

INNER STRUCTURE OF FUNCTIONAL REGION: THEORETICAL ASPECTS

VNITŘNÍ STRUKTURA FUNKČNÍHO REGIONU: TEORETICKÉ ASPEKTY

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Annotation

The contribution addresses theoretically the inner structure of functional region. It defines types of functional regions on the basis of selected criteria regarding their inner structure. As classification criteria a number of cores in a region, their hierarchical importance and character of interaction relationships between them and within a region have been employed. A study of functional regions is not important only for geography, but also for regional and spatial science and for planning practise.

Key words

functional region, inner structure, types of regions

Anotace

Příspěvek se z teoretického hlediska zabývá vnitřní strukturou funkčního regionu. Na základě zvolených kritérií týkajících se vnitřní struktury definuje typy funkčních regionů. Klasifikačními kritérii byly počet jader v regionu, jejich hierarchický význam a charakter interakčních vazeb mezi nimi i v rámci regionu. Studium funkčních regionů a vnitřní struktury nemá význam pouze pro geografii, ale také pro regionální a prostorovou vědu a pro plánovací praxi.

Klíčová slova*funkční region, vnitřní struktura, typy regionů***JEL classification:** J01, J40, R10, R12**Introduction**

The contribution attempts to provide a theoretical insight into the inner structure of functional region and follows our recent work published in the same series of proceedings (Klapka et al., 2013). The analysis of links within functional regions helps to reveal not only their inner structure, but their typology and function can be put forth. A study of functional regions has important practical implications that might be of interest not only for geographers but also for spatial economists, regional planners and political decision makers.

Administrative or political divisions do not reflect fast changes in geographical reality, thus they can manifest a considerable degree of inefficiency. Correctly defined functional regions can serve better as a geographical tool for normative use than administrative regions. Functional regions can be used for assessment of regional disparities, labour market policy, allocation of investments, planning of transport infrastructure etc., actually everywhere where there is a need for some kind of spatial units with an internal geographical logic in order to reduce a possible spatial bias caused for instance by the political decisions or the modifiable areal unit problem. All that has been said so far concerns also the inner structure of functional regions, since its identification and analysis provide more thorough information.

1. Concept of functional region

Current geography and spatial science distinguishes between two basic types of regions: formal and functional. They differ in a form of spatial organisation and inner structure (Nystuen, Dacey, 1961; Haggett, 1965; Brown, Holmes, 1970; Bašovský, Lauko, 1990; Klapka, Tonev 2008; Klapka et al., 2013). A functional region is based on the horizontal spatial flows. These functional links (hence the term functional region) are determined by the polarisation of space, which is a product of heterogeneity of geographical environment (Klapka, Tonev, 2008). The functional links, or interactions, are represented by flows of persons, capital, information etc. The important features of the interactions are their distance, intensity and orientation; virtually they have a character of a vector.

A significant role in the concept of functional region is played by a regional core that organises whole region and that attracts or radiates the greatest portion of interactions. However, the existence of core is not a necessary condition for definition of functional region (Klapka et al., 2013). The primary and only condition is a self-containment of a region (Klapka et al., 2013). The self-containment rests in the principles of internal cohesiveness and external separation of regions, which claim that intra-regional interactions should be maximised and inter-regional interactions should be minimised (Smart, 1974; Fischer, 1980; Karlsson, Olsson, 2006; Farmer, Fotheringham, 2011; Klapka et al., 2013).

2. Inner structure of functional region

The inner structure of functional regions is more distinct than in case of formal regions. Its study has a long tradition in geography and spatial science dating back to the analysis of location of agricultural production (von Thünen, 1826) and grand localisation theories (Christaller, 1933; Lösch, 1940; Isard, 1956). All these authors addressed in a way the simple inner structure of functional region. In this conception the functional regions has a core, its hinterland, and periphery, identified particularly on the basis of different intensity of intra-regional interactions basically following the distance decay function from a core (Halás et al., 2014).

More complex approach to the development of the inner structure of functional region is provided by Haggett (1965, 2001), when apart from the interaction intensity the important role is played by direction, orientation and pattern of flows within a region and existence of other cores at different hierarchical levels. Based on these characteristics different types of functional regions can be identified (Klapka et al., 2013), for instance functional urban regions (e.g. Berry, 1973), daily urban systems (e.g. Berry, 1973; Coombes et al., 1979), travel-to-work areas (e.g. Ball, 1980; Coombes, Openshaw, 1982) or local labour market areas (e.g. Casado-Díaz, 2000; Casado-Díaz, Coombes, 2011). These types are based particularly on the qualitative character of interactions, their periodicity and orientation.

