

**BABEȘ-BOLYAI UNIVERSITY CLUJ-NAPOCA
FACULTY OF GEOGRAPHY
HUMAN GEOGRAPHY DEPARTMENT**

**PhD THESIS
- Summary -**

**THE TERTIARY FUNCTIONS OF THE
CITY OF CLUJ-NAPOCA**

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Key words: urban function; tertiary functions; civic functions; City of Cluj-Napoca; managerial geography; diagnostic analysis; prospective geography; “frontier” phenomena; “frontier” processes.

Chapter 1. Epistemological exposition

The present research is epistemologically based on two pillars: an exclusive, no-logical and a second, axiological one.

The design of the first pillar follows the path of what not this thesis must be: it must not be a narrative, descriptive geography; it must not be a geographical statistics; it must not be a „city guide”, must not be string together and describe geographical elements.

The second pillar was designed under the guidance of complexity sciences, which, among their fundamental principles, has the one that states that the elements of a geosystem are not important, but the relations between the elements and between the elements and their states.

Starting from the General System Theory, the city is a geosystem. This theory emphasizes that, in an urban geosystem, there is a holarchy. The geosystem encompasses subsystems and belongs to certain oversystems (settlement systems, etc.). The subsystem of Cluj-Napoca’s tertiary functions is such a subsystem.

According to fractal theory (one of the complexity sciences), any fractal (subsystem) has the ability and behavior of the oversystem from which it comes (the tertiary functional subsystem belongs to Cluj-Napoca’s urban geosystem). Therefore, the geographical analysis of the tertiary subsystem is performed according to the analysis principles and criteria of the geosystem.

Following these approach principles, we consider that the tertiary functions’



subsystem must be phenomenologically and functionalistically analyzed, emphasizing:

- the subsystem’s structure;
- the functions of the urban tertiary system;
- the elements of tertiary functions; and especially
- the position, role, interactions and relations that are generated and cultivated by these functions, their manifestation and the synergetic relations born in the geosystem.

In order to materialize these axiological principles, we defined the following epistemological construction:

- we designed “The methodological scheme for the analysis of Cluj-Napoca’s tertiary functions subsystem” (in order to do so, we adapted the methodological scheme of territorial system analysis – I. Ianoș, 2000).

- the first part presents, within a new taxonomy of the city’s tertiary functions, all of these functions and their geographical organization manner.

- the second part encompasses “The diagnosis analysis of Cluj-Napoca’s tertiary functions”. This diagnosis will be performed according to:



Fig. 83. The structure of the diagnosis design for Cluj-Napoca’s tertiary functions subsystem (adapted from I. Ianoș, 2000)

- the last part tackles “The prospective geography of Cluj-Napoca’s tertiary functions subsystem”. The epistemological design created for this purpose is the one from fig. 111. The approach can be found within Chapter 4.

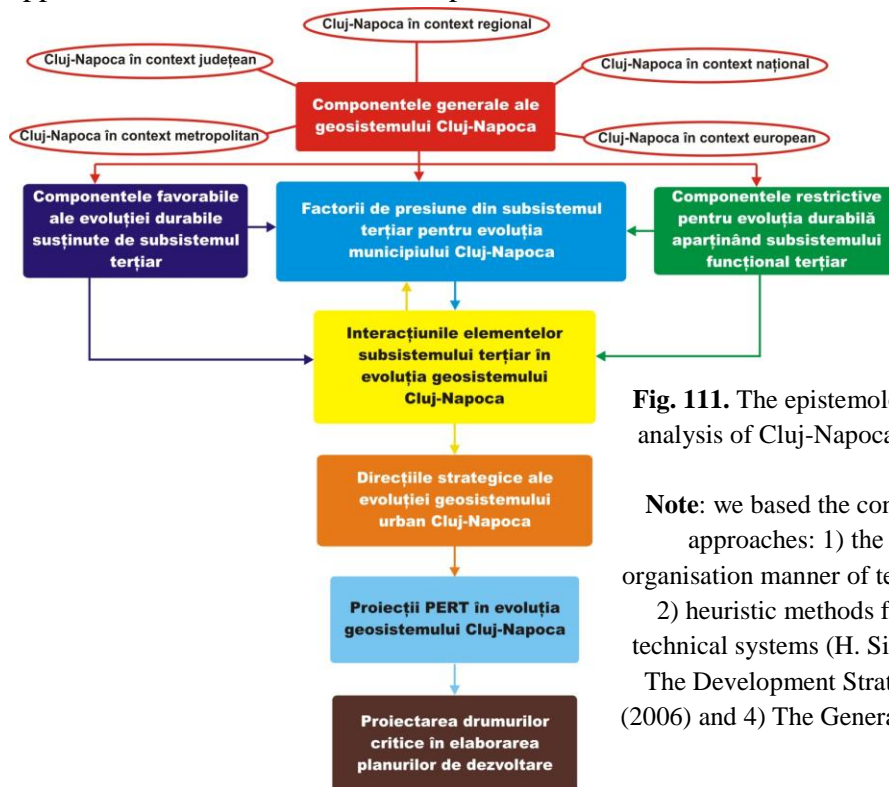


Fig. 111. The epistemological design for the prospective analysis of Cluj-Napoca’s tertiary functional subsystem

Note: we based the construction of this design on four approaches: 1) the „prognosis” scheme for the organisation manner of territorial systems (I. Ianoș, 2000); 2) heuristic methods for the prognosis and design of technical systems (H. Simon, 1978; L. Marian, 2009); 3) The Development Strategy of the City of Cluj-Napoca (2006) and 4) The General Urbanistic Plan of Cluj-Napoca (1998).

According to the research project used to substantiate this thesis, in Chapter 5 we tackled the tertiary functions of Cluj-Napoca in relation to one of the urbogenetic phenomena

with the most impact, presence and action in the city's evolution: the frontier phenomenon. It is an approach which, even though being partial, opens up an unexplored gnoseological field until today in Romanian urban geography, for which we predict, within the present and future geopolitical context, a brilliant dynamic.

The PhD thesis' contents

The thesis has five main chapter titles.

- Epistemological exposition.
- The approaches regarding urban geography within the geographical science.
- The functions of settlements. Classification and epistemological substantiation.
- The tertiary functions of Cluj-Napoca.
- The geography of tertiary functions and the „frontier” phenomena in Cluj-Napoca

Chapter 2. The approach stages of urban geography within geographical science

This chapter aims to present the evolution of urban geography as a branch of geography in three stages: 2.1. *The international geography's approaches of urban geography*; 2.2. *The Romanian geography's approaches of urban geography*; and 2.3. *Urban geography and the Cluj-Napoca Geographical School*.

In subchapter 2.1., we go through the *stages* and *milestones* of urban geography on the international stage and, in addition to several “approach steps” for urban geography, created by different geographers, we bring before the public the one developed by N.R. Fyfe and Judith T. Kenny (2005), that best describes the evolution of urban geography.

Besides the “five taxonomical stages” substantiated by the two authors (the stage of descriptive approach; the stage of the approach in the spirit of spatial economy; the stage of quantitative thinking; the stage of ideological thinking and the postmodernist stage), we advance another one: *the stage of managerial geography*.

We view this managerial geography as an objective consequence of its role as “*philosophy of measurable sciences*” (V. Surd, B.N. Păcurar, 2010), that geography must fulfill today and in the future, the only one capable of using the laws of fundamental sciences and coordinate the evolution of space: “normative geography”; “prospective and projective geography”, operational geography, and especially managerial geography.

The subchapter 2.2., containing the Romanian geography's approaches in urban geography, emphasizes the fact that the Romanian urban geography was among the pioneers in this field (V. Mihăilescu, 1915).

2.3. Urban geography and the Cluj-Napoca geographical school put together a representative research, starting with Sorin Opreanu, 1928. We built two tables:

- one with authors and their publications;
- one that emphasizes PhD theses created within this school, in urban geography and urbanism.

Chapter 3. The functions of settlements. Classification and epistemological substantiation

3.1. Functionalist views on the concepts and terms that define settlement functions

This chapter was envisioned as a functionalist approach on different concepts and definitions regarding urban geography.

Within our substantiation, we firstly put forward the idea to incorporate the concept of sense, finality, reason to be, within the definition of the city and its functions. Therefore, we built two definitions:

- the city is *the complexly organized geographical space, with a permanent dynamic, capable of ensuring a diversity of functions for its own evolution and development and also for the evolution and development of its influence space.*

- the city's function is *the necessity relation formed between the elements of the urban geosystem and its state and which generates, cultivates and sustains its life, in order to attain its sense, its systemic reason to be.*

3.2. The functions of settlements. Classification and epistemological substantiation

Within the generous framework of the theme, we put forward a functions' taxonomy for the two categories of perennial settlements in Romanian geography: *the village* and *the city*. We also reveal that the functions (rural and urban) are divided in *two fundamental categories*:

- **vital functions;**
- **conjunctural functions.**

Having studied the main classifications of urban functions, used by different authors or international bodies, basing our approach on the proposed concepts and definitions, we advance the following taxonomy of tertiary urban functions:

Table 3. The main categories of tertiary functions for present day Romanian cities

| No. | Functions | No. | Functions |
|-----|------------------------------------|-----|-------------------------------------|
| 1. | Civic functions | 6. | The financial function |
| 2. | Cultural functions | 7. | The judicial function |
| 3. | Administrative-political functions | 8. | The transport-vehiculatory function |
| 4. | The commercial function | 9. | The infocommunicational function |
| 5. | Touristic functions | 10. | The military function |
| | | 11. | The "frontier" function |

One can see that we have introduced a taxonomically non-classified category until now: *civic functions*. We justify this concept by basing it on the functional concept of *sense*

and on the reason that there is a category of functions (residential function; security function, etc.) whose *main purpose and finality (sense) is the ensurance of the 'civitas', of its vital necessities*. They are not generated by the mercantile relation of “attracting resources”. We consider that this relation is, fundamentally, the expression of mercantile frontiers, especially of “*the European frontier*”.

Chapter 4. The tertiary functions of the City of Cluj-Napoca

Starting from the “Methodological analysis design of the tertiary functions subsystem of Cluj-Napoca” (fig. 3), we will tackle within this chapter, according to the algorithm from figures 3, 83 and 111, the present day organization and taxonomical structure of Cluj-Napoca’s tertiary functions subsystem.

4.1.1. The present day organization

The sections of this subchapter contain the presentation of the tertiary functions of the urban subsystem and their organization.

