

Cultural Activity as a Central Function: the Example of Croatia

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The features of cultural activities - their gravitational range, degree of basic attributes or 'exportation', demand in relation to the market, the potential number of consumers of cultural 'products' - are considered in this paper. An analysis of the degree of hierarchy and concentration of cultural centers, their mutual influences and the topological features of the network of cultural centers is used in an attempt to show how specific features of cultural activities influence the formation of specific systems of cultural centers.

Key Words: cultural activity, cultural centers, hierarchy, basic attributes, concentration, gravitational region, topological features

Kulturna djelatnost kao centralna funkcija: primjer Hrvatska

U članku se razmatraju obilježja kulturne djelatnosti kao centralne funkcije - njen gravitacijski domet, stupanj "baznosti" ili "ekspozitivnosti" i zahtjevnost u odnosu na tržište - potencijalni broj korisnika kulturnih proizvoda. Analizom stupnja hijerarhije i koncentracije kulturnih centara, njihovih međusobnih utjecaja, te topoloških obilježja mreže kulturnih centara, nastoji se pokazati kako specifična obilježja kulturne djelatnosti utječu na oblikovanje specifičnog sustava kulturnih centara.

Ključne riječi: kulturna djelatnost, kulturni centri, hijerarhija, baznost, koncentracija, gravitacijska područja, topološka obilježja

The development of so-called "conventional culture" or overall cultural activity (i.e. a group of various cultural activities: the theater, museums, cinemas, etc.) is a reflection of numerous social, historical and, to some extent, even natural factors. Its development and spatial arrangement are in large part dictated by many diachronic and synchronous factors. These factors meet in a space in which cultural activity proceeds and develops and constitute environment in which the "conventional culture" system forms. However, the network of cultural centers, like any other opened system, is defined not only by the action of "external" environmental factors, but also by "internal" factors at the same time - mutual ties, relations and influences of various elements of the system itself. In other words, the system of cultural institutions is not only affected by its environment (social, economic, cultural, natural), but also by the norms governing the functioning of cultural activities themselves.

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It is precisely with the intent of studying these norms that determine the spatial arrangement of cultural activities from "inside" that they are considered as a central function in this work. The initial hypothesis is that the observation of cultural activities as central functions will enable an analysis of both mutual relations and ties (gravity, competition, concentration) between individual elements of the system - cultural centers - and the study of the specific aspects of the system itself as the result of the action of these relations and ties.

It is a known fact that the degree of centrality of a settlement and its position in a network of settlements is related to its functions. Smaller centers generally perform functions with a low gravitational pull, while in larger centers these functions are accompanied by other functions that have a stronger gravitational pull. Thus centers with a low degree of centrality gravitate towards centers with a high degree of centrality, or they functionally depend on them. Therefore, a functional hierarchy exists between central settlements.

It can be assumed that a hierarchical network of cultural centers is created within the framework of cultural functions, as well as within the framework of other central functions. The purpose of this work is to attempt an analysis of the degree to which the order and network of these cultural centers corresponds to the rules suggested by the central place theory, i.e. to what degree these rules are valid for the cultural function as an overall central function composed of a series of branches/activities. For practical reasons, the term cultural centers will here mean all settlements that have one or more cultural institutions.

THE FUNCTIONAL HIERARCHY OF CULTURAL CENTERS

As we know, within the network of cultural centers that perform central functions, i.e. supply the population with "central services" and "central goods", a functional hierarchy is formed. Centers with varying degrees of development, or centers of various sizes, are the drivers of central functions of various ranges. Smaller centers perform a smaller number of functions, and larger centers a larger number - so that they supply some goods and services to smaller centers within their gravitational regions. The existence of certain functions most often requires a "critical mass" of sold goods or rendered services, which makes it possible to obtain so-called "thresholds" of sold goods or rendered services essential to the survival of a certain degree of a given function. Most often (due to a lack of relevant data) these thresholds are determined as the minimum number of inhabitants required for the "maintenance" of a certain degree of a given function.

So far the assumption has been that cultural activity as a central function influences the formation of a hierarchy of cultural centers with a scope of cultural activities characteristic of each degree and minimum population thresholds essential to their "maintenance". Thus, on the basis of the number of types of cultural activities present in an individual settlement, the development of a gradation of cultural centers was attempted. Six cultural activities for which there was available data were taken into consideration: museum, library, theater, cinema, newspaper and radio activities.

Settlements ranked according to the number of cultural activities present in them are marked on the map (*Fig. 1*). As the map shows, all six of the analyzed cultural

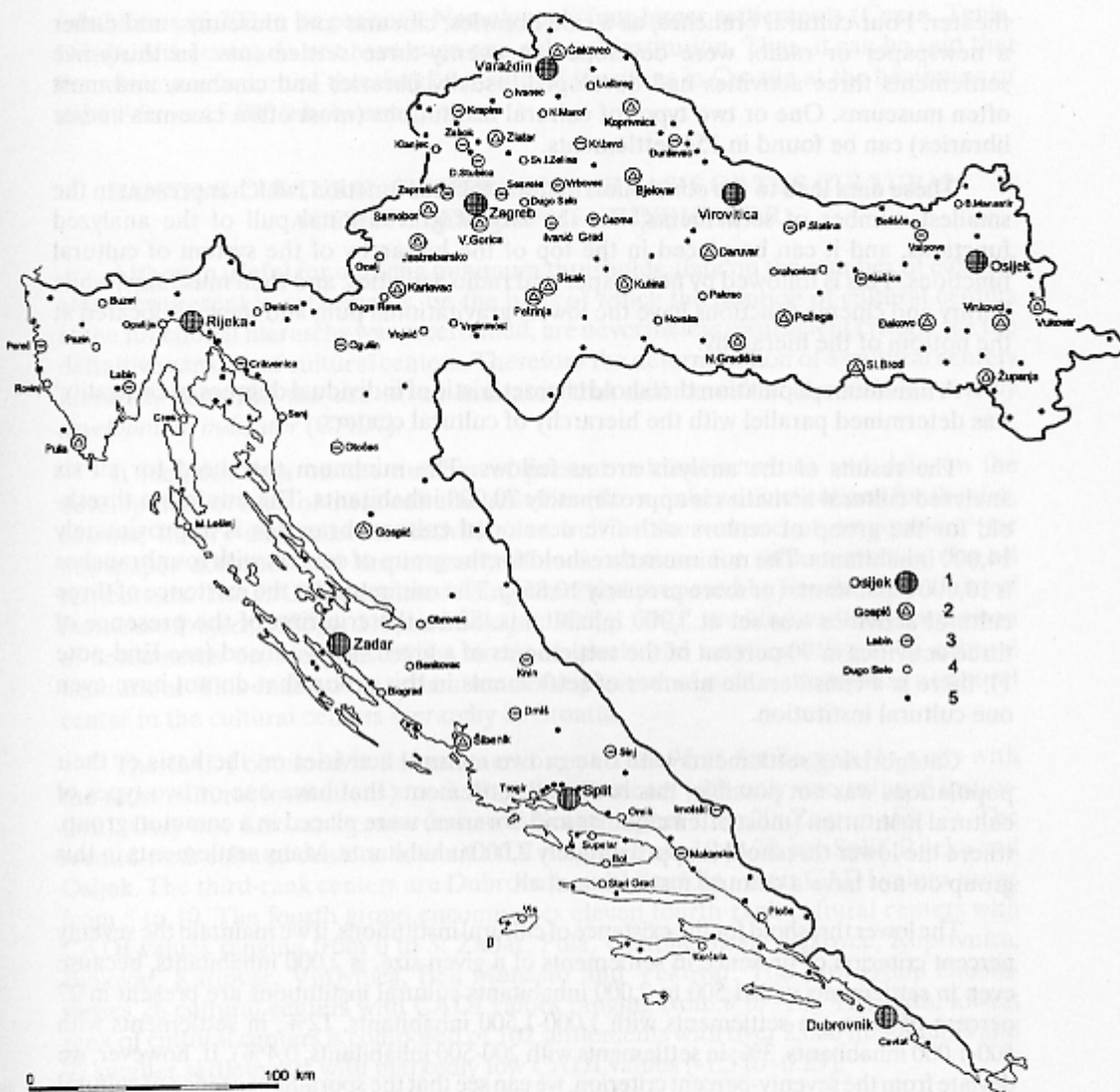


Fig. 1. Cultural centers according to the number of cultural activities
 The number of cultural activities in a cultural center; 1. 6 activities, 2. 5 activities, 3. 4 activities, 4. 3 activities, 5. 1-2 activities.

