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THE COGNITIVE MAP'S ROLE IN URBAN PLANNING AND LANDSCAPING. APPLICATION TO BRĂILA CITY, ROMANIA

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The cognitive map's role in urban planning and landscaping. Application to Brăila City, Romania

Silvia Ghioca

Rolul hărţii mentale în planificarea urbană şi peisagistică. Aplicaţii în oraşul Brăila, România. Amenajarea şi planificarea urbană constituie aspecte ale dinamicii urbane. Acestea au un caracter complex şi vizează identificarea unor căi de eliminare a disparităţilor teritoriale şi de asigurare a funcţionalităţii teritoriale, urmărind principiile dezvoltării durabile. Realitatea teritorială ce urmează a fi investigată în acest scop, poate fi reprezentată cu ajutorul hărţilor mentale ce redau percepţia subiectivă a locuitorilor asupra mediului în care trăiesc. Această percepţie cognitivă conturează o imagine urbană ce reflectă disfuncţionalităţile mediului local. Prin urmare, imaginea urbană poate funcţiona ca un instrument al rebranding-ului urban, prin funcţiile sale de diagnoză şi prognoză. În cazul municipiului Brăila, s-au identificat spaţiile atractive, repulsive şi neutre, creându-se premisele apariţiei unor strategii de amenajare şi planificare teritorială conforme cu realitatea.

Cuvinte cheie: hartă mentală, amenajare teritorială, planificare teritorială, imagine urbană, design urban, topofilie , topofobie, VPS

The cognitive map's role in urban planning and landscaping. Application to Brăila City, Romania. Spatial planning and urban planning represent aspects of urban dynamics. They have a complex character and aim to identify some ways of eliminating the territorial disparities, for ensuring the territorial functionality, following up the sustainable development principles. The territorial reality, that is to be investigated for this purpose, can be represented using the mental maps that present the subjective perception of the residents on the environment where they are living. This cognitive perception outlines an urban overview that reflects the local failures. Therefore, the urban overview can function as an instrument of urban rebranding, by its diagnosis and prognosis functions. As regards Brăila City, attractive, repulsive and neutral spaces were identified, being created in this way the premises for the appearance of some strategies of territorial planning, in accordance with reality.

Keywords: mental map, spatial planning, territorial planning, urban overview, urban design, topophile spaces, topophobe spaces, VPS.

1. INTRODUCTION

According to Torremolinos Chart from 1983, landscaping is the spatial expression of economic, social, cultural and ecological society policy [1].

Analyzing the objectives of spatial planning scheme (Figure 1), it is derived the complex nature of this activity. At EU level, it was accepted a common sense, namely the set of methods used by the public sector to ensure a rational organization of the territory, environmental protection and the achieving of economic and social objectives [1].

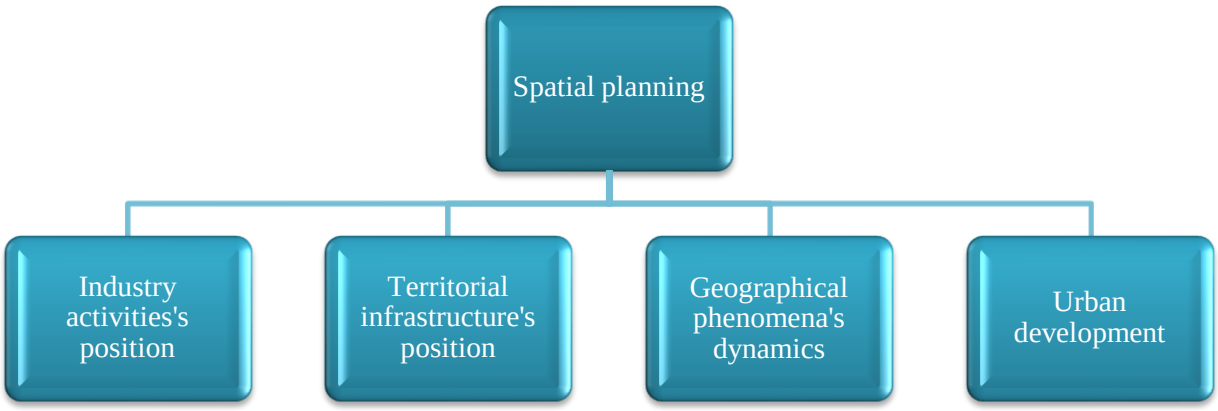

Figure 1. Spatial planning's objectives (Data source: [1])

The major principles of spatial planning are regarding plans for development of the underdeveloped regions, the economic recovery of the trans-border zones and the maintaining the urban-rural balance in sustainable development [2].