- **civic functions:** *the residential function; the administrative-civic function; the urbanistic function; the ecological function; the medical function and the security function;*
- **cultural functions:** *the mass educational function; the university function; the spiritual-religious function; the cultural-festive function; the cultural-artistic function; the scientific-academic function and the sport function;*
- **administrative-political functions:** *the county administrative-political function and the regional administrative-political function;*
- **the commercial function;**
- **touristic functions:** *the commercial-touristic function; the festive-touristic function; the medical-touristic function; the business touristic function; the plesirtouristic function; the religious-touristic function and the educational-touristic function;*
- **the financial function;**
- **the judicial function;**
- **transport-vehiculatory functions:** *the road transport function; the railway transport function; the air transport function; the intraurban transport function and the special transports function;*
- **the infocommunicational function;**
- **the militar function;**
- **the “frontier” function.**

4.1.2. The tertiary functions of Cluj-Napoca. Geographic presentation

4.1.2.1. The civic functions of Cluj-Napoca

According to the previous substantiation, we name these functions, *civic*, because they primordially serve “the civitas” and are vital for the structure’s security, for the system’s health and evolution, for harbouring the primordial geosystemic element: man. We therefore see these functions from a anthropo-social, structural, civic perspective and only much later as bringer of income. All these six functions are functions of systemic safety and administration.

4.1.2.1.1. The residential function of Cluj-Napoca

The first part will be dedicated to the theoretical and conceptual substantiation of the above mentioned function. In the next section 4.1.2.1.1.2. we present “the function’s institutional logistics”, its systemic structure related to the geographical space.

4.1.2.1.2. The administrative-civic function of Cluj-Napoca

The theoretical presentation – at this point – tries to justify the civic concept and its breakup from the “political” one, due to the fact that, regardless of the political organization in place, regardless of the political-ideological institutions situated within the city, it must manage from a apolitical, civic standpoint. The spirit of the concept of administrative-civic function, that we endorse, is filled by the content and interaction of the public act, programmed, known, assumed and institutionally organized for the management of the urban geosystem.

The elements of Cluj-Napoca’s functional administrative-civic subsystem are: Cluj-Napoca City Hall and Cluj-Napoca Local (City) Council.

4.1.2.1.3. The urbanistic function of Cluj-Napoca

In this section we aim to find and present the relations between urban geography and urbanism and also to emphasize, through a questionnaire, that there are several problems regarding the understanding of this concept.

This function has not yet been classified within tertiary functions, even though – in urban geography – it tends to become a “super-function”, just like the ecological function. At this stage we stress once more the managerial geography’s role and we view urbanism as a geographic concept and only then as an architectural issue.

The institutional logistics of Cluj-Napoca’s urbanistic function are:

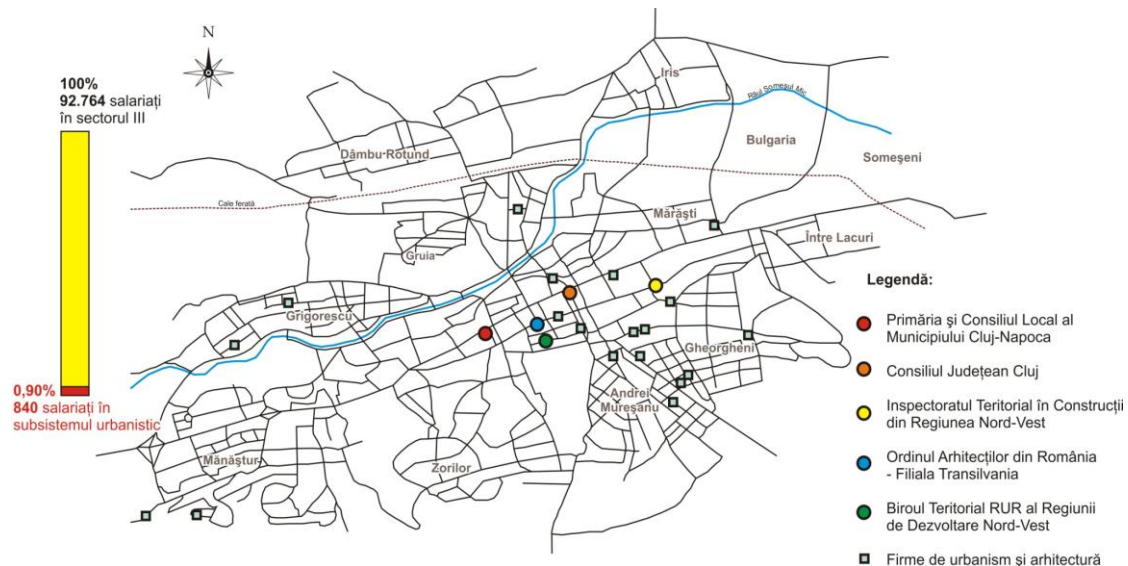


Fig. 7. The geographic projection of the urbanistic function on the plan of Cluj-Napoca in 2010

4.1.2.1.4. The ecological function of Cluj-Napoca

Within the theoretical support, we give prominence to the position of this function, *non-classified* until now, and which is put forward and backed with solid arguments, from the “general-ecological” perspective.

We ‘enter’ the so-called “*green urbanism*” concept, “organized” by S. Filip (2009) on three intervention axes and we end up with the conclusion that the city (Cluj-Napoca) can reach these objectives by “institutionally creating” a specialized function – *the ecological function*.

The elements of Cluj-Napoca ecological function subsystem are:

- The Regional Agency for Environmental Protection Cluj-Napoca;
- The Cluj Regional Commissariate of the National Environmental Guard;
- The Regional Intermediate Body SOP Environment Cluj-Napoca;
- Cluj County Council – Environmental Protection Department and PIU “Integrated Waste Management System in Cluj County”;
- Cluj-Napoca City Hall;
- „Alexandru Borza” Botanical Garden;
- Cluj-Napoca Forestry Department;
- The Territorial Inspectorate for Forestry and Hunting Cluj;
- waste management operators;
- environmental protection NGOs;
- national and county nature reserves, Natura 2000 sites, parks and green areas.

4.1.2.1.5. The medical function of Cluj-Napoca

The theory of this classic urban function is based on two subspaces: that of *officialized medical care* and that of “*non-license*” care.

Beyond any taxonomical idea regarding this function, beyond its internal and external “character”, it is, in our opinion, a civic function. Its main goal is the health of the city and only then, through development, can it also become “basic”.

The structure of Cluj-Napoca’s medical function is:

- hospitals (10 in 2010), comprising 62 sections / clinics;
- policlinics (9 in 2010);
- three medical institutes;
- eight private hospitals;
- 20 private medical centres;
- seven private medical laboratories;
- 362 stomatological practices and 96 dental laboratories;
- 112 private pharmacies and 27 pharmaceutical warehouses;
- 164 family medicine practices;
- 33 school medical practices;
- Cluj Mobile Emergency and Reanimation Service (SMURD) Cluj;
- Cluj County Ambulance Service, etc.

4.1.2.1.6. The security function of Cluj-Napoca

The theoretical part reveals the fact that the city ensures its security through a subsystem that contains a great number of different institutions and structures from several fields: public administration; public order; preventing and managing emergency situations; informational structures; preventing economical-financial crime; environmental guard; food security; competent structures for special situations, etc. The security function is a *vital function* within our classification.

The structure of the security function of the city is:

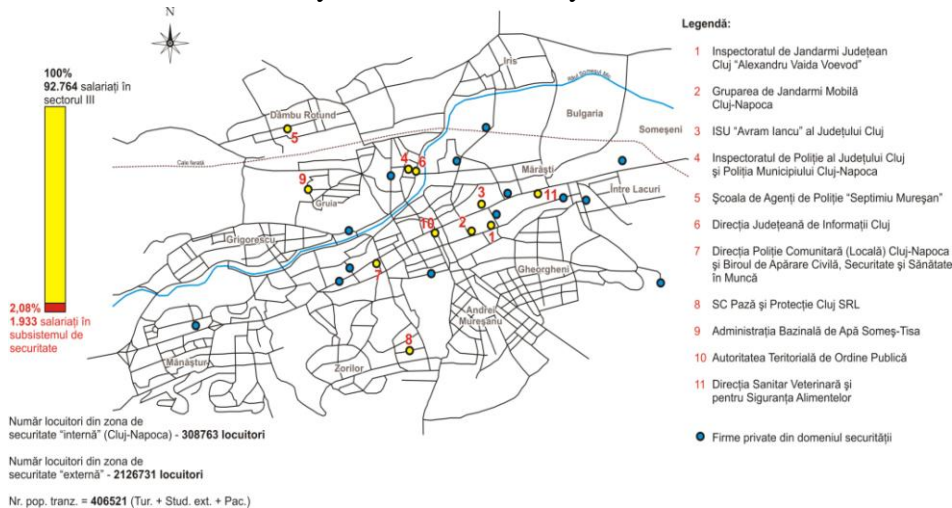


Fig. 23. The geographic projection of the security function on the plan of Cluj-Napoca în 2010

4.1.2.2. The cultural functions of Cluj-Napoca

Culture, the cultural functions, as an organizational and structural expression of “*fundamental anthropological concepts*” (A. Marga, 2009) has played, every since urbogenesis, a fundamental role in: knowing the world; educating the city’s society; “understanding history”; building a new society and the “*birth of a new world*” (E. Laszlo, 2009). These are a few of the reasons why we hesitate, from a taxonomical point of view, to place the cultural phenomenon within “the services” according to C. Clark’s classification of 1945.

We observe that especially “*cultural cities*” (V. Surd, 2003) stand out through an existential complexity so that, for that, the cultural function becomes vital (at least *conjunctural-vital*).

Within this context of geography, the city has a dominant position, that creates “*the phenomenon of cultural polarization*” and “...will configure the convergence and the *izocronal areas*” (I. Bădescu, N. Radu, 1980; V. Surd, 2003).

Certain objective realities push us towards noticing that there is a complexity of cultural functions, a complexity that does not lead to the classification of *a cultural function*, but of *cultural functions*.