Sl. 1. Kulturni centri prema broju kulturnih djelatnosti

Broj kulturnih djelatnosti u kulturnom centru: 1. 6 djelatnosti, 2. 5 djelatnosti, 3. 4 djelatnosti, 4. 3 djelatnosti, 5. 1-2 djelatnosti.

activities have developed in only eight settlements: Zagreb, Split, Rijeka, Osijek, Zadar, Dubrovnik, Varaždin and Virovitica. Twenty-two settlements in Croatia have developed five cultural activities. The branch that is most often missing from them is the

theater. Four cultural branches, as a rule libraries, cinemas and museums, and either a newspaper or radio, were developed in twenty-three settlements. In thirty-five settlements three activities had developed, usually libraries and cinemas, and most often museums. One or two types of cultural institutions (most often cinemas and/or libraries) can be found in 154 settlements.

These data lead to the conclusion that the theater function, which is present in the smallest number of settlements, has the largest gravitational pull of the analyzed functions, and it can be placed in the top of the hierarchy of the system of cultural functions. This is followed by newspaper and radio activities, and then museums, while library and cinema functions have the lowest gravitational pull, and they are located at the bottom of the hierarchy.

A minimum population threshold characteristic of individual degrees of centrality¹ was determined parallel with the hierarchy of cultural centers.

The results of the analysis are as follows. The minimum threshold for all six analyzed cultural activities is approximately 70,000 inhabitants. The minimum threshold for the group of centers with five developed cultural branches is approximately 14,000 inhabitants. The minimum threshold for the group of centers with four branches is 10,000 inhabitants (or more precisely 10,857). The minimum for the existence of three cultural activities was set at 3,300 inhabitants. Since the criterion of the presence of three activities in 70 percent of the settlements of a given size was used (see End-note 1), there is a considerable number of settlements in this group that do not have even one cultural institution.

Categorizing settlements with one or two cultural activities on the basis of their populations was not possible; this is why all settlements that have one or two types of cultural institution (most often cinemas and libraries) were placed in a common group, where the lower threshold is approximately 2,000 inhabitants. Many settlements in this group do not have a cultural institution at all.

The lower threshold for the existence of cultural institutions, if we maintain the seventy percent criterion of presence in settlements of a given size, is 2,000 inhabitants, because even in settlements with 1,500 to 2,000 inhabitants cultural institutions are present in 27 percent of them (in settlements with 1,000-1,500 inhabitants, 12%; in settlements with 500-1,000 inhabitants, 3%; in settlements with 200-500 inhabitants, 0,4%). If, however, we deviate from the seventy-percent criterion, we can see that the sporadic existence of cultural functions does not even need a permanent population. Thus in Croatia museum activity (which is apparently the least demanding in terms of a permanent population, because it is often intended for tourists and vacationers) has developed on the Brijuni islands, an archipelago, without a permanent population according to the 1991 census, and in Trakošćan, with only 30 residents, and Osor with 80 residents.

These thresholds do not apply to all settlements. They indicate a basic tendency to which thirty percent of the settlements in the last three groups do not belong. In large, cultural institutions are not present in this thirty percent of settlements. The data do, however, make it possible to derive a firmer threshold - a threshold of "regularity" or "imperativeness" of cultural functions, i.e. thresholds above which all settlements possess some sort of cultural infrastructure. This threshold is approximately 5,000

inhabitants (5,200 to be precise). Namely, only four larger settlements (Čepin, Tenja, Darda, Višnjevac) do not have even one cultural institution. Thus, it can be said that the minimum "essential threshold" of cultural functions in Croatia at the beginning of the 1990s was 5,000 inhabitants.

RANKING CULTURAL CENTERS ON THE BASIS OF THE CULTURAL ACTIVITY DEVELOPMENT INDICATOR

Although useful for deriving minimum thresholds, data on the number of cultural activities present in settlements, on the basis of which the position of cultural centers in the functional hierarchy was ascertained, are nevertheless insufficient criteria for the definitive ranking of cultural centers. Therefore the determination of a cultural centers hierarchy required the use of an indicator that will be called the *cultural activity development indicator* (CADI).

It includes data on the number of present cultural activities and data on the development of each of these cultural activities (the number of institutions for theater, cinema, library and museum activities, as well as the volume of newspapers² for newspaper activities and the intensity of radio stations for radio activities) for all settlements. The CADI, calculated using a method proposed by Frechet (see *Cultural Indicators Project*, 1985, p. 119; and Šakaja, 1995, p. 399)³, enabled mutual comparison of settlements on the basis of the array of goods and services offered by cultural institutions. This enabled the estimation of the position of each settlement as a cultural center in the cultural centers hierarchy in Croatia.

The CADI obtained in this manner ranged from 94.38 for Zagreb (as a city with the most cultural institutions) to -3.29 (for settlements with only one cultural institution). Only one first-rank center has an indicator higher than 20: Zagreb (Fig. 2). The second-rank cultural centers, with a CADI ranging from 10 to 20, are Split, Rijeka and Osijek. The third-rank centers are Dubrovnik and Varaždin - their CADI values range from 5 to 10. The fourth group encompasses eleven fourth-rank cultural centers with CADI values ranging from 0 to 5: Zadar, Pula, Opatija, Sisak, Čakovec, Koprivnica, Bjelovar, Karlovac, Virovitica, Beli Manastir and Vukovar. The fifth group encompasses 26 cultural centers with CADI values ranging from 0 to -1.5. The sixth, lowest rank of cultural centers is composed of 102 settlements with over 2,000 inhabitants and 97 smaller settlements with markedly low CADI values (-1.5 to -3.29).

Attention must be focused on the fact that the 43 most developed settlements belonging to the first five groups with CADI values higher than -1.5 generally correspond to the settlements in the first three groups in the preceding functional ranking (these are cultural centers with over four cultural activities present). It follows that they have the same population threshold: 10,000.⁴

As a relevant indicator of the level of development of cultural centers, the CADI is used in this work in all further analyses of the cultural centers network: in the consideration of problems of cultural functions as basic functions, in the determination of the degree of concentration in the cultural centers network, in the determination of the theoretical gravitational areas of cultural centers and in the analysis of the spatial features of their networks.