Urban planning aims to ensure the optimal operation of urban space's functions. Urban planning actions are designed at the cognitive's inhabitants level, so is influenced their attitude towards certain parts / neighborhoods of the city. These perceptions can be attractive, repulsive or neutral. Specifically, the idea is materialized through the construction of cognitive/mental maps of the city. They can play an important role in taking decisions concerning urban management, as they function as an "x-ray" of the [3].

International references [4] give three directions that support the upper named research:

a. city's mental planning;
b. cognitive map;
c. urban image – an urban marketing instrument;

The cognitive maps help in marking the attractive areas (topophile), the repellent (topophobe) or neutral ones [4]. Cognitive (mental) map is defined as a metaphor for the mental representation of the environment by the population [5].

But the image of a space has no practical value unless it is linked to a broader context, namely that of "space management philosophy" [6] and the interface between the physical space and human perception of the population, respectively.

Overview of similar studies

The analysis of topophobe and topophile spaces presented a point of interest in Romanian scientific literature. Ianoş [4] relates this concept to urban dynamics, so that urban image perception influences positive or negative assessments of an area. Suditu (2005), [7], emphasizes the importance of studying these spaces as they directly influence the housing quality.

Nae (2006) highlights the implications of the segregation phenomenon, characteristic to topophobe areas, on the quality of the built area [8].

Neacşu (2008) deals with the urban image as an essential element in the urban management based on a case-study - Ploieşti City; thus the urban image defined through topophobe, topohile and neutral areas, is a tool for urban diagnose and decisions in the organization of urban space and also, a key factor in urban marketing [6].

Cucu, Ciocănea, Onose (2011) relate attractive or repulsive urban areas to the distribution of green spaces; thus it was noted that the presence of green areas assimilated with topophile spaces lead to an increasing residential area [9]. Bădiţă, Popescu (2012) analyze the tophobe and topophile spaces of Craiova [10] city using visual surveys and Pătrăşcoiu (2012) identifies the disadvantaged urban areas in Craiova through an urban image map (cognitive map) [11]. .
Nicolae (2011) compares the restrictive and attractive urban aspects of Giurgiu and Călăraşi city, in order to establish the residential identity and belonging of the population. Thus, there are highlighted two problems in the city's development (which require some interventions) - segregation and suburbanization [12].

Şoşea (2012) made a diagnosis of urban habitat quality in Craiova City, Romania. The study aims for a development planning perspective based on its residents perception. There were described the differences between center, pericenter and periphery of the city through the analyze of attractive or repulsive spaces map [13].

Nae, Suditu, Neguţ, Dumitrache, Gheorghilaş (2014) explored the reality of repulsive urban area from Bucharest Municipality, Romania. They outlined that the environmental elements can be differently represented from and through the experience perspective. The study highlights that there are important differences between the urban reality and the public perception [14].

Different methodologies used in the above studies represented a basis for the present study which was completed by specific and original elements.

The mental map is a tool to identify issues such as life quality, public services quality, places insecurity or affiliation with others. Mental maps are a "key" in decision-making process which involves a number of variables - authorities, law, beneficiaries, experts, conflicts of views and interests etc. [3].

Mental map can be defined as a reflection of the thinking and perception of individuals to a particular aspect. It becomes a barometer of knowledge, perception and interpretation of the reality [3].

Mental map indicates not only the knowledge but also the non-knowledge [15]; thus, residents' cognitive structures are assessed by projecting the connections between ideas, concepts preferences.

Some researchers suggest that the cognitive map reflects the perspective differences in the perception of the environment [8].

Mental maps can serve as a premise in the development of programs to improve urban structures, being based on emotional conditions that represent the enthusiasm or repulsion for spaces. By using cognitive maps, there can be shaped an evolving urban design. Urban design is similar to the art of making places for people [4].