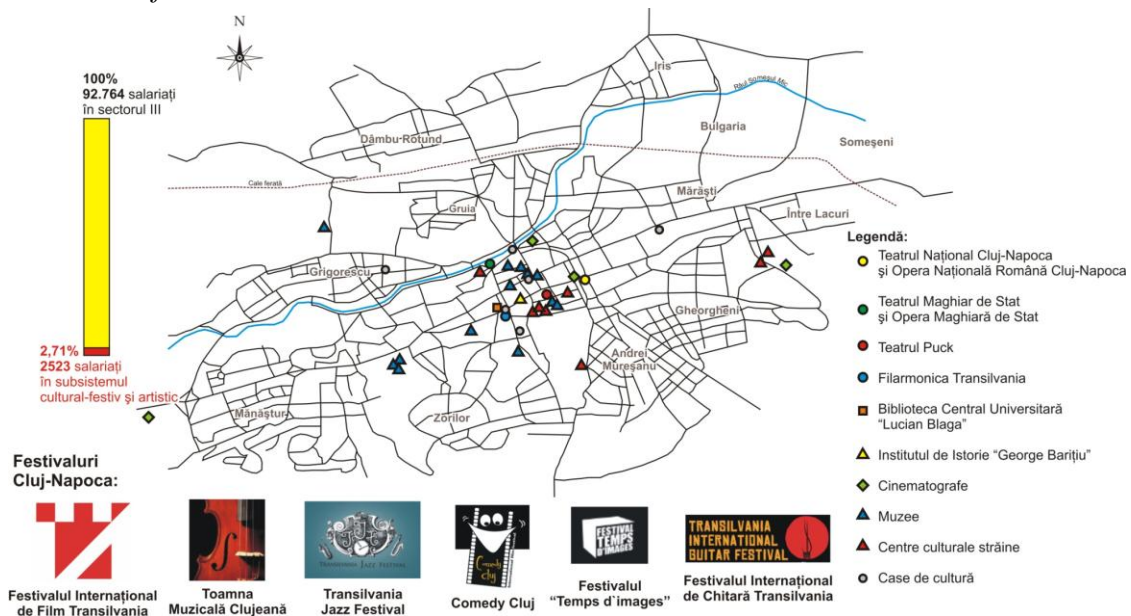


Fig. 30. The geographic projection of the cultural functions on the plan of Cluj-Napoca în 2010

4.1.2.2.3. The mass-educational function of Cluj-Napoca

The integrating conception of the cultural phenomenon in a “cultural city” (Cluj-Napoca) also determined us to introduce the educational function in the category of cultural functions. We do recognize that this cultural subsystem has a certain taxonomical autonomy, but we included it as a fundamental part (the basis, the foundation) of the cultural system. The

structure and the level of the educational system are determined by the cultural structure and level of society, of the urban community.

4.1.2.2.3.2. The structure of the mass-educational function of Cluj-Napoca

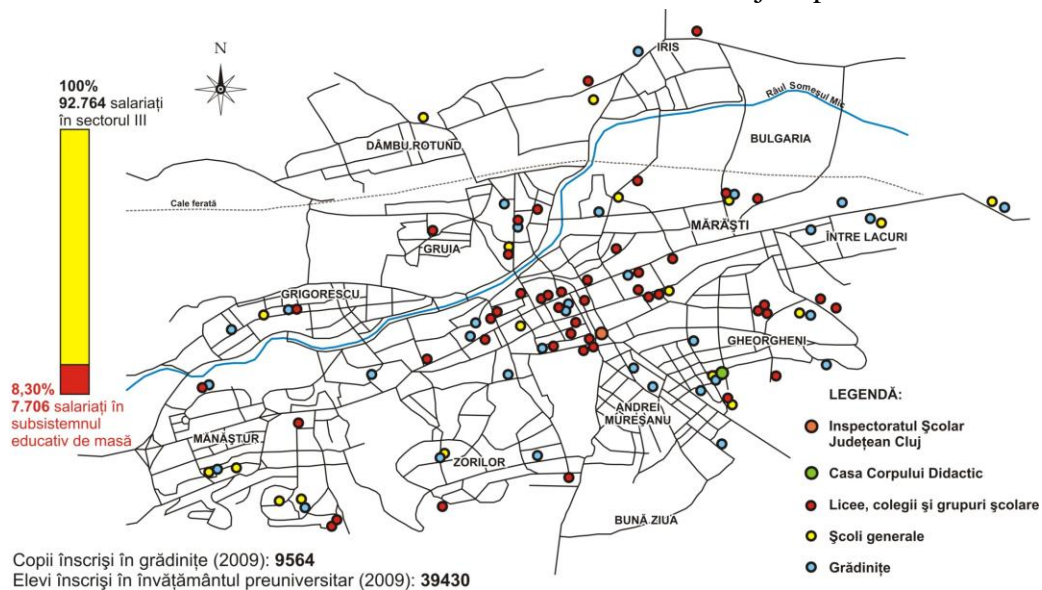


Fig. 33. The preuniversity educational system of Cluj-Napoca in 2010

4.1.2.2.4. The university function of Cluj-Napoca

In the substantiation of this function, we reveal, within its complexity, some defining features such as: “transference”; the functional vital-conjunctural character; “the function’s classic character”.

We reveal in 4.1.2.2.4.2. the mutations that took place within the university function’s structure after the threshold moment of 1989-1990:

- the disappearance of the ideological educational system;
- centrifugal phenomena of educational segregation (the case of the Hungarian minority);
- the increase of the number of universities;
- the emergence of private and religious educational institutions;
- the explosive increase of faculties and students (also including foreign students – over 2000 in 2007/2008);
- the emergence of alternative educational forms;
- the establishment of internationally renowned pedagogical and academic institutes;
- frequent restructurings of the educational system.

In 4.1.2.2.4.3. we present the systemic position and the offer of Cluj-Napoca’s university function and we emphasize its character.

From the standpoint of the structure of Cluj-Napoca’s „basic sector” (V. Surd, 2003), using the evaluation method for the distribution of the active population among activity sectors, we may estimate „the functional population” of the city, part of the university function, in the following manner:

a) according to the number of active people in education / teaching personnel in higher learning. For example, in 2009, the situation was as follows:

$$\text{Functional population} = \frac{\text{Number of active personnel in Cluj-Napoca's ed. system}}{\text{Number of personnel in Cluj-Napoca's higher ed. system}} \times 100 = \frac{13508}{3749} \times 100 = 27.75\%$$

b) according to the education's „localisation quotient” (from The Development Strategy of Cluj-Napoca, 2006), we have:

$$\text{Localisation quotient} = \frac{\text{Number active personnel in the national ed. sys.}}{\text{Total number of active personnel in the national economy}} \cdot \frac{\text{Total number personnel in the local economy}}{\text{Number active personnel in the local ed. system}} = 1.06$$

=> the quotient of Cluj-Napoca's educational economy (the university function) is higher than 1 (one) => locally concentrated function and therefore working for the outside.

c) according to the differential-comparative evaluation between *the number of pupils* and *university students* part of the educational system, in 2008, within the Cluj-Napoca sociosystem, we have:

Number of students (61487) – [Number of pupils (40243) · 0.5] = 41365, resulting that in the university system of Cluj-Napoca there are 41365 students from the outside; the theoretical ratio local students / external students = 1:2; the ratio between the nonbasic (internal) and the basic (external) weight of the university function is definitely in favour of the external one.

4.1.2.2.5. The spiritual-religious function of Cluj-Napoca

In our view, the spiritual-religious function, similarly to other consecrated (classic) functions, is a urbogenetic function (see the “consecrated cities” or some of the first cities, which were religious).

We start the analysis of the spiritual-religious function from the *dimensional trivalence of space* (according to V. Surd, 2005), but then we move on to the *geographic plurivalence* in which a function acts in: the spiritual space; the economic space; the military space; the urban space, etc.

We support the vital character of the religious function and we adopt P. Țuțea's statement (1992) “*Man's position is determined by its relation with God, the universe, its*

peers and itself". Consequently, we consider the spiritual-religious function as part of the urban vital triad, alongside de residential and security functions.

4.1.2.2.5.2. The functional-systemic elements of Cluj-Napoca's spiritual-religious function

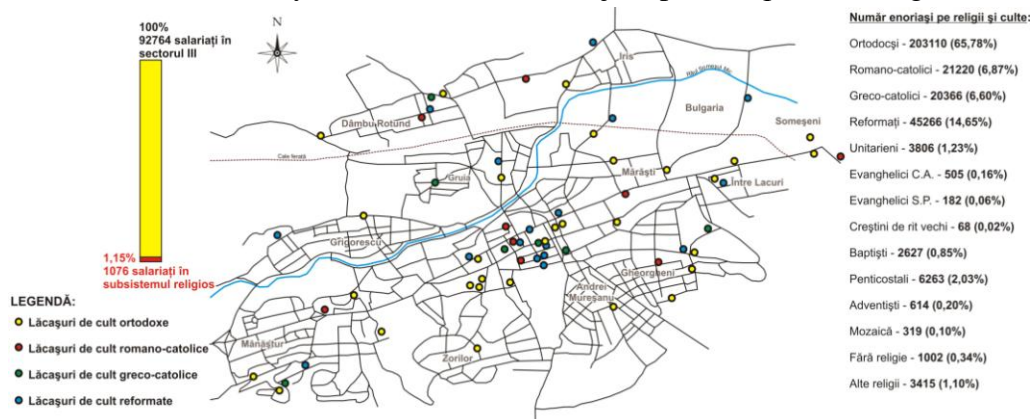


Fig. 47. The geographic projection of the religious function in the plan of Cluj-Napoca (2010)

4.1.2.2.6. The scientific-academic function of Cluj-Napoca

The function's theoretical substantiation is based on a higher geography, which owes its prying spirit to higher minds, being a place where one can speak of "knowledge society", knowledge through conscience, etc. According to this spirit, the city, as a geosystem, stands out through features and relations through which it collects, conserves, interprets and multiplies the scientific act. This cultural activity is supported by the scientific-academic function.

We also reveal that the scientific-academic function is a rare function, not in the grasp of every city. Is such a function justified in the proposed classification? We consider it justified and back our claims with the help of six arguments.

4.1.2.2.6.2. The structural-functional elements of the scientific-academic function of Cluj-Napoca

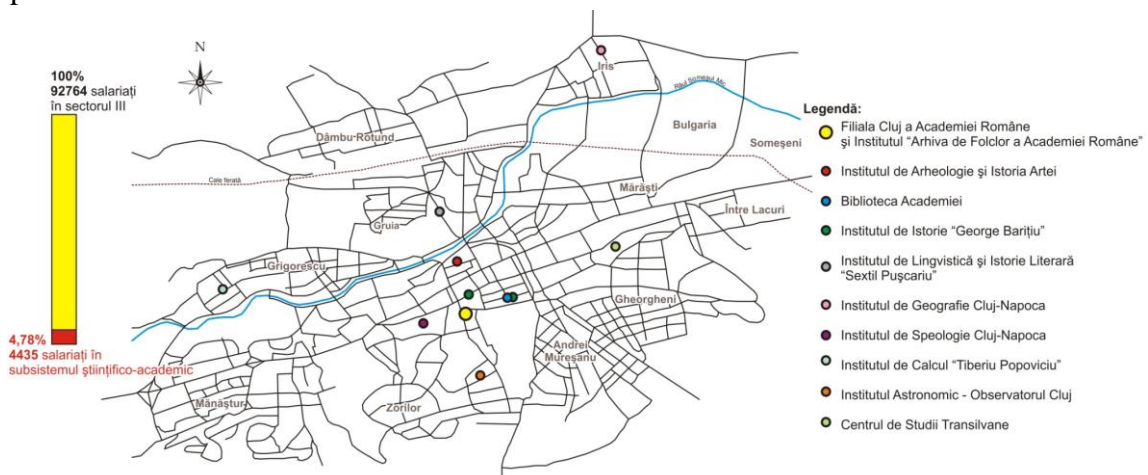


Fig. 49. The geographic projection of the scientific-academic function on the plan of Cluj-Napoca (2010) – the main elements

4.1.2.2.7. The sport function of Cluj-Napoca

Nowadays, through cyclical repetition, physical culture is synonymous with a modern and healthy society. The “*territorial systems*” (I. Ianoș, 2000) most capable of cultivating and developing physical culture and sports, through „institutional logistics”, are the cities. This relation generated and cultivated *the sport function* on many occasions, as an act of culture and civilization, which in turn generated a “sport industry”.