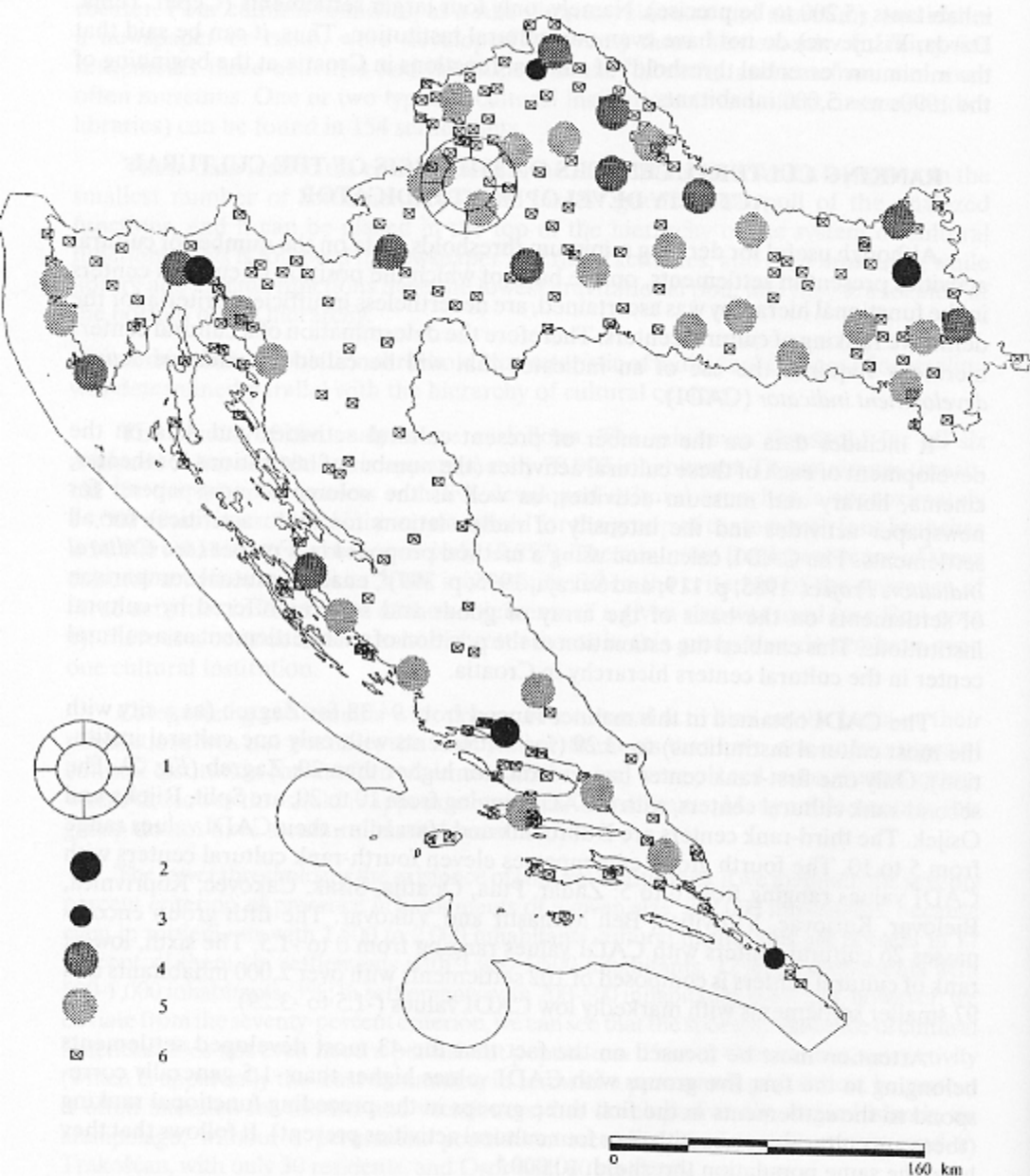


Fig. 2. Cultural centers according to level of development
 Cultural activity development indicator (CADI): 1. CADI > 20, 2. CADI 10-20, 3. CADI 5-10, 4. CADI 0-5,
 5. CADI -1.5-0, 6. CADI -3.3 - -1.5.

Sl. 2. Kulturni centri prema stupnju razvijenosti
 Indikator razvijenosti kulturne djelatnosti (IRKD): 1. IRKD > 20, 2. IRKD 10-20, 3. IRKD 5-10, 4. IRKD 0-5,
 5. IRKD -1.5-0, 6. IRKD -3.3 - -1.5.

THE BASIC CHARACTER OF CULTURAL FUNCTIONS

The functions performed by an individual settlement can, as we know, have a basic or non-basic significance. Basic significance means export activity. Their products and services are not intended for the population of the settlement itself, but rather for populations that live outside of the settlement in which the function is located. In contrast to these, non-basic activities exclusively serve the needs of the settlement's population. If products and services are intended for both the settlement's population and populations from other regions, the function is interpreted as a partially basic function. The basic attributes of a function is determined on the basis of quantitative methods - location quotients or "minimum" requirement methods.⁵ Both are based on data on the persons employed in the activity being researched. Since comprehensive data on employees in cultural activities in settlements were not available, it was not possible to ascertain the settlements in which cultural activity plays a basic role.

Nonetheless, if the CADI is used in the calculation of the location quotient instead of data on those employed in cultural activities, it seems to be possible to obtain interesting results. Naturally, one must keep in mind that because of the smaller range of the CADI in relation to the number of employees, and due to the fact that the development of cultural activities in larger cities is not only the result of a larger number of cultural institutions, but also their greater extent, the location quotient calculated on the basis of the CADI differs greatly from the standard. For example, in the first case the location quotient of cultural activities for Zagreb is 1, while in the second it is 2.8.

The level of development of "conventional culture" in a settlement is de facto correlated with its size (i.e. the settlement's population) if the location quotient is calculated on the basis of the CADI. Thus, this quotient directly indicates the basic degree of the overall culture in a settlement in a manner somewhat different from the traditional, and it may indirectly indicate the basic degree of its individual segments/activities. The highest values of location quotients calculated in this manner (over 20) were determined for the following 15 centers: Trakošćan, Osor, Pitve, Dobrinj, Mali Iž, Otavice, Janjina, Kumrovec, Buzet, Vukmanić, Desinić, Klanjec, Čabar, Rad and Veli Iž. The Brijuni islands - a cultural center with no inhabitants - can be added to this list. The aforementioned settlements are exclusively coastal tourist localities, the locations of cultural (historical) monuments or the birthplaces of distinguished personalities, i.e. settlements suitable for the development of museum activities. Thirteen of these sixteen settlements have a museum, five have cinemas, and four have a national library. Since all settlements with high location quotients are small, in which the population does not exceed 330, it is apparent that their cultural infrastructure is "export oriented", i.e. it is generally geared for populations considerably higher than their own. The domination of museum activity in this infrastructure is uncontested. Therefore, this leads to the conclusion that museum activity as a cultural activity is obviously a branch with the greatest basic degree, and the highest export and city-forming potential.

THE CONCENTRATION OF CULTURAL CENTERS

The overall cultural centers network already differs from the overall settlement network at first glance. Namely, there are only 242 cultural centers (those settlements that have at least one cultural institution) in Croatia, i.e. only every twenty-seventh settlement in Croatia is a cultural center.

In order to make the comparison between the cultural centers network and the settlement network as precise as possible, or rather, a comparison of the degree of concentration of these two networks, a Lorenz curve⁶ was constructed (Fig. 3). The cumulative CADI percentages were marked on its ordinates, while the cumulative population percentages were recorded on its abscissa. The curve is located in a quadrant constructed on coordinate axes representing 100 percent. The bisection of this quadrant shows what the curve would look like if the CADI accurately corresponded to the number of inhabitants in settlements. The greater the convexity of the curve, and the more it differs from the bisection, the greater the degree of concentration of cultural centers. This curve demonstrates a considerably high discrepancy between the cultural centers network and the settlement network, or rather, a high degree of concentration in the cultural centers network.

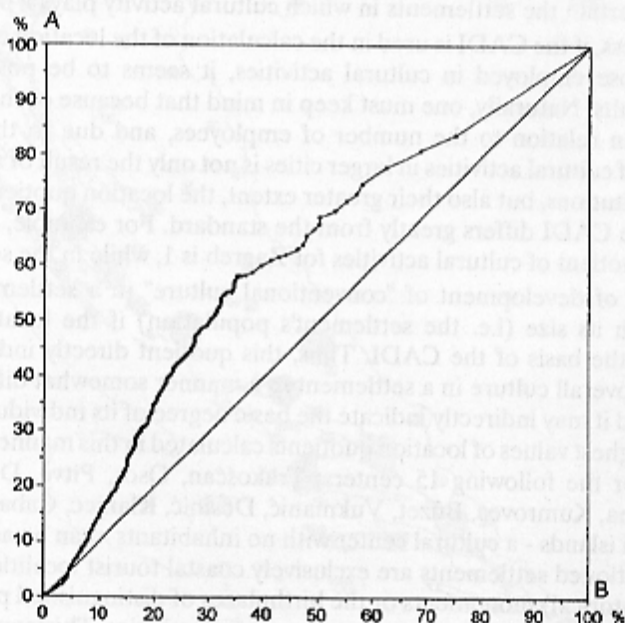


Fig. 3. A Lorenz curve of the concentration of cultural activity in settlements with over 2,000 inhabitants
 A - cumulative percentage of cultural activity development indicators (CADI) of settlements,
 B - cumulative percentage of the population of settlements

Sl. 3. Lorenzova krivulja koncentracije kulturnih djelatnosti u naseljima s više od 2.000 stanovnika
 A - kumulativni postotak Indikatora razvijenosti kulturne djelatnosti (IRKD) naselja,
 B - kumulativni postotak broja stanovnika naselja.

The high concentration of cultural activities is also demonstrated by the data on employees, shown in Tables 1 and 2. From these tables it is apparent that the concentration of all individual cultural activities under observation and cultural activities as a whole are greater than both the concentration of the active population and the concentration of production and service industries, and the concentration of non-central activities (manufacturing industry) and central activities (trade).