Also cognitive map is correlated with urban image, a concept introduced by Lynch, in 1960. Urban image is perceived as an essentialized reality at the city level [16].

So, between the urban space organization, city design and its image as aesthetically compared, there is an inextricable link of interdependence regarding landscaping and physiognomy, as the fundamental inter-conditionings models are established between urban structure and functionality of the city [17].

The issues above were applied to the city of Brăila, in order to determine their impact on the Brăila's landscape elements.

2. METHODOLOGY

2.1 Study area

The city of Brăila is located in the South-Eastern part of Romania, in Brăila County, in Galați city downstream, alongside the Danube river (Figure 2). In 2011, its inhabitants were of about 180,302 persons (in accordance with Brăila's Master Office of Statistics).

Figure 2. The position of Brăila City, Romania (Data source: [18])

Over the time, Braila urban space suffered a number of significant changes. Among these, the communist period, which required a certain spatial and functional organization, can be nominated. Thus, the spatial planning during the communist period produced disturbances in the city structure by the forced industrialization policies that did not fit entirely in the available space.

Years 1965 and 1975 marks the forced industrialization with direct effects in urban organization. The area with buildings increased very much, the main "populated" districts in this period being Hipodrome, Plantelor, Apollo, Obor, Viziru. Between 1980- 1985, the residential districts Progresul Vidin and Radu Negru were built. The first two were for the employees of the enterprises in the neibourhood.

Ending of the communist regime allowed a freedom in the spatial evolution and planning.

The recent territorial development is made on inherited spatial structures, being observed an overcrowding of the central areas to the detriment of the peripherals ones. At present, we can see that the central area has a tendency of densification, and the peripheral area extends tentacularly alongside the main thoroughfares. Figure 3 presents the diferences between the built space in communist period and nowadays. There can be observed a progressive territorial expansion due to the need of urban functional development and space competition.