4.1.2.2.7.2. The structural-functional elements of Cluj-Napoca’s sport function

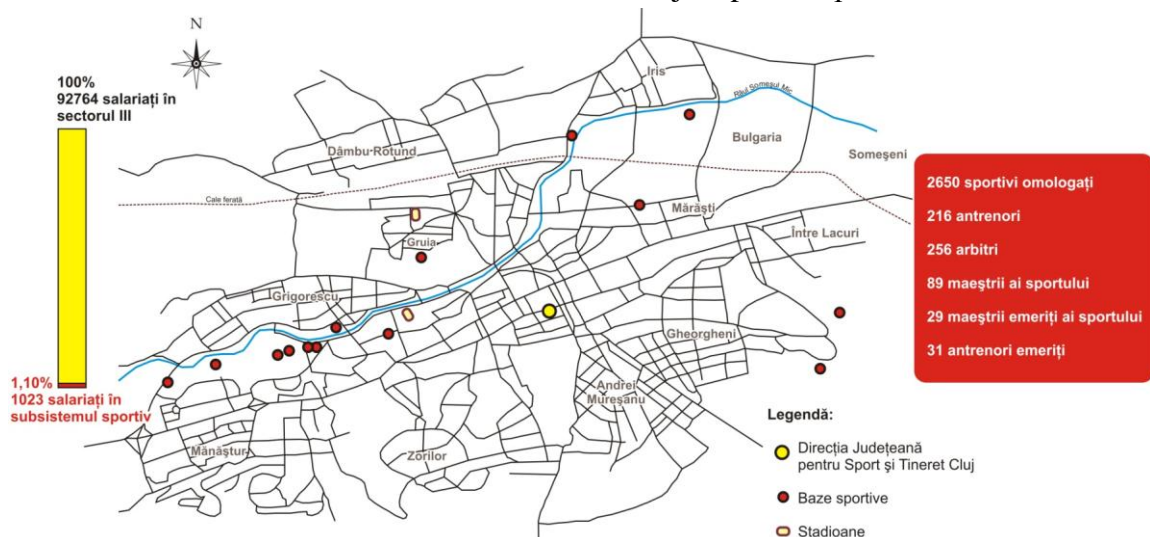


Fig. 51. The geographic projection of the sport function on the plan of Cluj-Napoca (2010)

4.1.2.3. The administrative-political functions

Continuing the substantiation started with the administrative-civic function, we argue that the administrative-political function (in general) is the institutional expression of the higher organization of human geospatial structures, as a “*result of a sound mind...*” (V. Surd, 2003).

By transferring the administrative character of the city to the civic-urban functions, the administrative-political part remains a separate category, specific only for higher holarchic levels: county; development region; state or overstate structures.

4.1.2.3.2.1. The elements of the county administrative-political function of the city

- Cluj County Council;
- Cluj County’s Prefecture;
- other institutions of the State;
- diffused services of the Romanian Government;

4.1.2.3.3.1. The elements of the regional administrative-political function of the city

- The North-Western Regional Development Agency;
- The Regional Development Council;
- Cluj Regional Statistics Department.

4.1.2.4. The commercial function of Cluj-Napoca

The theoretical part will historically present of evolution of trade from the “trade without merchants” phase to higher phases that influence “*systems of settlements*” (V. Surd, 2003), and will reveal the role of the coin in the evolution of trade, the role of dynamic factors (merchants, currency, credit), while in the end placing the city at the top of the *contemporary commercial pyramid* generated by the „*European frontier*” (I. Bădescu, 1993). This gnoseological journey supports the functionalist analysis of the urban comercial subsystem of Cluj-Napoca.

4.1.2.4.2. The institutional logistics of the comercial function of Cluj-Napoca

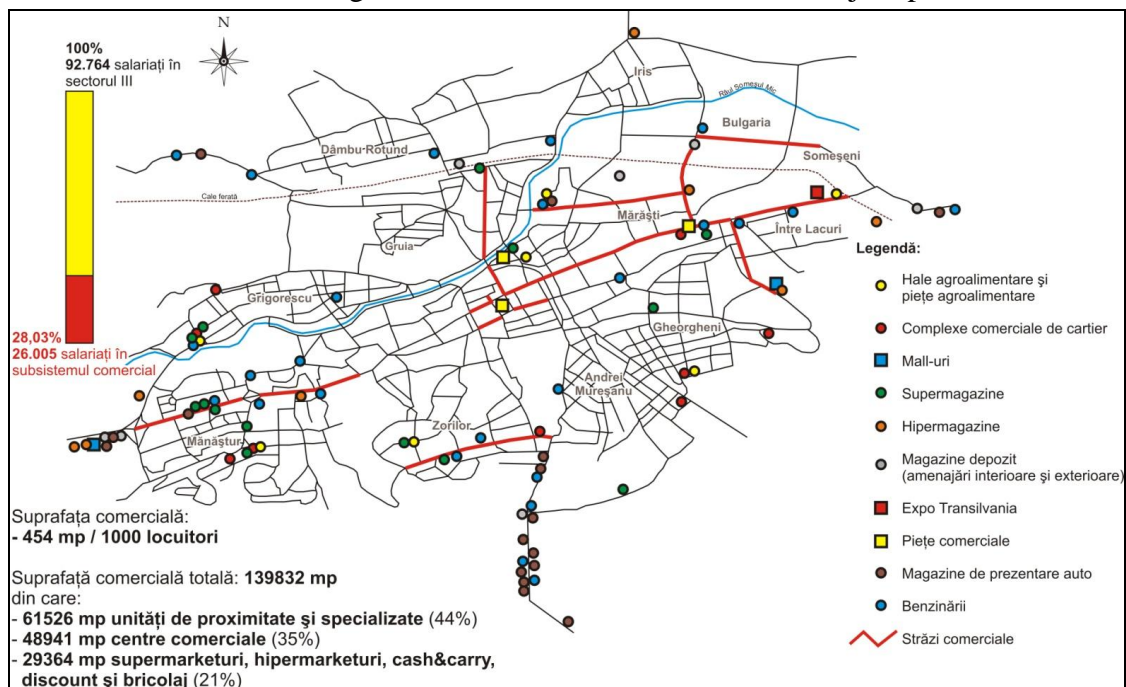


Fig. 58. The geographic projection of the commercial function on the plan of Cluj-Napoca in 2010

4.1.2.5. The touristic functions of Cluj-Napoca

The touristic function, an expression of the necessity relation between the urban human element and the built element, is individualized within urban geography in the 20th century through the touristic services ensured by the city.

At the end of the 20th century, a functional specialization appears, that allows „*the classification of cities*” (V. Surd, 2003) in touristic cities, which create and supply touristic services.

The Cluj-Napoca geographical school sees this social-economical phenomenon at a global scale (N. Ciangă, 2001) through three elements: touristic demand; touristic potential and the connection between them, that is movement, touristic consumption and the intercorrelations determined by the other social-economic domains.

Based on substantiations from the thesis and from other sources, we dealt with Cluj-Napoca’s touristic functions starting from *the trifunctional urban relation: necessity-offer-institutional functional relation*.

The city creates *specialized touristic functions* for itself as long as it can cover the *functional triangle*. Based on this, we proposed the following taxonomy for Cluj-Napoca:

- the commercial-touristic function;
- the cultural-touristic function;
- the medical-touristic function;
- the religious-touristic function;
- the plesirtouristic function (loisir-touristic);
- the sport-touristic function.

These touristic functions apparently “*enlarged the market to the limit*” (A. Marga, 2008).

4.1.2.6. The financial function of Cluj-Napoca

The intervention, usage and administration of currency generated a specialized system in history: the financial system. This system creates specialized logistical institutions. Today, this perfected and sophisticated system contains:

- | | |
|--|---|
| - global financial-banking systems; | - stock market organisations; |
| - international financial-banking systems; | - banks; |
| - transnational financial-banking systems; | - credit institutions; |
| - central banks (national); | - payment institutions; |
| - fiscal (revenue) institutions; | - non-banking institutions; |
| - financial institutions; | - other institutions (payment, financial, |
| - stock market institutions; | non-financial, etc.). |

4.1.2.7. The judicial function of Cluj-Napoca

The judicial institutions of microreferential territorial systems have the role of systemic adjustment and autoadjustment, meant to prevent “*the autodestruction of collectivities through mutual control*” (J. Szczepanski, 1972). Depending on the holarchic level, the judicial institutions of a city may have local, county or territorial-regional jurisdiction. In this manner, objectively, a city, that includes such institutions in its geography, has a judicial function.

In general, this function is basic, not due to the resources attracted, but due “*the flux of mass, energy and information*” (V. Surd, P. Cocean, 1978) that is put in motion by it.

4.1.2.7.2. The structural-functional elements of Cluj-Napoca’s judicial function...

- courts: Cluj Court House; Cluj Tribunal; Cluj Commercial Tribunal; Cluj-Napoca Military Tribunal și Cluj-Napoca Court.
- Public Notary Chamber Cluj;
- Court Executors Chamber;
- Cluj Judicial Experts Corps;
- Cluj Forensic Experts Corps;
- The electronic archive of real estate guarantees through authorized operators;
- authorized translators by the Ministry of Justice;
- Cluj Bar, etc.

4.1.2.8. The transport-vehiculatory function of Cluj-Napoca

The theoretical substantiation of this field starts from the classification of complex transports according to the typological criterion:

- according to the physical-geographic medium used: ...
- according to the vehicle category: ...
- according to the geosystem that is used: ...
- from a social-systemic point of view: ...
- from the object of the transport point of view: ...
- from the thoroughfares point of view: ...
- from the investment interest point of view: ...
- according to the combination between transport ways and forms: ...

The transport system, in an urban geography, creates a complexity, that imposes true intra-urban patterns: street patterns; intersection patterns; urban patterns; evolutionary patterns (V. Surd et al., 2005; S. Filip, 2009), projective patterns, etc.

In this project, we see it as a megasystem, according to the substantiation of Anne Kaijser (2005), where we must analyze its subsystem from the following perspectives:

- the urban transport system must be viewed, not as a technical system, but as a social-technical system, because the entire institutional framework (the institutional logistics) is composed of technical components, instalations, people, organisms, etc.;
- the urban transport system encompasses railways, roads, nodes, subsystem stations, parking lots, vehicles, streets, pedestrians, cyclists, etc.
- all the system’s networks and vehicles supply two types of fluxes: people and goods;
- the city generates two eco-social fluxes: input (food and other necessities) and output (finite goods and waste);
- *the managerial geography* of the city must solve an important issue, within the circulation and urban transport system, more exactly to establish / introduce a „normative geography” and institutional logistics, which must please two divergent

aspects of the system: the subsystem of individual, pedestrian movement, and especially that of private automobile and the public transport subsystem.