Table 1. Share of persons employed in the capital city and macro-regional centers in the total number of employed (by activity)

	1	2	3	4	5	6	7	8	9
Zagreb	15%	16%	15%	20%	23%	53%	41%	72%	50%
Macro-regional centers, total	24%	26%	24%	34%	34%	67%	59%	77%	95%
Croatia	100%	100%	100%	100%	100%	100%	100%	100%	100%

1. Total population
2. Active population
3. Employed in manufacturing industry
4. Employed in trade
5. Employed in cinema activities
6. Employed in library activities
7. Employed in museum activities
8. Employed in radio activities
9. Employed in theater activities

* Data in columns 1, 2, 3, and 4 relate to 1991, columns 5, 8 and 9 to 1990, column 6 to 1989 and column 7 to 1988

Sources:

Kultura i umjetnost 1988. Dokumentacija 754. Zagreb: Socijalistička Republika Hrvatska, Republički zavod za statistiku, 1990.

Kultura i umjetnost 1989. Dokumentacija 791. Zagreb: Socijalistička Republika Hrvatska, Republički zavod za statistiku, 1990.

Kultura i umjetnost 1990. Dokumentacija 829. Zagreb: Socijalistička Republika Hrvatska, Republički zavod za statistiku, 1992.

"Popis stanovništva 1991. Aktivno stanovništvo u zemlji koje obavlja zanimanje, prema području djelatnosti po naseljima." *Dokumentacija 885.* Zagreb: Republika Hrvatska, Državni zavod za statistiku, 1994.

Table 2. Share of persons employed in Zagreb in the total number of employed (by activity), 1992

	Zagreb percentage
Employed in culture and the protection of cultural monuments	42%
Employed in production industry	24%
Employed in service industry	32%
Total employed	26%

Sources:

Zaposlenost: Tabele rezultata. Zagreb: Državni zavod za statistiku, 1992.

GRAVITATIONAL AREAS OF CULTURAL CENTERS

The concept of centers of networks and their hierarchies are closely related to the concept of zones that influence individual cities. As we know, the influence of cities is reflected within a given area, and this weakens as distance from it increases. This influence of cities is similar to the phenomenon of magnetism and gravitation. This similarity forms the foundation of well-known Reilly's law on the mutual effects of urban gravitational centers. According to this law, the gravitational force between two cities is proportionate to their populations and inversely proportionate to the square of the distances between these two cities.

Reilly's law, of course, assumes the homogeneity of the area and does not assess the factual (real) gravitation, only the theoretical aspects of this issue. However, much previous research showed the relevancy of using Reilly's law in the field.

Reilly's law was applied to the study of various spatial phenomena, and not only the population was used as a measure of the significance of cities. Other measures were also used: the surface area of the city, the number of people with telephones, etc. In this article, the level of the cultural activity development indicator (CADI) will be used instead of the population to estimate the gravitational area of cultural centers.

To be sure, the gravitational force of cultural centers does not have to correspond to the gravitational force of those same settlements observed from a different aspect (as commercial centers, employment centers, etc.).

The frequency with which cultural institutions are visited in a settlement by people who live elsewhere could serve as measure of the real gravitational force of cultural centers. However, since such data are not available for the gravitational area of cultural centers, an estimate can only be made on a theoretical basis. For this purpose a modification of Reilly's law was used:

$$G = \frac{d_{1,2}}{1 + \sqrt{S_1/S_2}}$$

where G is the breaking point of gravitation between two centers, $d_{1,2}$ is the distance between the centers, and S_1 and S_2 are the cultural activity development indicators (CADI) of the two centers (Medvedkov, 1965, p. 79; Gujabidze, 1976, p. 52; Vaitekunas, Kuncina, 1976, p. 126; Vresk, 1986, p. 210).

An area with an equal degree of gravitation is a circle, whose radius is calculated using the above formula. The smaller of the two cultural centers has the smaller radius. Its gravitational circle can even be located within the gravitational circle of a larger neighboring cultural center. As centers located in the vicinity of the cultural center whose gravitational area is being calculated are not the same size, the gravitational area often does not have the form of a true circle. It is rather formed of semi-circles with varying radii.

The gravitational areas of the 68 strongest cultural centers, calculated using the aforementioned method, are designated on the map (Fig. 4). The map shows that the gravitational area of Zagreb theoretically stretches from Đurđenovac in the east, Ravna Gora in the west to Benkovac in the south. Regardless of the fact that the CADI for Rijeka is larger than that of Osijek, because of its nearness to Zagreb the gravitational area of Rijeka is smaller than that of Osijek. This discovery, visible on the map, is

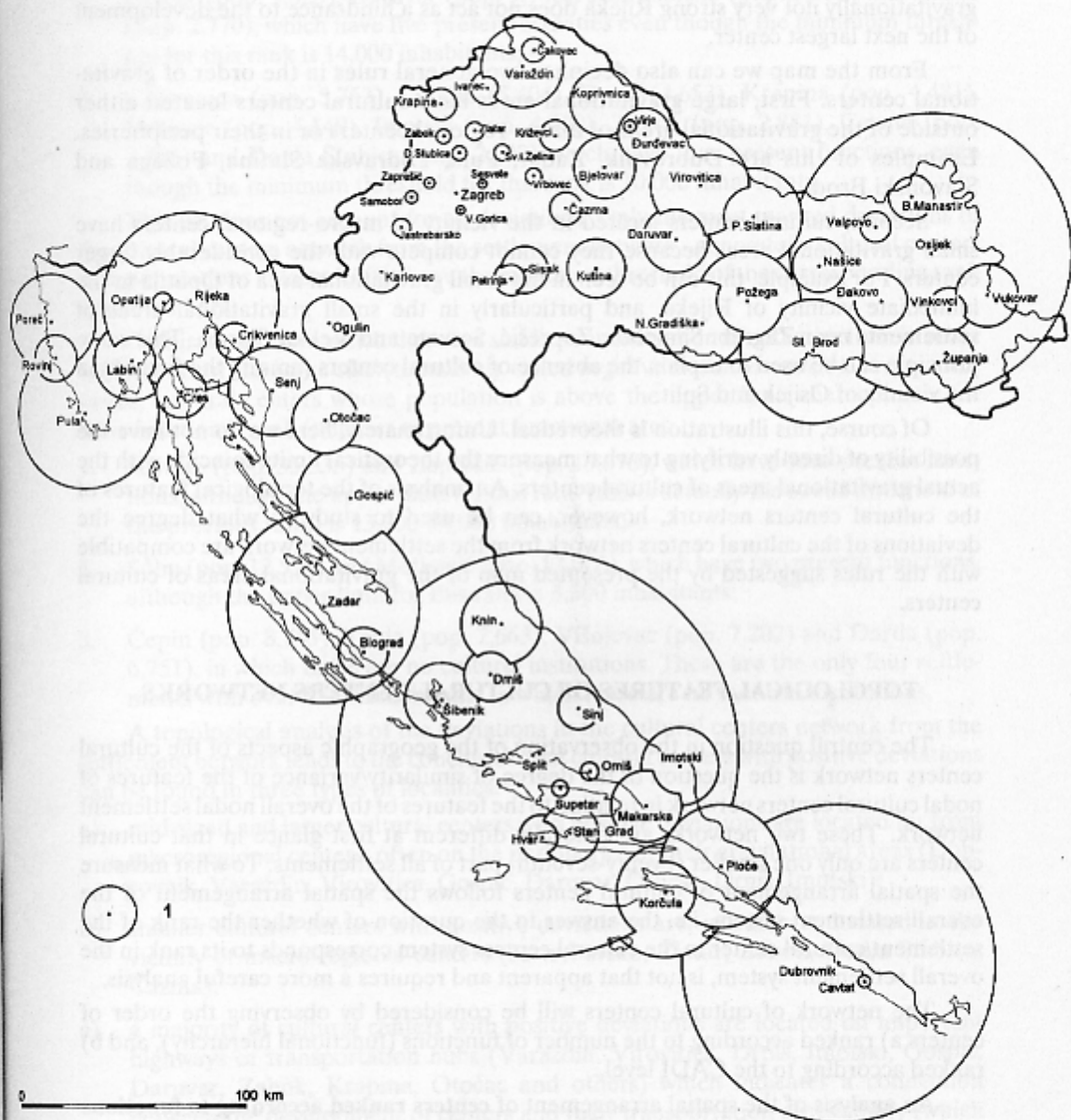


Fig. 4. Gravitational regions of larger cultural centers

1. - gravitational regions of the 67 largest cultural centers (not including Zagreb).

