geomorphology makes it impossible for urban-rural systems to function, and on the other hand, development trends and the need to attract investment in the post-crisis era have created other spatial balances and dependencies.

Concerning the first generation of institutionalized Regional Spatial Plans (2003-2004) considered the criteria set by the General Spatial Plan for the prioritization of the spatial network within a region. A couple of them introduce the concepts of "complementarity" and "networking" between residential centres, mainly in terms of the functions they develop. The approach of creating nodes, and the polycentric structure of the spatial network in general, are maintained here as well.

The newly revised Regional Spatial Plans, both the approved and the studies under preparation, have as a whole highlighted the need to adjust the broader logical hierarchy of the spatial network followed in the General Framework, considering it the most up-to-date.

In none of the new Spatial Plans is any reference to hierarchy criteria. It is useful to incorporate other criteria, such as those of the development perspective of each region, but also of the city, the networking between the settlements and the functional interdependence that exists due to the diffusion of activities in the area. In no case are criteria set that relate to cultural, socio-economic, or demographic characteristics.

The concept of balanced and multicentre development is translated differently at different levels of design, always considering the scope of the settlements. The perception of the pole of development at the national level is clearly different from the dipoles and complementarity observed at the regional level. It is necessary to have flexibility, shortening and simplification of planning processes, and, of course, to be able to incorporate directions representing and relating to the country's development trends.

4. Reviewing the criteria of the spatial network

From all the above, it is appropriate to expand the methodology and criteria for the prioritization of spatial network at both national and regional level. Theodora and Loukakis (2005) have attempted such an effort to organize the evaluation criteria into three main thematic units: "population," "geographical location," and "services and infrastructure."

no	Thematic unit	Criteria
1	**Population &**	Population size
		Citizen participation / Civil society

	Social environment	Social justice / Equal opportunities
		Flexibility - Creativity
		Lifelong learning
2	**Geographical position & Transport - accessibility**	Geopolitical position
		Accessibility
		Transport networks
		Transport density
3	**Services & Infrastructure**	Regional services
		Production infrastructure
		Research and technological infrastructure
		University education
		Technology - Innovation

Table 2: Thematic unit and criteria.
Source: Theodora and Loukakis (2005), Own processing.

Over the past 20 years, urban hierarchy has become a central tool for assessing the attractiveness of urban areas. In several comparative studies carried out, cities are evaluated and ranked according to different economic, social, geographical, and other characteristics (Giffinger et al., 2007).

For this above categorization, other criteria from a plethora of literature (ESPON - European Union (2018), Giffinger et al. (2007), Giffinger et al. (2008), Hoornweg et al. (2007)), which complement new thematic units of social life and compose a multifactorial system of variables, are re-examined and, of course, at a later stage, need re-prioritization.

no	Thematic units	Criteria
1	**Natural environment & Quality of life**	Adaptation to climate change
		Energy consumption
		Air quality
		Urban mobility and accessibility
		Environmental quality
		Waste management
		Building stock quality
2	**Political environment**	Justice and security
		Internal stability
		Legal security
		Violence & Crime
3	**Economic environment**	GDP per capita
		Households below the poverty line
		Long term unemployed
		Economic stability
		Business environment
		Investment interest

Table 3: New thematic units and criteria for spatial network.
Source: Own processing.

5. Conclusions

To conclude, it is appropriate to expand the methodology and criteria for prioritizing the spatial network at both the national and regional level. It is imperative that more thematic units and categories need to be applied, strengthened and combined with other criteria. The

spatial network policy in Greece needs to be revised by enhancing with new dimensions and approaches, under the new circumstances of economic crisis and pandemic.
For further research, more criteria will be added from literature, complementing new thematic units of social life and forming a multifactorial system of variables on the basis of which the residential network will be re-examined and, of course, will require a new prioritization at a later stage.

BIBLIOGRAPHIC REFERENCES

Angelidis, M. (2000) Spatial planning and sustainable development. Athens: Symmetria Publications. (in Greek)

De Montis, A., Barthélemy, M., Chessa, A. and Vespignani, A. (2007) The Structure of Interurban Traffic: A Weighted Network Analysis. *Environment and Planning B: Planning and Design*. **34**(5), pp. 905–924.

Economou, D. (2009) *Spatial planning policy*. Teaching notes. Volos: University of Thessaly. (in Greek)

ESPON - European Union. (2018) *Working Paper - Indicators for integrated territorial and urban development.* [online] Available at: https://www.espon.eu/sites/default/files/attachments/Working%20Paper%20Indicators%20for%20integrated%20development.pdf [τελευταία πρόσβαση: 29/11/2019].

Gemenetzi, G. (2011) Urban sprawl and spatial network: concepts and analysis tools. The case study of Thessaloniki. Doctoral thesis. Department of Architectural Engineering, Aristotle University of Thessaloniki. (in Greek)

Giffinger, R., Krama, H. and Haindl, G. (2008) The role of rankings in growing city competition. XI EURA CONFERENCE, Milan, 9-11 October.

Giffinger, R. Fertner, C., Krama, H. and Meijers, E. (2007) *City-ranking of European medium-sized cities*. [online] Available at: http://www.smart-cities.eu/download/city_ranking_final.pdf

Glaeser, E. L., Ponzetto, G.A. M. and Yimei, Z. (2015) Urban Networks: Connecting Markets, People, and Ideas. *Barcelona GSE Working Paper Series.* **841**. Available at: https://ssrn.com/abstract=2703199

Hoornweg, D., Nunez, R.F., Freire, M., Palugyai, N., Villaveces, M. and Wills, E. (2007) City Indicators: Now to Nanjing. *Policy Research Working Paper. No. 4114. Washington, DC: World Bank.*

Theodora, Y. and Loukakis, P. (2005) Typology of Greek cities with criteria of regional scope, *Aeichoros Scientific Journal*, 4(**2**), pp. 128-157. (in Greek)

Theodora, Y. and Loukakis, P. (2011) Trends in the network of urban centers in Greece, *Aeichoros Scientific Journal*, **15**, pp. 102-129. (in Greek)