Section 4.1.2.8.2. contains the vast logistics of Cluj-Napoca's transport-vehiculatory function

4.1.2.9. The infocommunicational function of Cluj-Napoca

The infocommunicational function, that we propose as systemic and not subsystemic function, is specific for the postmodern city. In the official or unofficial classifications, communications and transport are either separate or together, but in each and every one one can find, in one form or another, the concept of *communications* and *information*. This ensemble creates new „definitions” for the city:

- the virtual city (C. Martin, 1978);
- ciberspace (W. Gibson, 1982);
- the informational city (M. Castells, 1989);
- the invisible city (M. Batty, 1990);
- the electronic community (A. Poster, 1990);
- telecity (T.A. Fathy, 1991);
- teletopia (Piorunski, 1991);
- the smart city (J. Lattersasse, 1992);
- flexi-city (Judy Hillman, 1993);
- the virtual community (H. Rheingold, 1994);
- ciberville (H. von Schuber, 1994), etc.

In this dynamic complexity of today's city, it cannot attain its destiny or sense without auto-generating a specialized function: *the infocommunicational function*.

4.1.2.9.2. The institutional logistics of the infocommunicational function of Cluj-Napoca



Fig. 73. The geographic projection of the infocommunicational function on the plan of Cluj-Napoca in 2010

4.1.2.10. The military function of Cluj-Napoca

There is no city in the history of European settlements that did not have a military function until the 17th century, when the Judaic frontier reached its maturity, transforming

into “*the European frontier*” (I. Bădescu, D. Dungaciu, 1995). From this moment on, the military function of cities transformed, acquiring new properties. Today, for the cities that have it, the military function ensures a long list of elements, states and intra- and intersystemic relations, that can compete with other tertiary functions in terms of importance.

4.1.2.10.2. The elements of the military function of Cluj-Napoca

- Headquarters of the 4th „Gemina” Infantry Division;
- The Military Emergency Hospital „Dr. Constantin Papilian” Cluj-Napoca;
- The Zonal Military Centre Cluj;
- The Office for the Mobilisation of the Economy and Territorial Readiness for Defence of Cluj County (O.M.E.P.T.A. Cluj in Romanian);
- The Military Roundtable Cluj-Napoca;
- The Syndicate of Retired or Retiring Military Personnel - Cluj-Napoca Branch;
- The County Organisation of Retired or Retiring Military Personnel Cluj;
- The National Association of War Veterans and Widows – Cluj Branch.

4.1.2.11. The frontier function of Cluj-Napoca

Most schools of geography see the urban geosystem from a functionalist perspective, comparing it to a living organism (like the human body), and within this behaviour, it manifests and consecrates a series of functions (I. Serageldin, E. Shluger, Joan M. Brown, 2001). Based on a long series of remarkable contributions to the study of the frontier phenomenon and relating this phenomenon to: the concept of urban influence area; urbogenesis, etc., we consider that the *frontier functions* must be introduced among the urban functions. Its deep and systemic approach will reveal that, among the *urbogenetic function*, the frontier function holds on many occasions one of the first positions, and even the first one. This is also the case for the City of Cluj-Napoca. In the “Cluj-Napoca – a frontier construction” section, we emphasize that this city is, basically, the expression and the result of “frontier” expansion inside the Dacian-Romanian space.

4.1.2.11.2. The institutional logistics of Cluj-Napoca’s frontier function

In the geosystemic structure of Cluj-Napoca, there is no anthropic element that has not belonged to the city’s frontier function (past and present). The elements (“the institutional logistics”) of this function can be classified in the following manner:

- **institutional-cultural elements:** academic institutions; cultural-artistic institutions; higher learning institutions; cultural associations and unions.
- **religious elements;**
- **political-ideological elements:** political parties; political and ideological organisations.
- **economic elements:** agricultural firms; industriale enterprises; trade enterprises; touristic enterprises; R&D enterprises.
- **elements of the security system:** elements of the civic security system; elements of the national security system; elements of the ecological security system.

- **elements of the social-demographic system:** ethnic organisations; NGOs.
- **elements of international and transnational oversystems;**
- **systemic-financial elements.**

4.2. The diagnostic analysis of Cluj-Napoca's tertiary functions

We constructed the following scheme for this analysis:



Fig. 83. The structure of the diagnosis scheme for the tertiary functions of the Cluj-Napoca geosystem (adapted from I. Ianoș, 2000)

This design manages, in our view, to structurally-systemically analyze the entire geographical range of a tertiary function or of a tertiary subsystem.

4.2.2. The analysis of Cluj-Napoca's civic functions subsystem

Out of Cluj-Napoca's tertiary functions subsystem, we introduce the subsystem of civic functions (called *the civic-functional subsystem*) in this analysis design.

4.2.2.1. A. Territorial demarcation

By “demarcation” we meant the overlapping of influence and attraction areas (V. Surd, 2003), more exactly the territorial area of at least three functions.

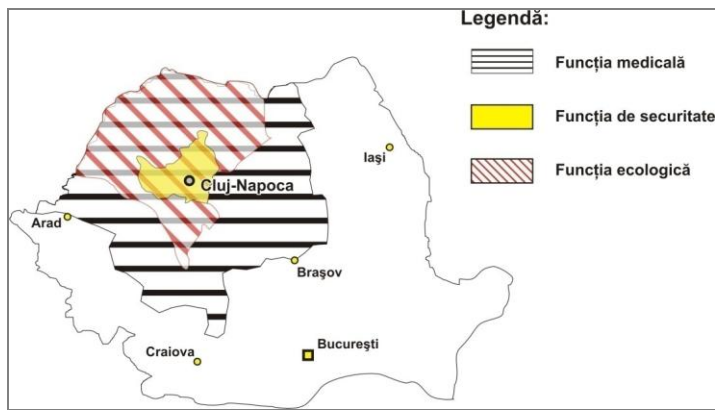


Fig. 84. The pattern of the civic functional subsystem of Cluj-Napoca in 2010

B. This part, entitled “The individuality of the civic-functional subsystem of the Cluj-Napoca geosystem”, encompasses “The quantity, structure and morphology of the fluxes of each civic function from the Cluj-Napoca urban geosystem”, in the following manner:

- B.1.1. The quantity, structure and morphology of the fluxes generated by the residential function
- B.1.2. The quantity, structure and morphology of fluxes generated by the security function
- B.1.3. The quantity, structure and morphology of fluxes generated by the urbanistic function of Cluj-Napoca
- B.1.4. The quantity, structure and morphology of fluxes generated by the medical function of Cluj-Napoca
- B.1.5. The quantity, structure and morphology of fluxes generated by the administrative-civic function of Cluj-Napoca
- B.1.6. The quantity, structure and morphology of fluxes generated by the ecological function of Cluj-Napoca

C. The integration of the functional-civic subsystem in the urban geosystem and in the higher holarchic systems

The relational „integration” of the civic-urban subsystem from the Cluj-Napoca geosystem can be emphasized through the category and level of relational integration.

1. **the residential function:** - according to a statistical-sequential evaluation, the ratio between the input / output fluxes from this subsystem is $\frac{1}{4}$ in favour of outputs;
2. **the security function:** - the functional security subsystem only has a relatively balanced integration level;
3. **the administrative-civic function:** - the functional administrative-civic subsystem of Cluj-Napoca is at a balanced and also excedentary level when it comes to holarchic integration fluxes;
4. **the urbanistic function:** - the urbanistic function subsystem of Cluj-Napoca appears to be, from the integration point of view, extremely unstable and aggressive. Defining the integration level comes from the interrogatory framework, that contains nine questions.

5. **the medical function:** - the systemic relations between Cluj-Napoca's medical subsystem and the other holarchic or neighbouring systems are balanced and organising in the geographic space;
6. **the ecological function:** – the integration of the ecological function with neighbouring or higher systems is highly complex. The range of *deficiency relations* mirrored with those that are *transcending* has the following status correlations:
 - integration relations through ecosystemic offer;
 - eco-insufficient integration relations within the holarchic systems.

The functional integration relations of the eco-urban subsystem of Cluj-Napoca contain both favourable and unfavourable elements, but the final status is still *one of deficiency*. This deficient integration of the Cluj-Napoca urban geosystem within the meso- and macrogeographic space is the result of some factors and some objective processes (including „frontier” processes), and the system's response is unsatisfactory. Beyond the overemphasis on some modest results and the stress on „projects” and „strategic plans”, the ecosystemic landscape of Cluj-Napoca is unsatisfactory from all points of view.

D. The evolution (dynamic) of the urban civic-functional subsystem from the Cluj-Napoca geosystem between 1990-2010

In order to have a suggestive “image” of the evolution of the civic-urban subsystem, we must resort to the historical principle by choosing a long enough period, more exactly 1990-2010. The pressure factors that affected the civic-urban subsystem of Cluj-Napoca during the threshold moment of 1989-1990 were:

- **internal factors:** the status of „closed city” from a residential point of view; the civic security situation was perceived as permanent insecurity by the population; the city's administration, from an every day life, civic comfort point of view, etc., was servient to certain economic and political-ideological agendas that were obsolete and did not correspond with what the population (human factor) needed, etc.
- **external factors:** „the Euroatlantic frontier phenomenon”; „the local frontiers phenomenon” (the Hungarian frontier for example); the desintegration of the communist block, etc.

E. The functionality of the civic-urban subsystem of the Cluj-Napoca geosystem

In order to analyze the functionality of the civic-urban subsystem of Cluj-Napoca, based on the analysis-diagnosis design, we came up with the following conceptual construction:

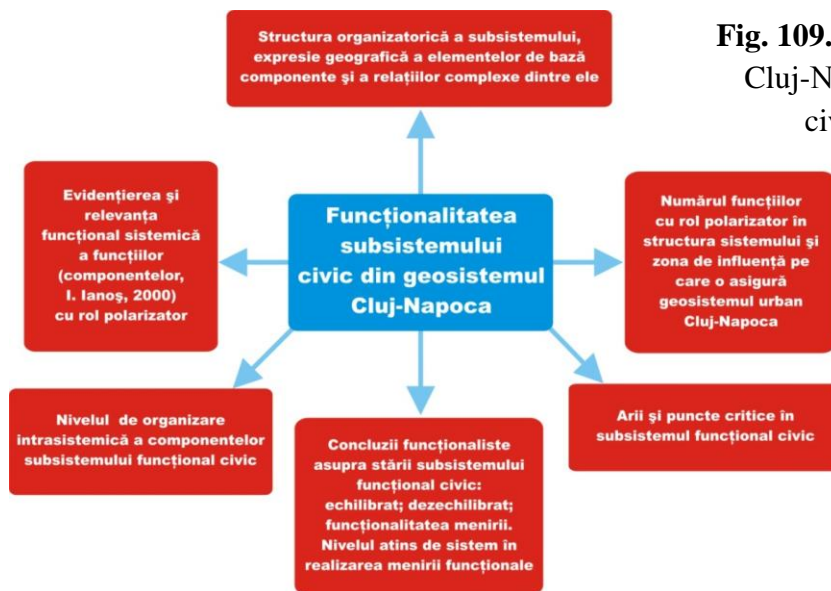


Fig. 109. The functionality of Cluj-Napoca's functional civic subsystem

This epistemological construction starts from the directing principle that states that “*a system's functionality*” (I. Ianoș, 2000) is the higher analytical level of the diagnosis, it is *the self-organization level* and the level of its structural-systemic status. *Functionality* is the generalizing mirror of the conclusions that came out of the diagnosis.