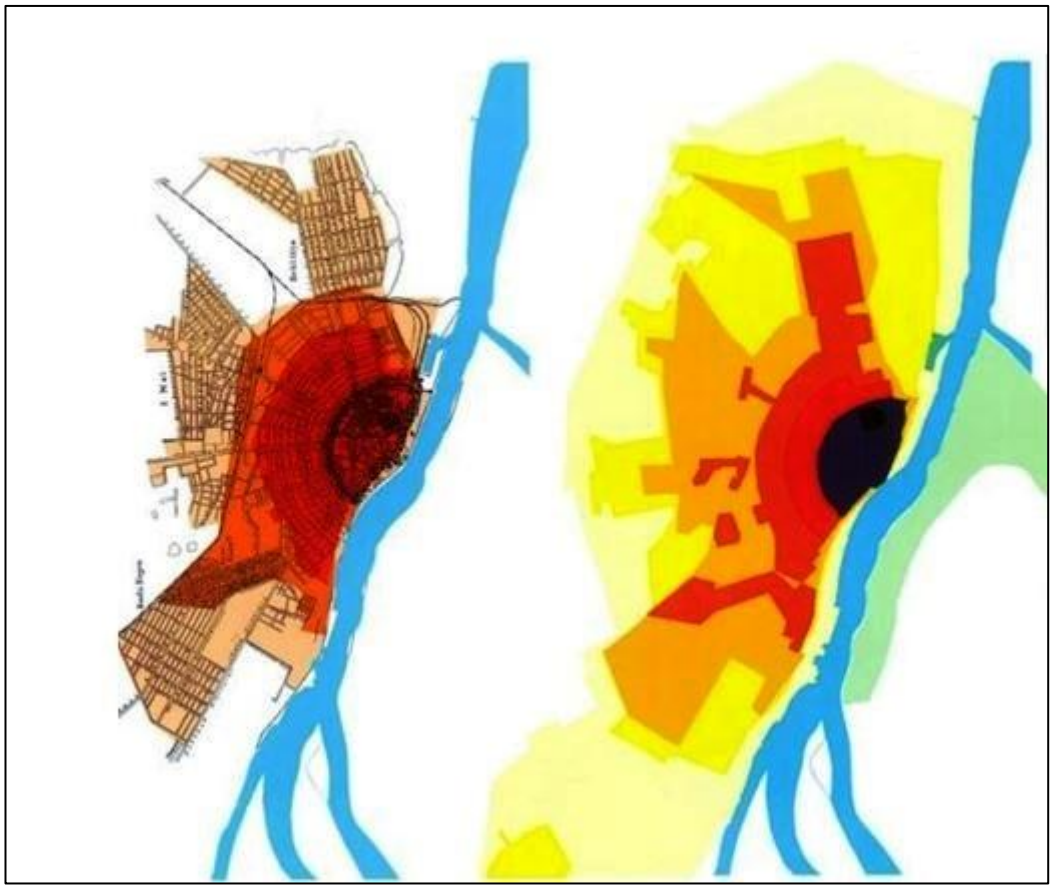

Figure 3. The built space in 1969 (left) and 2013 (right) in Brăila City, Romania (Data source: [18])

2.2 Visual Preference Survey

In preparing the study, there was used the VPS method (Visual Preference Survey) which is related to identifying an opinion about an area through the analysis of suggestive images.

This method was anticipated by Spreiregen 1965 [19], suggesting that each person builds his own image about the city, based on his own emotional experiences. Subsequently, the model was improved by Nellesen in 1970 [20], giving to the city residents the possibility to express their perception of the city's image and to contribute to building of the society wished by them. In 2012, this method was applied to the urban area of Craiova town, Romania, in order to establish how the urban overview is seen by the inhabitants of this city [10].

Thus, the VPS became an evaluation tool for the inhabitants of a city, they being able to express a realistic vision of the urban development.

The study provides several steps:

1. identifying socio - demographic issues (age, level of education);
2. scoring the images of parks, walkways, roads, shopping areas, historic buildings, local institutions, transportation, residential buildings;

3. open question (regarding the appreciation of topophobe or topophile urban areas) that were focused on buildings state, urban facilities, space functionality, security [10].

The survey was conducted on-line, covering 150 respondents, in June, 2014. Respondents have ages between 26 years and 62 years (65% are over 30 years old), all of them graduated at least the secondary education level (high school – 22 residents, university – 128). The results of the study that analyzes the answers of the interviewees are preliminary, the research will be continued in order to cover a larger number of respondents. The following interview is established for February 2015, for the same number of respondents.

By providing scores for a series of images, Brăila's citizens quantified their position related to the urban image, taking into account issues such as:

- public spaces;
- socio-cultural environment;
- transport system;
- built elements;
- green spaces;

Choosing the images in the above mentioned areas was based on the criterion of the representativeness, these types of areas being the ones ensuring the urban comfort and the life quality.

The interviewed people had to consider three or four images (Figure 4) from the above listed urban components.

Figure. 4. Urban image poses uses in VPS research (1 – Piața Mare – market area, 2 – Barieră area – public transport, 3 – Călărași neighborhoud image – residential space, 4 – Brăila's Museum – cultural space, 2013) (Source: Silvia Ghioca)

The offered images were scored with points between -3 (not appropriate) and 3 (the most appropriate) while 0 is the neutral element (Table 1).

Table. 1. The scores and their significance

-3	-2	-1	0	1	2	3
Not appropriate	Mostly not appropriate	Somehow not appropriate	Neutral value	Almost appropriate	Appropriate	The most appropriate

Following the steps above, there was pointed out an urban image map for Brăila City. VPS acts as a bridge between two elements, namely urban facilities and residents requirements.

The VPS study was completed with a number of open answer questions regarding the topophobe and topophile city areas and neutral spaces, in order to draw up a cognitive map of the city. Questions refer to:

- damaged building
- places that offer connection to the city; arguments on chosen places
- areas of urban insecurity ,
- best schools in the city
- quality of life and the best neighboorhoods

- preferred entertainment places

Also, through the interview technique there were identified the symbol elements of the city, malfunctions or issues that mark the attractiveness of some space, and also the degree of the inhabitants spatial identity.

The obtained information was then processed in the Wordle program which "mapped" the most used words and concepts the inhabitants associate with their city.