Sl. 4. Gravitacijska područja većih kulturnih centara

1. - gravitacijska područja 67 najvećih kulturnih centara (bez Zagreba)

completely in accord with the biculturalism of the Rijeka region, due to which the gravitationally not very strong Rijeka does not act as a hindrance to the development of the next largest center.

From the map we can also decipher two general rules in the order of gravitational centers. First, large gravitational areas have cultural centers located either outside of the gravitational areas of macro-regional centers or in their peripheries. Examples of this are Dubrovnik, Zadar, Pula, Podravska Slatina, Požega and Slavonski Brod.

Second, cultural centers located in the vicinity of macro-regional centers have small gravitational areas because they cannot compete with the considerably larger centers. For example, this can be seen in the small gravitational area of Opatija in the immediate vicinity of Rijeka, and particularly in the small gravitational areas of settlements near Zagreb: Samobor, Zaprešić, Sesvete and Velika Gorica. This same principle can be used to explain the absence of cultural centers (among the first 68) in the vicinity of Osijek and Split.

Of course, this illustration is theoretical. Unfortunately, here we do not have the possibility of directly verifying to what measure the theoretical limits coincide with the actual gravitational areas of cultural centers. An analysis of the topological features of the cultural centers network, however, can be used to study to what degree the deviations of the cultural centers network from the settlement network are compatible with the rules suggested by the presented map of the gravitational areas of cultural centers.

TOPOLOGICAL FEATURES OF CULTURAL CENTERS NETWORKS

The central question in the observation of the geographic aspects of the cultural centers network is the question of the degree of similarity/variance of the features of nodal cultural centers network in relation to the features of the overall nodal settlement network. These two networks are naturally different at first glance in that cultural centers are only one smaller (twenty-seventh) part of all settlements. To what measure the spatial arrangement of cultural centers follows the spatial arrangement of the overall settlement system, i.e. the answer to the question of whether the rank of the settlement/cultural center in the cultural centers system corresponds to its rank in the overall settlement system, is not that apparent and requires a more careful analysis.

The network of cultural centers will be considered by observing the order of centers a) ranked according to the number of functions (functional hierarchy), and b) ranked according to the CADI level.

An analysis of the spatial arrangement of **centers ranked according to functions** shows the following. Centers in which there is a concentration of a larger number of activities than in other settlements of the same size (these will tentatively be called *positive deviance centers*), or, in other words, cultural centers whose population is under the minimum threshold characteristic for their rank (number of present functions) are:

1. Dubrovnik (pop. 49,726), Varaždin (pop. 41,846) and Virovitica (pop. 16,167), which have six present activities even though the minimum threshold for this rank is 70,000 inhabitants;

2. Gospić (pop. 9,025), Daruvar (pop. 9,748), Jastrebarsko (pop. 5,380) and Zlatar (pop. 2,770), which have five present activities even though the minimum threshold for this rank is 14,000 inhabitants;
3. Crikvenica (pop. 5,763), Otočac (5,404), Drniš (4,653), Krapina (pop. 4,481), Vrbovec (pop. 4,149), Imotski (pop. 4,000), Zabok (pop. 2,881), Čazma (pop. 2,785) and Donja Stubica (pop. 2,232) which have four present functions, even though the minimum threshold for this rank is 10,000 inhabitants.

This list does not account for all deviations. Only the most marked deviations of the cultural centers network from the settlement network - concretely, cultural centers with populations at least 5,000 above the minimum threshold of the corresponding rank are noted here.

Cultural centers in which there is a smaller concentration of activities than in other settlements of the same size (tentatively called *negative deviance centers*), or, in other words, cultural centers whose population is above the upper limit characteristic for their functional rank (number of present functions) are:

1. Sesvete (pop. 35,335) and Zaprešić (pop. 15,678), which have four present functions, although the upper limit for this rank (this is actually the lower threshold of the previous rank) is 13,000-14,000 inhabitants;
2. Solin (pop. 12,575) and Metković (pop. 12,026), which have two present functions, although the upper limit for this rank is 3,300 inhabitants;
3. Čepin (pop. 8,745), Tenja (pop. 7,663), Višnjevac (pop. 7,202) and Darda (pop. 6,751), in which there are no cultural institutions. These are the only four settlements with over 5,000 inhabitants in which there are no cultural institutions.

A topological analysis of the deviations in the cultural centers network from the settlement network leads to the conclusion that cultural centers with positive deviations can be found in three types of localities:

- a) mid-sized and larger cultural centers with positive deviations are located far from macroregional centers, often on the peripheries of their gravitational areas (Dubrovnik, Varaždin, Virovitica, Gospić, Daruvar, Otočac, Drniš, Imotski);
- b) smaller cultural centers with positive deviations are, in contrast, located in the vicinity of macro-regional centers (Jastrebarsko, Zlatar, Zabok, Donja Stubica, Čazma);
- c) a majority of cultural centers with positive deviations are located on important highways or transportation hubs (Varaždin, Virovitica, Drniš, Imotski, Gospić, Daruvar, Zabok, Krapina, Otočac and others) which indicates a connection between the development of centers and their transportation accessibility (which is an important gravitational factor).

Cultural centers with negative deviations are largely (with the exception of Metković) settlements located near, and under the influence of macro-regional centers (Sesvete, Zaprešić, Solin, Čepin, Višnjevac, Tenja and Darda).

The following question imposes itself: how does the vicinity of a large macro-regional center hinder development in one case and stimulate it in others? If, however, a comparison is made between cultural centers with positive and negative deviations

located near macro-regional centers, a difference in their sizes is observed. Centers with positive deviations have less than two to three thousand inhabitants (only Jastrebarsko has 5,380 inhabitants), while centers with a negative deviation are settlements with over 6,000 (Osijek's satellites) or 10,000 inhabitants (Zagreb's or Split's satellites).

From this we can conclude that the gravitational force and cultural emission of macro-regional centers act as equalizers on the cultural infrastructure of the surrounding areas - on the one hand they raise the level of cultural functions in smaller centers (2,000 to 3,000 inhabitants), and hinder the cultural development in nearby centers with over 6,000 to 10,000 inhabitants on the other.

A similar analysis was conducted on centers ranked according to the CADI level. The ordinal numbers of settlements ordered according CADI level were taken from the ordinal numbers of the same settlements ordered according to population. The discrepancy between the ranks that was obtained shows a deviation in the cultural centers network in relation to the settlement network. A positive discrepancy indicates a larger, while a negative discrepancy a smaller relative significance of a concrete settlement in the cultural centers network in relation to the overall settlement network.

Here only the settlements with a rank difference greater or lesser than five units (-5 or +5) will be noted. Due to the subtlety of the differences among centers with small CADI levels, only the first 68 settlements were analyzed in terms of the CADI level (CADI > -2.08). Settlements that are more developed as cultural centers than other settlements of the same size (i.e. settlements with positive rank discrepancies) are Varaždin, Beli Manastir, Virovitica, Koprivnica, Čakovec, Opatija, Đurđevac, Crikvenica, Krapina, Ploče, Biograd, Poreč, Senj, Sveti Ivan Zelina, Omiš, Korčula, Supetar, Cres, Virje, Hvar, Stari Grad, Cavtat, Vrbovec, Zabok, Ivanec, Donja Stubica, Jastrebarsko, Zlatar, Imotski, Drniš, Otočac and Čazma.

On the other hand, settlements that are less developed from the point of view of cultural infrastructure than settlements of a similar size (i.e. settlements with negative rank discrepancies) are Karlovac, Sisak, Slavonski Brod, Šibenik, Vinkovci, Velika Gorica, Požega, Samobor, Rovinj, Đakovo, Makarska, Gospić, Sesvete, Knin, Ogulin, Petrinja, Našice, Valpovo, Trogir and Belišće.

It is apparent that these results correspond to the results of the spatial analysis of the cultural centers network ranked according to the number of functions,⁷ while the difference is that here the list of centers with positive and negative deviations are somewhat wider. But the principal features of the spatial arrangement of the "deviant" settlements remains the same. These are:

1. the development of smaller cultural centers stimulated by the nearness of Zagreb (Zabok, Jastrebarsko, Zlatar, Donja Stubica and Čazma, Sveti Ivan Zelina and Vrbovec);
2. the stagnation of cities with over 10,000 inhabitants that are located in areas under the powerful influence of macro-regional centers (Velika Gorica, Samobor, Sesvete, Karlovac, Sisak, Petrinja and Trogir);
3. the stimulative effects of highways, particularly apparent on the Virovitica-Varaždin highway, on which centers with a positive deviation are most concentrated (Čakovec, Varaždin, Koprivnica, Đurđevac, Virovitica and Virje).