E.1. Basic structures and the relations between them

Due to the lack of space and in order to systemize, we built a table of intrasystemic relations between civic functions, emphasizing one relation for each of them, a relation introduced by each function and directed towards the other functions. Obviously, for every function there are other relations that can be associated to this table.

E.2. The polarizing components of the civic-urban subsystem of Cluj-Napoca

The functionality of Cluj-Napoca's civic-urban subsystem is characterized, in a definite way, by the number and power of the elements with a polarizing role. The polarizing role and function of each element from this subsystem can be suggestively emphasized through the areas of influence generated by each of the subsystem's functions in the superior holarchic geosystem of Cluj-Napoca. In order to do this, we will introduce in the territorial determination of the polarizing area the elements that generate the size and strength of the attraction: population, work force, influence area/attraction, the function's character (basic/nonbasic, external/internal), the maximum influence area, the influence directions, etc. By overlapping them (analytically and spatially), we will see the number and characteristics of the systemic components that have a polarizing role.

Table 87. The influence areas generated by some of the civic functions of the Cluj-Napoca geosystem

| Type of influence area | The function/functions that determine the influence area | The actual influence area |
|---|---|--|
| <p>The maximum influence area (determined by the the function with the largest influence area)</p> | <p>The medical function</p> |  |
| <p>The minimum influence area (determined by the function with the smallest influence area)</p> | <p>The residential function</p> | <p>The built-up area of Cluj-Napoca</p>  |
| <p>The defining influence area (determined by at least three civic functions)</p> | <p>The security function The ecological function The medical function</p> | <p>Cluj, Sălaj, Bihor, Maramureș and Satu Mare counties</p>  |

What is the result from the point of view of the functionality of Cluj-Napoca civic-urban subsystem? The result is that from the six systemic functions, three have an area of influence that surpasses the limit of the Cluj-Napoca geosystem in such a way that they reduce the geosystem (compared to the area of influence) to the meaning of „central place”, attraction pole (convergence pole). The three functions, according to their polarizing power, are: 1) *the medical function*; 2) *the ecological function* and 3) *the security function*.

E.3. The organization level of the civic-functional subsystem of the geosystem of Cluj-Napoca

We consider that the level of systemic organization can be suggestively evaluated through an analytical-statistical form, from which relevant relations (ratios) will spring up: the number of systemic elements; their organization form and the geographical space organized by the functional element. We therefore propose, for the systematization of the analytical endeavor, the following form:

Tableul 88. The evaluation of the organisational level of Cluj-Napoca's functional civic subsystem in 2010

| Civic function | Functional elements | The organisation hierarchical level attained | The geographic space organised by the elements | The geographic space organised by the function | Number of persons integrated in the logistical-institutional system | The organisation level of the functional civic subsystem |
|--|--|--|---|---|---|--|
| The security function | Cluj County Gendarmerie | County responsibility | The security space of Cluj County | Comprises from microspatial (local) geosystems to county, regional and zonal mesospacial systems. | Over 200 | The functional-civic subsystem of Cluj-Napoca is the largest and the most important tertiary subsystem of the city due to its functions. All these civic functions primarily stand out through specific and specialised institutions, most of them being <i>public institutions</i> , of the city, and not commercial enterprises (profit driven). |
| | The Mobile Gendarmerie Group Cluj-Napoca | Regional intervention operative unit | The security space of the North-Western Region | | Around 20 | |
| | The Emergency Situations Inspectorate „Avram Iancu” Cluj | County inspectorate | The security space of Cluj County | | 120 | |
| | The Police Inspectorate of Cluj County | County security and public order | The security space of Cluj County | | - | |
| | Cluj-Napoca Police Department | Urban security institution | The urban space of Cluj-Napoca | | - | |
| | „Septimiu Mureşan” School Academy Cluj-Napoca | Regional level | The intercounty space of Cluj, Alba, Bihor, Sălaj, Mureş, Bistriţa-Năsăud | | 24 teachers (commissars, subcommissars and agents) | |
| | The County Information Agency Cluj | County organisation | The security space of Cluj County | | - | |
| | Cluj-Napoca Local Police | Community police | The urban space of Cluj-Napoca | | 66 | |
| | “SC Pază şi Protecţie SA” | Territorial organisation with 5 offices | The security space of Cluj County | | 295 | |
| | Bureau for Civil Defence, Security and Work Health | Community service within City Hall | The urban space of Cluj-Napoca | | - | |
| | Someş-Tisa Water Administration | Five systems of water management | The Someş regional-hydrographic space | | 455 | |
| Cluj Sanitary-Veterinarian and Food Safety Authority | Local and county organisation | The space of Cluj County | 145 | | | |
| The medical function | 10 hospitals | Territorial-regional medical units | National space | Comprises county and regional mesospacial geosystems | Around 1400 | |
| | 9 policlinics | Territorial-regional medical units | National space | | Around 900 | |

| Civic function | Functional elements | The organisation hierarchical level attained | The geographic space organised by the elements | The geographic space organised by the function | Number of persons integrated in the logistical-institutional system | The organisation level of the functional civic subsystem |
|---------------------------------|--|--|--|--|---|--|
| | 8 private hospitals; 4 private polyclinics; 20 private medical centres; 47 private medical laboratories; 362 stomatologica l practices; 96 dental labs.; 27 pharmaceutical storages; 112 private pharmacies; 164 family medicine practices | Private territorial-regional medical units | Transylvanian space | | Around 1300 | |
| | SMURD Cluj | Unit within The Emergency Situations Inspectorate | The space of Cluj County | | 140 | |
| | Cluj County Ambulance Service plus other private ambulance services | County public unit plus other private unit | The space of Cluj County | | 502 | |
| | Cluj Health Insurance | County unit | The space of Cluj County | | 123 | |
| | Public Health Institute Cluj | Profilactic medical unit, subordinated to the Ministry of Health | Regional space (10 counties) | | - | |
| | 38 NGOs | Healthcare NGOs | Regional space | | Around 160 | |
| The administrat.-civic function | Cluj-Napoca City Hall | Municipal organisation | The space of Cluj-Napoca | Comprises only microspatial (local) geosystems | 811 | |
| | Cluj-Napoca City Council | Elected body, within City Hall | The space of Cluj-Napoca | | 27 | |
| The ecological function | Cluj-Napoca City Hall (environmental protection subunits) | Municipal organisation | The space of Cluj-Napoca | Comprises from microspatial (local) geosystems | 29 | |

| Civic function | Functional elements | The organisation hierarchical level attained | The geographic space organised by the elements | The geographic space organised by the function | Number of persons integrated in the logistical-institutional system | The organisation level of the functional civic subsystem |
|--------------------------|--|---|---|--|--|--|
| | Regional Environmental Protection Agency Cluj-Napoca | Regional environmental protection forum | The space of the North-Western Development Region | to county, regional and zonal geosystems. | 36 | |
| | The National Environmental Guard Regional Commissariate Cluj | Regional environmental security unit | The space of Cluj, Bihor, Bistrița-Năsăud, Sălaj, Satu Mare, Maramureș Counties | | 16 plus commissar and auxiliary personnel from the Bihor, Bistrița-Năsăud, Sălaj, Satu Mare și Maramureș county commissariates | |
| | IB SOP Environment Cluj-Napoca | Environmental Intermediate Body for the North-Western Development Region | The space of the North-Western Development Region | | 21 | |
| | Cluj County Council – Environmental Issues Department | Environmental unit within the county forum | The space of Cluj county | | 10 | |
| | „Alexandru Borza” Botanical Garden | Natural environment conservation subsystem within Babeș-Bolyai University | The submunicipal space (Clinicilor area) | | 47 | |
| | Cluj-Napoca Forestry Authority | County organisation | The space of Cluj County | | 342 | |
| | The Territorial Forestry and Hunting Inspectorate Cluj | Regional organisation | The space of Cluj, Alba, Bistrița-Năsăud, Maramureș Counties | | 54 | |
| | Waste management operators | Private firms | The intercounty space | | Around 750 | |
| | Environmental protection NGOs | Non-governmental organisations | The intercounty space | | Around 2300 | |
| The residential function | Cluj-Napoca City Hall and City Council | Municipal organisation | The space of Cluj-Napoca | Comprises all types of geosystems (from micro | 811 | |

| Civic function | Functional elements | The organisation hierarchical level attained | The geographic space organised by the elements | The geographic space organised by the function | Number of persons integrated in the logistical-institutional system | The organisation level of the functional civic subsystem |
|-------------------------|--|---|---|--|--|---|
| | National Housing Authority | National organisation | The space of Cluj-Napoca | to macro) | - | |
| | Real estate firms, construction firms, etc. | Private enterprises | Intercounty, regional, national space | | 9926 | |
| The urbanistic function | Cluj-Napoca City Council | Elected municipal body | The space of Cluj-Napoca | The geographic functional organisation space comprises micro and mesospatial geosystems. | 27 | |
| | Cluj-Napoca City Hall | Municipal organisation | The space of Cluj-Napoca | | 51 | |
| | Cluj County Council | County organisation | The space of Cluj County | | 16 | |
| | Construction Quality Control Service | Technical county organisation | The space of Cluj County | | 17 | |
| | Romanian Architects Organisation – Transilvania Branch | Regional, independent, non-profit organisation | The Transylvanian space | | 506 | |
| | Romanian Urbanists Register – North-Western Branch | Regional organisation | The space of the North-Western Development Region | | 223 | |

E.4. Critical areas and spots within the functional-civic subsystem of Cluj-Napoca

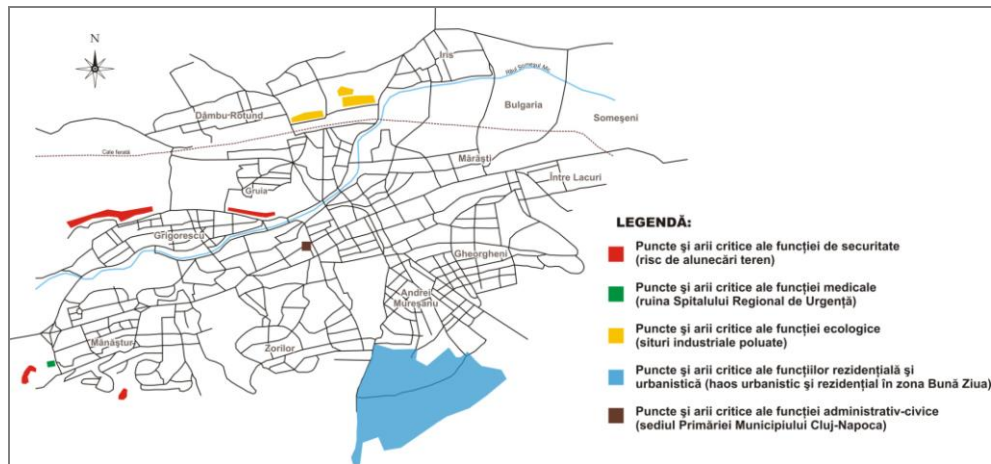


Fig. 110. Examples of critical spots and areas within the functional-civic subsystem of Cluj-Napoca in 2010

E.5. Conclusions regarding the status and functionality of the civic-urban subsystem from the Cluj-Napoca geosystem

We will adopt three directions for the conclusions regarding the functionality of the civic-urban subsystem from the Cluj-Napoca geosystem:

- its balance;
- its unbalances;
- its functionality in order to attain its predestination, its reason to be, its finality.