The typology of functional regions proposed in this contribution is primarily based on their inner structure. In this case the inner structure generally respects spatial patterns, orientation and intensity of a region-organising interaction. Moreover, three classification criteria are employed in order to identify types of functional regions concerning the relationships between cores:

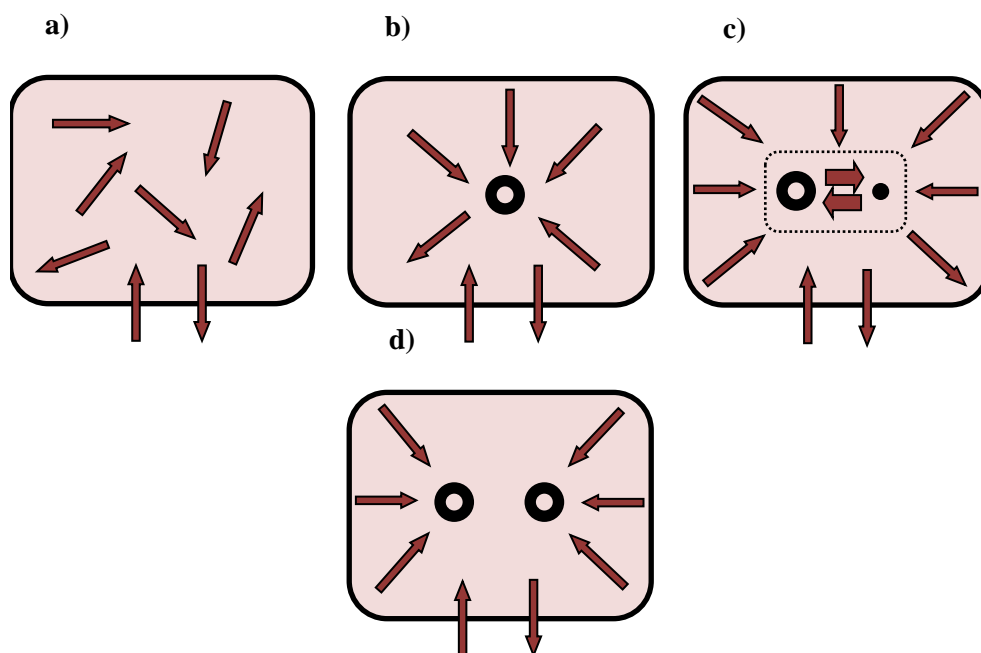
- number of basic spatial zones qualifying as cores,
- hierarchical level of basic spatial zones qualifying as cores,
- nature of relationships between basic spatial zones qualifying as cores.

The application of the first criterion provides four theoretical possibilities (fig. 1):

- functional region has no core, interactions have random patterns (fig. 1a),
- functional region has one core consisting of one basic spatial zone, interactions have concentric pattern (fig. 1b),
- functional region has one core consisting of more basic spatial zones, interactions have concentric pattern, the most significant interactions occur between spatial zones forming a core (fig. 1c),
- functional region has more cores, interactions have concentric pattern, relationship between cores is indifferent (fig. 1d).

Even if there is a theoretical possibility that a functional region has no core, in practise it is usually organised around one or more cores. The third case mentioned about is a special instance of spatially conditioned cooperation or complementarity (see below) that produces a contiguous core made of more basic spatial zones that are interlinked by the interactions of similar intensity.

Fig. 1: Types of functional regions based on the criterion of the number of zones forming a core



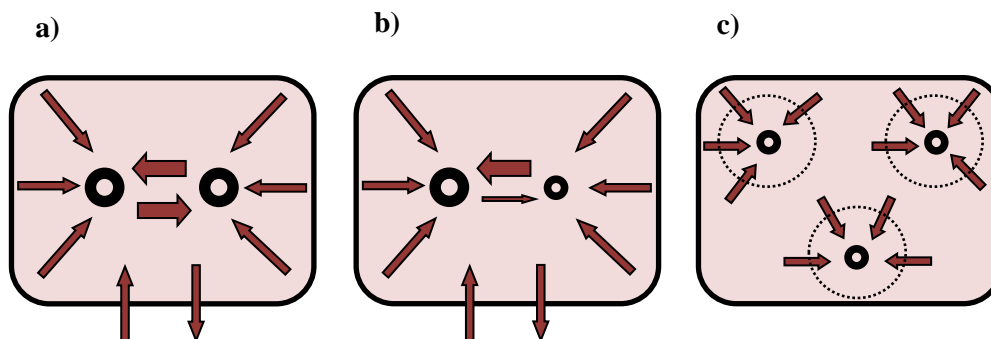
Source: authors' elaboration.

The application of the second criterion provides two theoretical possibilities that come out from the situations 3 and 4 as it was mentioned above. The cores in a functional region have either the same hierarchical position or level (1), or have a different hierarchical position or level (2). The application of the third criterion provides three theoretical possibilities that are closely related to the preceding criteria. Relationships between cores can possess a character of: cooperation (1), complementarity (2) and competition (3).