The map showing the spatial arrangement of cultural centers according to the CADI clearly indicates that, with the exception of Opatija, not one better developed cultural center (CADI > 0) is located in the vicinity of a macro-regional center. Thus, here the powerful emission and gravitational effects of macro-regional centers can once more be seen. Centrifugal (cultural emission) and centripetal (cultural gravitation) forces obviously act to form a balanced nodal system with neither excessively strong nor excessively weak centers in the vicinity of macro-regional centers. This is the only way to explain the stagnation of larger, and the stimulation of smaller cultural centers located near the largest Croatian cultural centers.

The location of cultural centers with positive deviations on important highways also shows the essential role of gravitational pull in the formation of the cultural centers network, for highways - by easing access to a city/town - make it "closer" and in this manner expand the gravitational range of the city. From the correlation of highways and the development of cultural centers, the role of gravitation in the formation of the cultural centers network can also be derived.

The aforementioned leads to the conclusion that under the influence of the law of gravity and cultural factors, the settlement network is modified in the cultural centers network, whose nodal structure is different from the nodal structure of the base settlement network. The settlement network is formed by itself under the influence of the law of gravity and centrality. The effects of these laws, however, are obviously strengthened by specific laws which act in the cultural sphere. In addition, the nodal cultural centers network is not an exact copy of the nodal settlement network, rather it is a transformed image of it, in which some parts are more marked, and others less so in comparison to the base network.

Of course, the mutual effects of cultural centers (centrifugal and centripetal forces among them) cannot explain all of the differences between cultural centers and the settlement network. By analyzing the CADI, it can be seen that the cultural centers with positive deviations are Adriatic cities: Dubrovnik, Crikvenica, Biograd, Senj, Opatija, Poreč, Korčula, Supetar, Cres, Hvar, Stari Grad and Cavtat. With the exception of Crikvenica and Dubrovnik, these cities do not appear among the centers with positive deviations in terms of the number of functions, which indicates relatively strong but one-sided development in coastal settlements (with the dominance of museum activities).

Half of the cultural centers with a positive variance are located in the Zagreb macro-region (Varaždin, Koprivnica, Virovitica, Čakovec, Đurđevac, Krapina, Sveti Ivan Zelina, Virje, Zabok, Ivanec, Donja Stubica, Jastrebarsko, Zlatar and Čazma).

Among the centers with a negative deviation, more than a third are Slavonian secondary centers (Slavonski Brod, Vinkovci, Požega, Đakovo, Našice, Valpovo and Belišće).

A map showing settlements with less than 2,000 inhabitants, as well as a map showing settlements with over 2,000 inhabitants (Figs. 5 and 6) without cultural infrastructure, confirms the aforementioned findings: the relatively high development level of cultural centers in the coastal regions and in the Zagreb macro-region and the lesser development of Slavonian secondary centers.