This method was also used by Dumitrache, Nae [21] in order to establish the special attachment (sense of place) for the historical centre of Bucharest City. In this way, there was offered an image of a cultural landscape my mapping the words. The words are related to visual elements of the urban environment (churches, old buildings, pedestrian alleys etc.).

Therefore, the choice of these methods was based on the intention to accurately identify the dysfunctional areas and those presenting increased attractiveness, in order to find solutions for integrated spatial planning.

3. RESULTS AND DISCUSSIONS

The attractive and repulsive space analysis of urban space of Braila provides information on the urban dynamics in terms of flows generated by these spaces. The VPS analysis (Visual Preference Survey) has identified the main urban areas of attraction, repulsion and the neutral spaces.

After collecting the VPS survey's data, there were established scoring categories related to three types of spaces - topophile, topophobe, neutral. Thus, the scores between 2 - 3 are characteristic to the topophile spaces, the -3 and -2 interval is related to topophobe spaces, while the neutral spaces are scored with scores between -1 and 1 between (Tabel 2).

Tabel.2. Average score categories for topophile, topophobe and neutral spaces

Type of space	Average score
Topophile	2 - 3
Topophobe	-3 – (-2)
Neutral	-1 – 1

According to analysis and to the scores given by the respondents, among topophile spaces there are:

- areas with high density of population and urban activities (ex. Dorobanţi crossroad: 2.4, The Independenţei Boulevard: 2.6, the city center: 2.9);

- medical services area (Regional Hospital: 2.1);
- renovated railway station (2.5);
- mainly green spaces (Public Garden: 2.3);
- cultural significant buildings (Braila's Museum, Regional Library, Maria Filotti Theatre, Statuary Group from Traian Square etc.: 2.7);
- public transportation (tramways images: 2.3);
- commercial areas (Promenada Mall: 2.8);

Also, the topophobe spaces are related to:

- periphery neighborhood's (Viziru: -2.9, Călăraşi IV: -2.9, Chercea: -2.1);
- public transportation (mini-buses/maxi-taxi : -2.2);
- parking areas (from Marna: -2.2, Vidin neighborhood: -2.3);
- pedestrian alleys (alleys with stray dogs wich are all over the city: -3);
- old damaged buildings (from M. Eminescu street: -2.8)
- agro-food market areas (-2.2);
- playgrounds for children (from Viziru: -2.4, Călăraşi IV neighborhoods: -2.5);

The neutral spaces are regarding areas as follows:

- alleys from residential neighborhoods like Hipodrom (0.3) or Dorobanţi (0.7);
- the nearby streets from Piaţa Mare (the biggest market in the town): 0.8;
- Gării Street (0.2);
- the "St. Constantin and Elena" church from Şcolilor crossroad (0.4);
- Obor neighborhood apartment buildings (-0.7);
- old houses from Călăraşi Street (0.5);

The analysis was supplemented by questions that were focused on the buildings state, municipal facilities, spaces functionalities, security features. Therefore, results emerge as follows:

a. Attractive areas (topophile area)

The topophile term describes the affective bound between human and space [22]. The attractive spaces (Figure 9) are given by the city core area, its center, the Danube promenade (Figure 5) to which converge numerous flows. The choice is justified by the presence of units that concentrate management activities, banking and financial, cultural, educational and recreational activities.

In this category is as well included the Republic Boulevard, marked by the numerous trade units, Al. I.Cuza, Călăraşi and Independence Boulevard - crossed by an

important tram line connecting the ends of the city; also, it can be named the aesthetic value of the green from its central shaft. This category encompasses the area of Promenada mall from the south entrance of Braila, and other large commercial establishments (like Billa, Selgros etc.), Salt Lake tourist resort and Monument Park (Figure 6).

Figure 5. Danube's cliff – panoramic view, 2014, August (Data source: [23])

Figure 6. Monument Park view, 2014, June (Source: Silvia Ghioca)

Basically, the attractive areas are supported by several indicators such as:

- centrality (due to good road accessibility and the concentration of most services and information flows) ;

- green spaces (ensure the air quality, function as recreational space and has an esthetic role);
- historical area (usually are arranged and considered as tourist attractions);
- culture;
- public facilities (ensure good life quality standards);
- inner motivation ("the childhood area", "the highschool that I graduated", "where I have fun with friends", "where I relax with my family", "where I work", "where I come for supplies");

b. Repulsive area (topophobe area)

The topophobe terms describes a fear, a threat space [22]. The repulsive areas (Figure 9) were similar to Vidin, Călăraşi IV or Chercea neighborhoods (Figure 7), Radu Negru, Comorofca neighborhoods, the railway vicinity, and "brownfield" spaces.