The diagnosis of the civic-urban subsystem of the City of Cluj-Napoca leads us to the following geographical conclusions:

Table 89. The list of balancing and unbalancing elements from the functional civic subsystem of the Cluj-Napoca geosystem

| Elements of balance | Elements of unbalance |
|---|---|
| The residential function grants the safety of habitation in the geosystem by ensuring all the vital necessities for the human factor: drinkable water; energy (heat and electricity); clean air (within standardized limits); freedom of movement, livable spaces, etc. | The residential function is not capable of ensuring the necessary spatial comfort nor the minimum livable space for the city's population. |
| The security function is organized and has the institutional logistics to ensure the operative coverage of all the security necessities of the geosystem: the security of the citizen liberties; the security of properties; the security of movement; the security of work; the security of food; the sanitary-veterinarian security, etc. | The geosystem's level of civic security did not improve proportionally with the improvement of the functional security subsystem. When the number of institutions for civic security increased from four in 1989 to 14 in 2010 (public institutions), the civic security situation decreased. |
| The administrative-civic function has all the categories of competent and legally established for the normal administration of the Cluj-Napoca urban geosystem. | The level of institutional organisation of the subsystem is permanently overwhelmed: the level of issues; bureaucracy; social-economic mobility; the instability of the political system (higher system); the "frontier" processes, etc. |
| The urbanistic function of the city will be „completed” by the long awaited renewal of Cluj-Napoca's General Urbanistic Plan, made by a consortium comprised of Cluj-Napoca Technical University and SC Planwerk SRL and Bog`Art SRL. | The urbanistic function is completely overwhelmed, conceptually, institutionally and ethically. From an urbanistic point of view, the geosystem of Cluj-Napoca is in permanent unbalance: a General Urbanistic Plan which went through to many derogations; lack of development strategies; lack of funds; chaotic constructions; ethnogentrification, etc. |

Table 89. The list of balancing and unbalancing elements from the functional civic subsystem of the Cluj-Napoca geosystem

| Elements of balance | Elements of unbalance |
|---|--|
| <p>The medical function has a highly consolidated structure, sistemically integrated in the urban structure of Cluj-Napoca, balanced and highly polarizing for a large geographic area and for overlapping geographic spaces (part of a hierarchy level on many levels). It is the civic function most capable of functionally covering all the „levels” that define its mission:</p> <ul style="list-style-type: none"> in the medical security of the population; in the medical-sanitary security of the geosystem; in balancing and the self-organisation of the urban civic system; in the urban civilization and civic culture space; <p>in ensuring the health status of the population for a very large and complex space (at meso and macrospatial levels);</p> <ul style="list-style-type: none"> in organizing the work force and its space, etc. <p>It is the function which has, for the geosystem of Cluj-Napoca, a dominating and polarising role; can be named civic, internal, but also external, basic, amnd at the same time non-basic, and be named, in one word, <i>defining</i> for the geosystem of Cluj-Napoca</p> | <p>Its excessively dominance within the geosystem creates an attraction for specialised work force, that hampers the equal and uniform spread of competences and medical elites in its influence area.</p> |
| <p>From an ecological point of view, the city of Cluj-Napoca is a centre of conception, organisation, planning and education in order to reach a sustainable evolution of a very large geographic space (mesospace).</p> | <p>Cluj-Napoca geosystem is at the same time the most aggressive geographic element in the surrounding mesospace from an ecological standpoint. It is polluting for the macrospace, has elements of high ecological risk, it is capable of creating ecogeographic „events”, it is a „predator” for the natural environment, etc.</p> |

The final conclusion is that the civic functions subsystem of Cluj-Napoca attains its finality ('menire' in Romanian) by / through:

- ensuring the vital necessities;
- a superior and complex self-organization level;
- a sustainable integration of the geosystem within higher holarchic systems.

4.3. The tertiary functions and the prospective geography of Cluj-Napoca. Heuristic approach

In subchapters 4.1. și 4.2 of this chapter, we presented the geography of the tertiary functions and their way of organization, as well as diagnostic analysis of Cluj-Napoca's tertiary functions (sequentially). Moving forward with the epistemological endeavor, based on the analytical approach design of a geographical system / subsystem (more exactly the subsystem of Cluj-Napoca's tertiary functions), we will present a third phase: the prospective geography of Cluj-Napoca regarding the representative sections for the system of its tertiary functions. The heuristic approach tries to identify and reveal possible geographic evolutions in the geosystem that were generated by the position and evolution of the tertiary functions subsystem, but also inverted relation. In short, we will try to convey the possible evolutions in the geosystem, in which the tertiary functions can have disorganizing or organizing roles.

From the prospective geography standpoint, in the Cluj-Napoca urban geosystem, we will use, for our analysis, straight out of convergent engineering, *the „all efforts towards the attainment of the same target” principle*, and through the heuristic method we will go from *idea* (project, possibility) to *target* (accomplishment, evolutionary stage, etc.), in a critical and functionalist manner, according to which the perspectives of an evolution in a geosystem can

be *objective* and thus uncontrollable, but also *foreseeable, projected, planned*, having to go through, during the geographical projection, through unavoidable *critical points*. We believe that only so can geography attain its desirable status of prospective science, for the sustainable evolution of anthropic space as well as for understanding the evolution perspectives of man-made systems, in our case the City of Cluj-Napoca. Through this approach towards the geographic perspective in an urban system, we can supply the epistemological „instruments” for *the managerial geography*, proposed in previous chapters. In conclusion, the epistemological scheme that will be used can be seen in Figure 111.

The general components – the five ellipses - will contain the presentations of the geosystem’s main components on five levels: *Cluj-Napoca within European context; Cluj-Napoca within national context; Cluj-Napoca within regional context; Cluj-Napoca within county context* and *Cluj-Napoca within metropolitan context*.

The favourable and also the restrictive components for the sustainable evolution of the tertiary functional subsystem of the city are presented in a bulleted list, alongside explanatory maps, plans, charts and tables.

The interactions between the elements of Cluj-Napoca’s tertiary subsystem and their influence on the evolution of the Cluj-Napoca urban geosystem

According to complexity sciences, in a complex system, the things that matter most are not the elements of the system, not the sum of the elements, not the force of the component elements in the structure, but the *interactions between the components* „...complexity is a property created from the interactions between the parts ... it manifests itself only at the level of the system itself” (P. Cilliers, 1998).

Babeş-Bolyai University Cluj-Napoca, as a cause element within the systemic interaction, enforces a complexity of relations. The thesis contains nine main interactions of this representative tertiary element.

Another way of emphasizing the interactions in the Cluj-Napoca tertiary subsystem is by creating a „panel” of the systemic elements with multiple (complex) functions. We will therefore build a functional panel with the main elements of the tertiary subsystem and the functions sustained by them (main and secondary).

Tabelul 107. The functional presentation of the main elements that make up the tertiary subsystem of Cluj-Napoca and the functions sustained by them in 2010

| No. | Geosystemic element | The main sustained function | Secondary sustained functions |
|-----|-------------------------------------|-----------------------------|--|
| 1. | The County School Inspectorate Cluj | Mass education | - Touristic-educational - Sport - Infocommunicational |
| 2. | Cluj-Napoca Technical University | University | - Infocommunicational - Transport-vehiculatory - Urbanistic - Touristic-educational - Frontier - Commercial |

| No. | Geosystemic element | The main sustained function | Secondary sustained functions |
|-----|---|-----------------------------|---|
| 3. | The Romanian Orthodox Archbishopcy of Vad, Feleacu and Cluj | Spiritual-religious | - Religious-touristic - Mass education - University |
| 4. | Transilvania International Film festival | Cultural-festive | - Cultural-artistic - Touristic-educational - Transport-vehiculatory - Mass educational - Frontier - University - Commercial-touristic |
| 5. | Romanian National Opera Cluj-Napoca | Cultural-artistic | - Cultural-festive - Transport-vehiculatory - Frontier |
| 6. | The Cluj Branch of the Romanian Academy | Scientific-academic | - University - Educational-turistic - Frontier - Cultural-artistic |
| 7. | The Sport Management Authority of Cluj County | Sport | - Mass educational - Urbanistic - Cultural-festive - Transport-vehiculatory - University - Administrative-civic and county administrative-political |
| 8. | The Health Management Authority of Cluj County | Medical | - University - Security - Ecological - Commercial |
| 9. | Chief Architect of Cluj-Napoca | Urbanistic | - University - Administrative-civic - Regional and county administrative-political - Medical - Ecological |
| 10. | Cluj-Napoca City Hall | Administrative-civic | - Mass educational - Cultural-festive - Sport - Residential - Education-touristic - Infocommunicational - Road transport-vehiculatory - Ecological - Frontier |
| 11. | Environmental Issues Department – Cluj County Council | Ecological | - Regional and county administrative-political - Education-touristic - Medical - Urbanistic - University - Road transport-vehiculatory - Administrative-civic |

| No. | Geosystemic element | The main sustained function | Secondary sustained functions |
|-----|--|-----------------------------------|--|
| 12. | Cluj-Napoca City Council | Residential | - Urbanistic - Mass educational - Ecological - Sport - Cultural-festive, etc. |
| 13. | Cluj County Gendarmerie | Security | - Administrative-political - Administrative-civic - Mass educational - Judicial - Transport-vehiculatory - Sport - Infocommunicational - Frontier |
| 14. | Cluj Court of Appeal | Judicial | - Security - Administrative-political - Administrative-civic - Infocommunicational |
| 15. | Cluj County Council | County administrative-political | All the rest. |
| 16. | The North-Western Development Region | Regional administrative-political | - Infocommunicational - Frontier |
| 17. | „Gemina” 4 th Infantry Division | Military | - Urbanistic - Cultural - Ecological - Commercial, etc. |
| 18. | Polus Center Mall | Commercial | - Frontier - Cultural-festive - Commercial-touristic - Urbanistic |
| 19. | Transilvania Bank | Financial | - Infocommunicational - Frontier - Commercial |
| 20. | RATUC Cluj-Napoca | Intraurban transport-vehiculatory | - Urbanistic - Road transport-vehiculatory - Mass education |
| 21. | Romanian Railways Regional Authority Cluj | Rail transport-vehiculatory | - Urbanistic - University - Mass educational |
| 22. | Cluj-Napoca International Airport | Air transport-vehiculatory | - Frontier - Cultural-festive - Commercial - Military - Urbanistic |
| 23. | Post Regional Authority Cluj | Special transport-vehiculatory | - Infocommunicational - Urbanistic - Air transport-vehiculatory - Rail transport-vehiculatory |

| No. | Geosystemic element | The main sustained function | Secondary sustained functions |
|-----|--|-----------------------------|--|
| 24. | Special Telecommunications Service – County Office for Special Telecommunications Cluj | Infocommunicational | - Security - Administrative-political - Administrative-civic - Military |