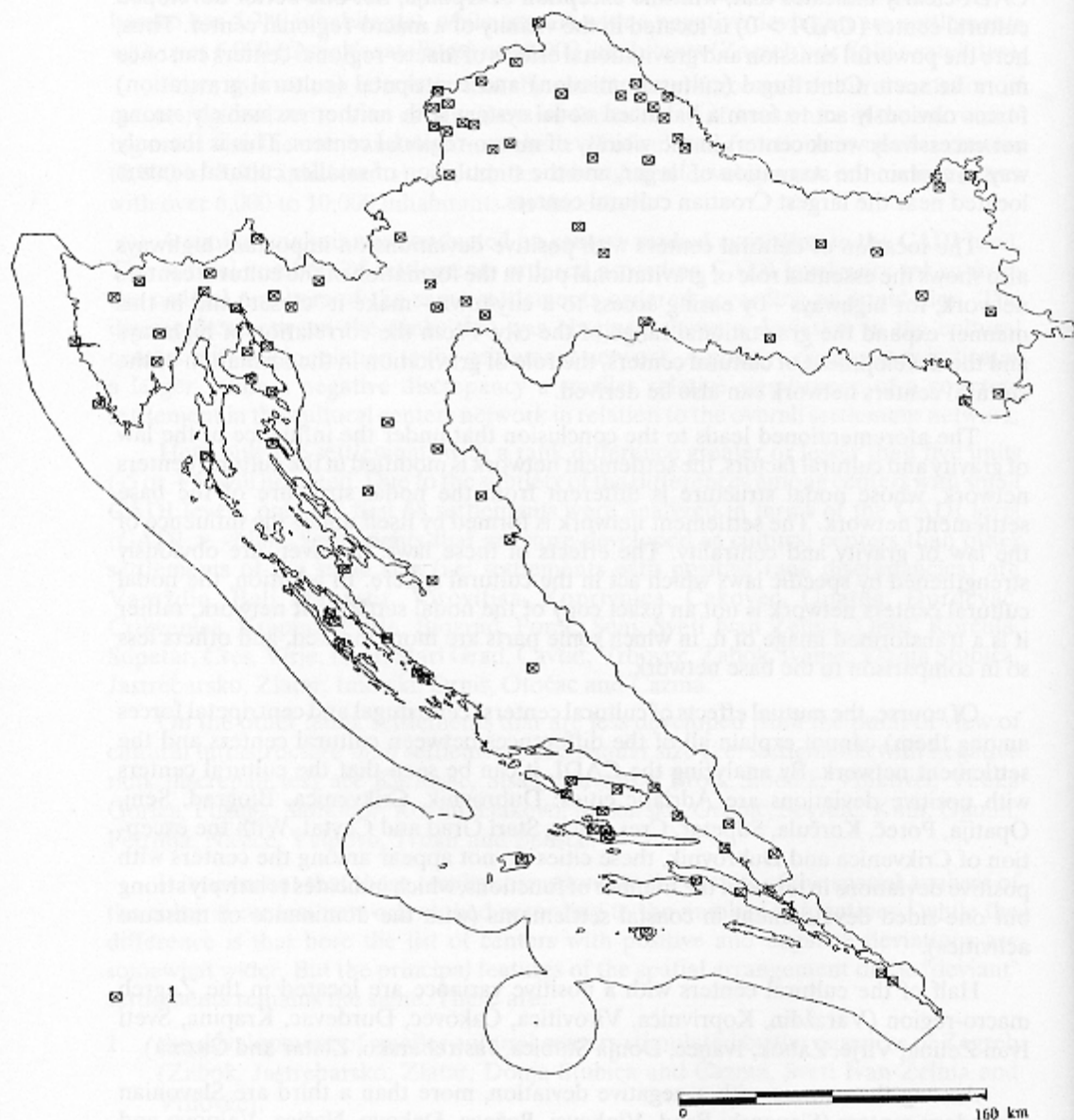


Fig. 5. Cultural centers with less than 2,000 inhabitants
1. - cultural centers

Sl. 5. Kulturni centri s manje od 2.000 stanovnika
1. - kulturni centri

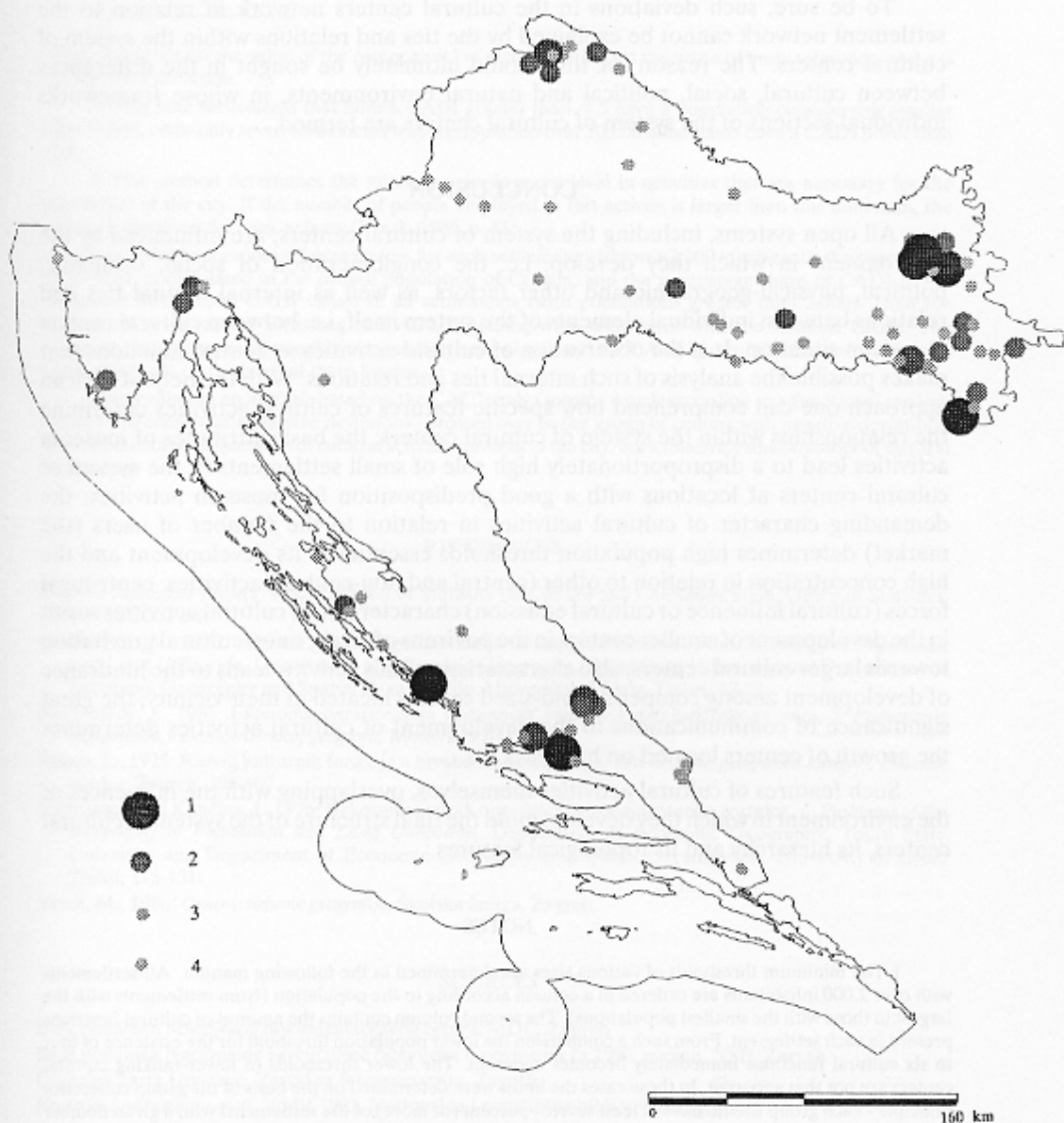


Fig. 6. Settlements with over 2,000 inhabitants lacking cultural institutions

Size of settlement: 1. Over 5,000 inhabitants, 2. 4,000-5,000 inhabitants, 3. 3,000-4,000 inhabitants, 4. 2,000-3,000 inhabitants.

Sl. 6. Naselja s više od 2.000 stanovnika bez kulturnih ustanova

Veličina naselja: 1. Više od 5.000 stanovnika, 2. 4.000-5.000 stanovnika, 3. 3.000-4.000 stanovnika, 4. 2.000-3.000 stanovnika.

To be sure, such deviations in the cultural centers network in relation to the settlement network cannot be explained by the ties and relations within the system of cultural centers. The reason for this should ultimately be sought in the differences between cultural, social, political and natural environments, in whose frameworks individual sections of the system of cultural centers are termed.

CONCLUSION

All open systems, including the system of cultural centers, are influenced by the environment in which they develop, i.e. the conglomeration of social, economic, political, physical-geographic and other factors, as well as internal mutual ties and relations between individual elements of the system itself, i.e. between cultural centers in a given situation. It is the observation of cultural activities as central functions that makes possible the analysis of such internal ties and relations. With the help of such an approach one can comprehend how specific features of cultural activities determine the relationships within the system of cultural centers: the basic attributes of museum activities lead to a disproportionately high role of small settlements in the system of cultural centers at locations with a good predisposition for museum activities; the demanding character of cultural activities in relation to the number of users (the market) determines high population thresholds essential to its development and the high concentration in relation to other (central and non-central) activities; centrifugal forces (cultural influence or cultural emission) characteristic of cultural activities result in the development of smaller centers in the environs of larger ones; cultural gravitation towards larger cultural centers, also characteristic of this activity, leads to the hindrance of development among competing mid-sized centers located in their vicinity; the great significance of communications to the development of cultural activities determines the growth of centers located on highways.

Such features of cultural activities themselves, overlapping with the influences of the environment in which they develop, mold the final structure of the system of cultural centers, its hierarchy and its topological features.

NOTES

1 The minimum thresholds of various sizes are determined in the following manner. All settlements with over 2,000 inhabitants are ordered in a column according to the population (from settlements with the largest to those with the smallest populations). The second column contains the amount of cultural functions present in each settlement. From such a comparison the lower population threshold for the existence of four to six cultural functions immediately becomes apparent. The lower thresholds of lower-ranking cultural centers are not that apparent. In these cases the limits were determined on the basis of the group coherence principle - each group should have at least seventy percent (or more) of the settlements with a given number of cultural functions. The number of cultural activities equal to or greater than y should be present with at least 70% in the group of settlements with a size matching x_1 to x_2 , where x_1 is the minimum threshold of the previous group, and x_2 the sought-after minimum threshold of the given group. The analysis included all settlements with over 2,000 inhabitants, regardless of whether they have cultural institutions in their regions.

2 Overall "volume" of newspapers issued in a settlement during a month is calculated as a sum of the number of daily newspapers multiplied by 30, weekly periodicals multiplied by 4, fortnightly periodicals multiplied by 2, and monthly press (multiplied by 1). In fact, "volume" of newspapers depends both on the number of newspapers and other periodicals issued in a settlement, and on their character (daily, weekly, etc.).

3 According to the Frechet method, the CADI was calculated using the following formula:

$$F_j = \sum_i \frac{X_{ij} - X_{*j}}{\sigma}$$

where X_{ij} stands for the value of the component i in settlement j , X_{*} is the norm of basic reference, and σ is the standard deviation.

4 Only nine settlements that have a CADI greater than -1.5 have a population considerably smaller than 10,000, while only seven settlements with a population over 10,000 inhabitants have a CADI lower than -1.5.

5 This method determines the minimum employment level in activities that are necessary for the population of the city. If the number of people employed in this activity is larger than this minimum, the activity is considered a basic activity (Vresk, 1986, p. 41).

6 In order to compose a Lorenz curve for each settlement with over 2,000 inhabitants, the percentage of its share is calculated in the overall population of Croatia, and the percentage share of CADI of the settlement in the total CADI values of all settlements (with populations greater than 2,000). Then the settlements were ranked according to CADI, beginning with settlements with the smallest CADI. The following step was to transform these population percentages and the CADI into cumulative percentages. A graph was made on the basis of these figures.

7 According to an analysis based on the CADI, only Gospić - which according to a functional analysis belonged to centers with positive deviations - crossed over to the group of centers with negative deviations. This indicates a wide spectrum of cultural activities present in the city, but a relatively small number of cultural institutions.

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SAŽETAK

Kulturna djelatnost kao centralna funkcija: primjer Hrvatske

Laura Šakaja

Razmatrajući takozvanu "konvencionalnu kulturu" (ili skup kulturnih djelatnosti: kazališnu, muzejsku, kinematografsku itd.) kao centralnu djelatnost, ovaj rad polazi od pretpostavke da takav pristup u sagledavanju kulturne djelatnosti može omogućiti analizu kako uzajamnih odnosa i veza (gravitacije, konkurencije, koncentracije) između pojedinih elemenata sistema - tj. kulturnih centara - tako i proučavanje specifične samoga sistema kao rezultata djelovanja tih odnosa i veza.