Figure 7. View form Chercea neighborhood, Maramures Street, 2013 (Source: Silvia Ghioca)

The above mentioned districts are peripherally positioned; only in Radu Negru can be reached using the tram. The other districts are accessible only by mini-buses. In Comorofca, Chercea and Radu Negru districts (Figure 8), the predominant houses have one single level, the most of them being not renovated. Also, these districts are the most disadvantaged from the urban infrastructure point of view (partially existing sewerage network, unpaved roads). The criminal level is higher than in other districts in Brăila and unemployment is a characteristic phenomenon. The education level of the inhabitants is medium, many of them being involved in agricultural activities (Chercea) or industrial activities (Radu Negru, Vidin).

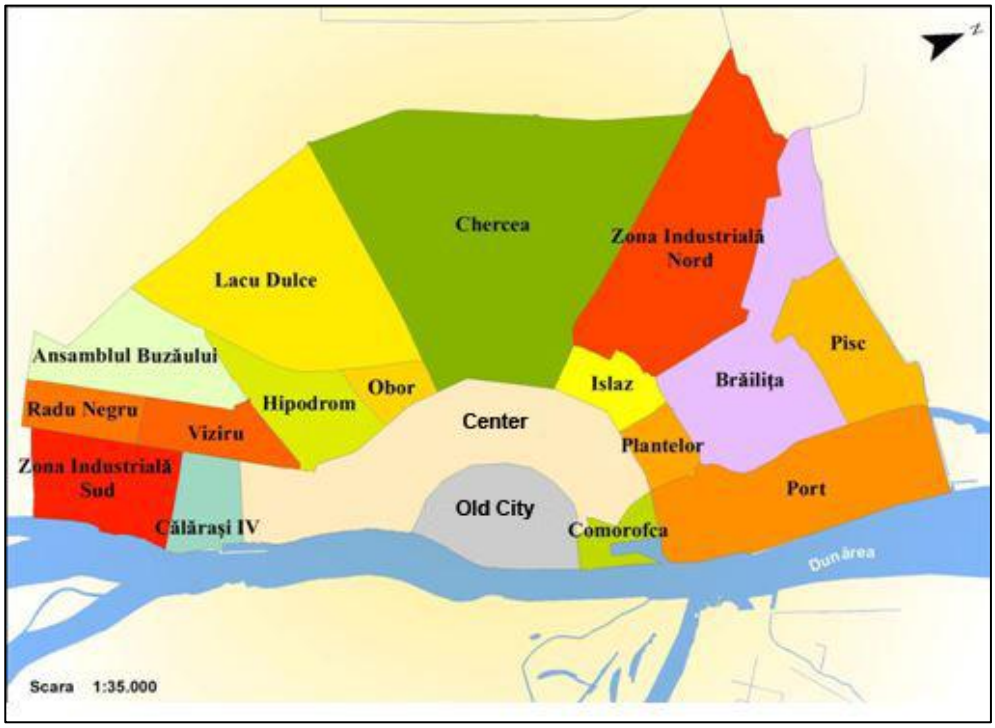

Figure 8. Brăila's neighborhoods (Data source: [24])

The elements that mark these repulsive spaces are designated by:

- urban insecurity (decreases the physic comfort);
- gipsy communities (these are seen as delinquents, or prejudgments exist);
- damaged buildings (the visual aspect and landscape quality is damaged);
- damaged access roads (poor road accessibility leads to difficulties in transport);
- underdeveloped sewerage network (floods often occur);
- low socio-cultural level of the inhabitants (among them stands out most delinquents);
- high unemployment (poverty is increased, mental discomfort occurs, or there may be predisposed to crime);

c. Neutral spaces

The neutral spaces in terms of attractiveness are associated with areas falling between repulsive and attractive areas (Figure 9). They designate neighborhoods like Hipodrom, Obor, Barieră area, the related streets to Dorobanţilor Boulevard, Călăraşi Avenue, portions of Galaţi Avenue, Plantelor, Şcolilor, Griviţei, Gării Street, Piaţa Mare area etc..