The pressure factors from the tertiary subsystem, with geosystemic effect on the future evolution of Cluj-Napoca

We will build a classification of factors, according to the origin principle, thus having: *internal* and *external factors*. Out of both categories, we will pick those factors with predictable geographical force and effect, presenting a factor for every functional subsystem.

For example, *the internal pressure factors* from the functional tertiary sector of Cluj-Napoca are:

- the academic potential of the university function;
- the volume, diversity and quality of consumptions and commercial services from the commercial function;
- the potential of the medical function, based on patrimony, tradition, competence and development;
- the very well structured institutional logistics of the administrative subsystem, at all three levels (local, county and regional);
- the touristic potential that can count on a large range of patrimonial, cultural, economic, entertainment, natural, etc., resources;
- the logistical infrastructure of the transport-vehiculatory function is morally, technically, geotechnically and historically obsolete;
- the shock of *the 1989-1990 threshold moment* and the *extension of the transience state*, a factor for all the subsystems from Cluj-Napoca's tertiary functions;
- the consolidation of a regional theological centre with high ranking theological institutions, but also with a permanent potential for ideological and religious confrontation;
- the Cluj-Napoca geosystem has a cultural-artistic institutional subsystem of academic rank in all its fields (theaters, operas, libraries, museums, churches and cathedrals, cultural organisations, universities, etc.);
- the existence of a institutional logistics regarding urbanism with elitist ambitions and with a modeling and influence power in a national-provincial space;
- the existence of a permanent social-administrative tension, fuelled by partisan-political, ethnosocial, geopolitical, etc. interests;
- Cluj-Napoca is a regional and provincial city with institutional and academic "representativity" within the field of *sustainable evolution*, paralleled with being the largest waste generator in the county (around ½ of the generated quantity) and the most aggressive regional city towards the environment;
- the military subsystem generates and will continue to generate confrontational situations generated by geopolitical, patrimonial, urbanistic, antrepreneurial, and

especially frontier interests; the existence of a military subsystem within the geosystem is, for the aggressive frontiers, a reason for generating tensions, a pressure factor functionalist-systemic implications;

- as the second financial and banking centre of Romania, Cluj-Napoca generates financial-banking processes with “barometric” effects within every aspect of the social-political, economic life;

The strategic directions of Cluj-Napoca’s development

- the economic direction ...
- the touristic direction ...
- the urbanistic direction ...
- the direction of human resource development ...
- the direction of community development:
 - the community domain for the young;
 - the community domain for sport;
 - the community domain for culture;
 - the community domain for social services;
 - the community domain for healthcare and medical assistance;
 - the community domain for NGOs.

Designing „the sustainable evolution” of Cluj-Napoca’s urban space through heuristic methods

Point 4.3. in our analysis of the tertiary functions subsystem tackles the prospective geography and its design for a sustainable evolution. An appropriate way is the Programme (or Project) Evaluation and Review Technique (PERT) heuristic model, suitable for large and complex systems. However, for our goals, we will simplify, in this thesis, the steps of “*programming the complex processes through the critical path method*” (L. Marian, 2007), by introducing two phases: *the list of activities* and *the construction of the network graph*. Consequently, the list of geomanagerial operations for the sustainable evolution of Cluj-Napoca’s urban space is:

1. Creating the topographic plan of the city – scale of 1:10 000
2. Creating the special topographic plans for each „large technical system”
3. Creating the city’s development strategy ...
4. Creating the city’s General Urbanistic Plan
5. Designing the urban technical development of Cluj-Napoca
6. The reevaluation and the structural refinement of the General Urbanistic Plan according with the technical systems projects and with the development strategy, etc.
...
7. The substantiation and the creation of “*the development strategy*” for the Cluj-Napoca Metropolitan Area
8. The substantiation and the creation of a normative geography for the territory of Cluj-Napoca
9. Designing the General Plan of Sustainable Evolution for the City of Cluj-Napoca

10. Voting the approval of the General Urbanistic Plan, the Development Strategy of the Metropolitan Area and of all the sustainable development plans and projects for Cluj-Napoca
11. Constructing the financial plans for the General Plan of Cluj-Napoca and its Metropolitan Area sustainable development
12. Designing PERT and Gantt for the General Plan of sustainable evolution
13. The application of all the above mentioned plans

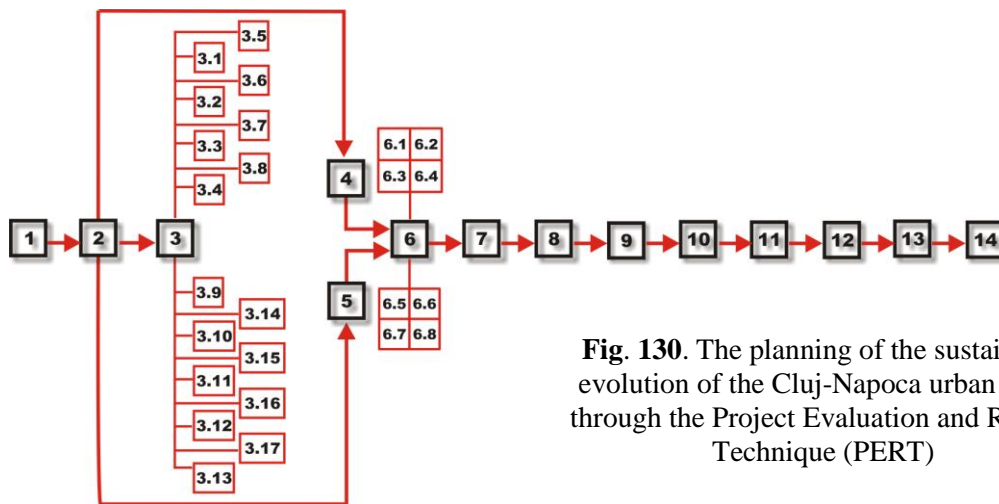


Fig. 130. The planning of the sustainable evolution of the Cluj-Napoca urban space through the Project Evaluation and Review Technique (PERT)

Chapter 5. The geography of tertiary functions and the “frontier phenomena” in Cluj-Napoca

In this chapter, we tackle the geography of the tertiary subsystem of Cluj-Napoca within the space created by the *frontier phenomenon*, one of the most complex social-geographical phenomena known today, studied by researchers from all fields of science (sociologists, geographers, geopoliticians, antropologists, historians, etc.).

When we analyze an urban geosystem like Cluj-Napoca, the frontier phenomena fits perfectly within the “*the law of progressive complexity of geospheres and their interactions*” (S. Mehedinți, 1927).

Starting therefore from the philosophy of the concept of frontier phenomena, coined by Frederick J. Turner and tackled and studied by several geopoliticians, geographers and sociologists, among which we can find Romanian scholars like S. Mehedinți, I. Conea, I. Chelcea, A. Golopenția, V. Mihăilescu, N. Iorga, I. Bădescu, D. Dungaciu, etc., we emphasize the systemic relation between the ‘frontier’ as a phenomenon and the geography of cities (more exactly Cluj-Napoca).

In our substantiation, we introduced *the frontier function of the city* in the subsystem of tertiary functions on one hand, and we placed, within the epistemological construction, the relations between the tertiary functions of Cluj-Napoca and the frontier phenomena on the other. In this context, we reveal a series of concepts regarding:

- the role of the frontier in the definition of the influence area of the city (the City of Cluj-Napoca);
- the substantiation of the city's role, position and systemic function within the relation "frontier –urban influence area".
- the influence relations between the structures of the city and the structure of the adjacent territory, within the *field of the frontier*;
- the city as a space of confrontation between frontiers;
- configuring the urban influence area in conjunction with the frontier phenomena;
- the configuring role (for the urban influence area) of the tertiary functions, within the context of frontier phenomena;
- the defining relations between the concept of frontier and the main tertiary functions.

In subchapter 5.3, we propose the taxonomy of the frontier phenomena in the geography of Cluj-Napoca's geosystem in order to further ground the theory '*Cluj-Napoca, frontier construction*'.

- autoexpansive frontiers:

- the Ethnonational frontier;
- the Roman frontier;
- the German frontier;
- the European frontier.

- vectorial frontiers:

- the Judaic frontier - vectors - *the Judeo-Christian frontier (the Orthodox and Catholic vectors)*
- the Catholic frontier – *vectors: the Hungarian frontier; the imperial frontier;*
- the Hungarian Frontier - *vectors: the Catholic frontier; the imperial frontiers: Austrian; Otoman; Soviet; Nazi; the European frontier (the resuscitation of Mitteleuropa)*

In subchapter 5.4., we put forward the conception through which we reveal that *the geosystem of Cluj-Napoca has been constructed by frontiers*. In order to do so we emphasize "**the geographic imprints**" of each frontier, left on the geosystem of Cluj-Napoca, and their **geodefining features**.

5.5. The tertiary functions and „the frontier processes” in the geography of Cluj-Napoca

Starting from the definition of the urban function as a relation of necessity between the elements of the geosystem and its state and which aims for the attainment of the city's 'menire', we see that between the functions of the city and the frontier processes there are structural-systemic relations that build a new geography in Cluj-Napoca. No matter what the character of the analyzed function is (local, regional, continental, universal), each one will have "*specific*" features and processes at a local level.

From the long line of frontier processes identified in the geo-history of Cluj-Napoca, which have systemic relations with the tertiary functions of the city, we selected only a small number. However, the analysis of each process will punctuate clear deterministic relations

between the tertiary functions and the frontier processes. From these relations, a series of *special geographies* sprang and still spring within the urban geosystem of Cluj-Napoca.

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