Kulturna djelatnost kao centralna funkcija ima svoje zakonitosti. Ona posjeduje gravitacijsku snagu, stimulira centripetalne tokove prema naselju u kojem je locirana. Kulturna ponuda krupnih centara čini njihov "kulturni kapital"; drugim riječima, kulturna ponuda grada potiče dotok ljudi u grad, zbog čega se sredstva uložena u kulturu ne samo vraćaju nego i umnažaju. Dakako, različite kulturne djelatnosti, na koje se raslojava cjelovita kulturna funkcija, imaju različit gravitacijski potencijal. Kazališna djelatnost, koja je od analiziranih djelatnosti prisutna u najmanjem broju naselja, ima najveći gravitacijski doseg te se može smjestiti u vrh hijerarhijskog sustava kulturnih funkcija. Iza nje slijede novinska i radijska djelatnost, zatim muzejska, dok najniži gravitacijski domet imaju bibliotečna i kinematografska funkcija, koje se nalaze na dnu hijerarhijske piramide.

Specifičnosti same kulturne djelatnosti rezultiraju specifičnostima veza i odnosa unutar sustava kulturnih centara. Tako zahtjevnost kulturne djelatnosti u odnosu na stanovništvo (publiku, odnosno tržište) utječe na formiranje hijerarhije kulturnih centara s rasponom kulturnih djelatnosti karakterističnim za svaki stupanj i s minimalnim pragovima stanovništva neophodnoga za njihovo "uzdržavanje". Pokazalo se da minimalni prag za postojanje svih šest analiziranih djelatnosti (kazališne, muzejske, bibliotečne, kinematografske, novinske i radijske) u naselju iznosi oko 70.000 stanovnika. Za postojanje pet djelatnosti potrebna je "kritična masa" od 14.000 stanovnika, za četiri djelatnosti - 10.000 stanovnika, za tri djelatnosti - 3.000, a za dvije - 2.000 stanovnika. Ti pragovi vrijede za najmanje sedamdeset posto naselja odgovarajućih veličina. Čvršći je donji prag - prag obvezatosti ili redovitosti kulturne funkcije u naseljima Hrvatske - 5.000 stanovnika, što znači da u svakom naselju te veličine (izuzetak su samo četiri naselja) postoji barem jedna kulturna ustanova.

Zahtjevnost kulturne djelatnosti u odnosu na stanovništvo određuje i visok stupanj koncentracije kulturne djelatnosti u većim naseljima. Visoka se koncentracija te djelatnosti vidi već iz činjenice da kulturne ustanove postoje samo u 242 naselja, odnosno - tek je svako dvadesetsedmo naselje Hrvatske ujedno i kulturni centar, tj. posjeduje najmanje jednu kulturnu ustanovu. Koncentracija kulturne djelatnosti nadmašuje koncentraciju u trgovini, industriji, općenito - u cijeloj privredi i neprivredi, kao i koncentraciju ukupno zaposlenih u Hrvatskoj.

Iako u cjelini kulturna djelatnost opslužuje stanovništvo određenoga naselja, ona ponegdje može biti i bazna ("izvozna"), tj. namijenjena publici koja stanuje izvan njenoga sjedišta. Dovođenje u vezu indikatora razvijenosti kulturne djelatnosti naselja (IRKD) s brojem stanovnika toga naselja pokazalo je da je najveći stupanj baznosti kulturne djelatnosti karakterističan za mala naselja (s manje od 330 ljudi), koja imaju pretpostavke za razvoj muzejske djelatnosti (turistička mjesta, lokacije povijesnih spomenika, rodna mjesta istaknutih osoba). Razvoj muzejske djelatnosti u takvim malim naseljima kojih stanovništvo samo po sebi nije dovoljno za njeno podržavanje, svjedoči, da muzejska djelatnost ima najveću predispoziciju da privlači publiku iz drugih mjesta, tj. u najvećoj je mjeri predisponirana da bude bazna. To obilježje muzejske djelatnosti utječe na sam sustav kulturnih centara, disproporcionalno povećavajući u njemu ulogu malih naselja na lokacijama pogodnim za osnivanje muzeja.

Specifičnost kulturne djelatnosti odražava se i na djelovanju gravitacijskih zakona unutar sistema kulturnih centara. Na osnovi modificirane gravitacijske formule, u radu su označena teorijska gravitacijska područja 68 najvećih kulturnih centara. Kao indikator gravitacijske moći kulturnoga centra upotrijebljen je

indikator razvijenosti kulturne djelatnosti (IRKD), izračunan na osnovi formule Frecheta. Karta dobivena na taj način pokazala je specifičnosti uzajamnih veza unutar mreže kulturnih centara. Na karti vidimo da se gravitacijsko područje Zagreba teorijski proteže do Đurđenovca na istoku, Ravne Gore na zapadu i Benkova na jugu. Zbog veće blizine (a to znači i utjecaja) Zagreba gravitacijsko područje Rijeke manje je nego gravitacijsko područje drugoga makroregionalnoga centra - Osijeka, iako Rijeka ima razvijeniju kulturnu djelatnost (veći IRKD). To otkriće, vidljivo na karti, u skladu je s određenom bikulturalnošću Riječke regije, zbog toga što gravitacijski ne osobito snažna Rijeka ne djeluje kao kočnica na razvoj Pule kao drugoga po veličini centra u toj makroregiji.

Uočavaju se dva opća pravila u rasporedu gravitacijskih područja. Kao prvo, velika gravitacijska područja imaju kulturni centri koji se nalaze ili izvan ili na rubovima gravitacijskih područja velikih makroregionalnih centara. Primjeri su tome Dubrovnik, Zadar, Pula, Podravska Slatina, Požega, Slavonski Brod. Kao drugo, kulturni centri koji se nalaze u blizini makroregionalnih centara imaju mala gravitacijska područja jer nisu - u usporedbi s makroregionalnim centrima - konkurentni. To vidimo, naprimjer, po malom gravitacijskom području Opatije u neposrednoj blizini Rijeke, a posebno po malim gravitacijskim područjima naselja u blizini Zagreba - Samobora, Zaprešića, Sesveta i Velike Gorice.

Posebnost djelovanja gravitacijskih zakona na području kulturne djelatnosti dolazi na vidjelo kada usporedimo nodalnu mrežu kulturnih centara s cjelokupnom nodalnom mrežom naselja. Mreža naselja sama po sebi, kao što znamo, formira se pod utjecajem zakona gravitacije i centralnosti. Djelovanje tih zakona očito se još pojačava specifičnim zakonima koji djeluju u sferi kulture. Usljed toga, nodalna mreža kulturnih centara nije točna kopija nodalne mreže naselja, nego je njena transformirana slika, u kojoj su neki dijelovi naglašeniji, a drugi slabije naglašeni u usporedbi s predloškom. Mogu se izdvojiti tri najvažnija tipa odstupanja mreže kulturnih centara od mreže naselja. Svako od njih povezano je sa specifikom kulturne djelatnosti. Kao prvo, kulturna gravitacija prema velikim kulturnim središtima, karakteristična za kulturnu djelatnost, privlači publiku u ta središta ("centripetalno djelovanje"). Kao posljedica toga - koči se razvoj centara s više od 10.000 stanovnika koji se nalaze u blizini takvih velikih kulturnih središta. Primjeri su tome Velika Gorica, Samobor, Sesvete, Karlovac, Sisak, Petrinja, Trogir. Kao drugo, veliki kulturni centri imaju očito i suprotan - stimulirajući - učinak na okolicu, u pravilu na manje centre. Njihov kulturni utjecaj, odnosno "kulturno zračenje" ("centrifugalno djelovanje") dovodi u blizini krupnih kulturnih središta do razvoja manjih centara sa samo 2.000-3.000 stanovnika (Zabok, Jastrebarsko, Zlatar, Donja Stubica, Čazma, Sveti Ivan Zelina, Vrbovec). Kao treće, veliko značenje komunikacija u razvoju kulturne djelatnosti određuje rast centara lociranih na prometnicama, što posebno dolazi do izražaja na prometnici Virovitica-Varaždin (Čakovec, Varaždin, Koprivnica, Đurđevac, Virovitica, Virje).

U članku se raspravlja i o tome da na temelju odnosa i veza unutar sustava kulturnih centara ne mogu biti objašnjena sva obilježja njegove strukture. Na sustav kulturnih centara, kao i na bilo koji drugi otvoreni sustav, djeluju i "izvanjski" čimbenici. Stoga je definitivna struktura sustava kulturnih centara rezultat zajedničkog djelovanja kako u ovome radu analiziranih zakonitosti djelovanja same kulturne funkcije, tako i socijalne, političke, ekonomske i prirodne sredine u kojoj se mreža kulturnih centara razvija.

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