The first case (fig. 2a) occurs when there are two or more cores at the same hierarchical level in a region. The mutual flows between cores are the most significant with a region and their intensity should be more or less equal. Cores also equally share the hinterland of such a region (fig. 2a). The second case occurs when there are two or more cores at different hierarchical levels. It can be assumed that the strongest ingoing flows out of relationships between the cores concern hierarchically higher core. It also attracts most flows from remaining basic spatial zones in a region. Hierarchically lower core in a way “supplements” the higher core and can contribute to greater size or higher self-containment of a region. Identification of cooperative and complementary relationships can be rather complicated, particularly thanks to their seeming similarity.

The difference between cooperation and complementarity rests in a hierarchical difference between cores and in a different intensity of mutual relationships between cores. A special instance of complementarity can be identified when a minimum size and self-containment are defined for a region (fig. 2c). Multiple core regions can be organised around several cores of similar importance (i.e. hierarchical level), which are not individually able to form their own regions according to demanded parameters. This case of complementarity does not show any importance flows between the cores and the resulting region is a cluster of several smaller autonomous areas. Configuration of resulting region is usually based on the distance decay function between cores of incident smaller autonomous areas.

Fig. 2: Types of functional regions based on the criteria of hierarchical position of cores and quality of relationships between them



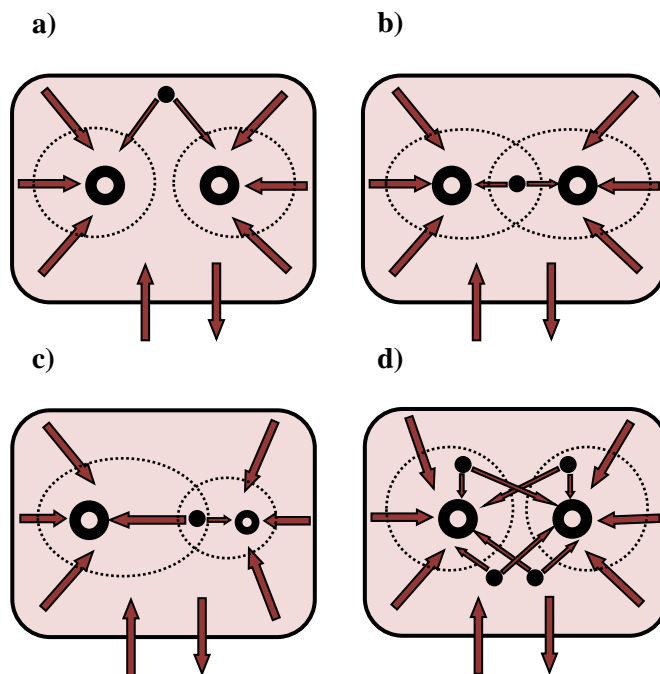
Source: authors' elaboration.

So far all cases assumed that there is no competition for hinterland between cores within a region and that most of remaining basic spatial zones are unambiguously attracted to one core. The third case of relationship between cores identifies the situation when cores compete for their hinterland. The competitive relationships are conditioned by the orientation and intensity of flows in the hinterland of a region, it means outgoing flows from basic spatial zones that did not qualify as cores. The competitive situation occurs when significant outgoing flows from basic spatial zones are attracted to several cores simultaneously.

Four theoretical competitive situations can be identified (fig. 3). First, each core can organise its own relatively autonomous hinterland and the competition occurs in the peripheral areas near boundaries of influence for each core (fig. 3a). Second, two cores compete for the interjacent and mutual part of their hinterlands that overlap (fig. 3b). Third, analogical situation as in fig. 3b occurs, but the competing cores are at different hierarchical levels (fig. 3c). A core at higher level has a competitive advantage against a core at lower level and attracts more significant outgoing flow from the interjacent

basic spatial zone. Fourth, a complex pattern of competitive relationships occurs within a functional region regarding both immediate hinterlands of cores and more peripheral areas (fig. 3d). This pattern is likely to occur in settlement conurbations.

Fig. 3: Competitive relationships within functional region



Source: authors' elaboration.

Conclusion

The contribution has identified a number of theoretical relationships within a functional region that can be used for a typology of functional regions based on their inner structure. Three basic distinct classification criteria (number of regional cores, their significance and quality of interactions) have been used to do so and their combination would provide 14 theoretical possibilities. Only those that can be expected to occur in reality have been presented in this contribution. Mono core regions manifest strong concentric relationships oriented at a core. Multiple core regions exhibit cooperative, complementary or competitive relationships and a hierarchical position of cores in a settlement system plays its role.

A step forward, being out of range of this contribution, is to identify real situations representing theoretical suggestions in real settlement and regional system. However, identification of some types of functional regions in their pure form can be rather complicated, since it can be assumed that transitory types may exist. The typology can be based on various interaction flows organising a functional region (labour commuting, school commuting, services commuting, information flows), but for practical reasons the employment of daily travel-to-work flows appears to be most suitable for this tasks.

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