These sites are framed within the mixed functional areas and they are located in the center of Braila city, both in the old center and in the new one. Therefore, they have a favorable position for developing of one community. The blocks are high, some of them

having even ten floors. Also, all kinds of professions are meet, from unemployed to workers, and to intellectuals.

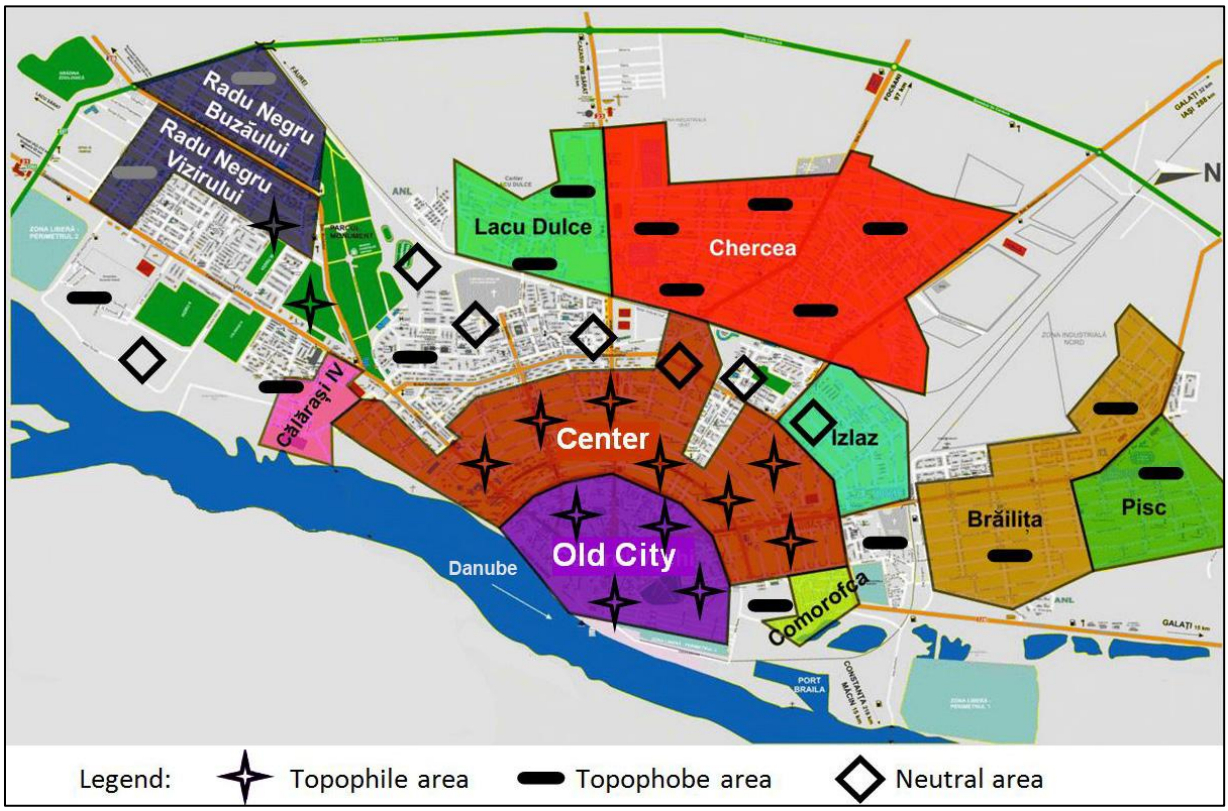

Figure 9. Topophile, topohobe, neutral areas from Brăila City neighborhoods (Data source: [24])

The cognitive map was completed by identifying the significance of the symbolic elements of the city, from the perspective of each interviewed persons (ex: "Name two elements - symbol / meaning of the city").

The answers were processed in Wordle soft; it “mapped" the words so that responses whose frequency was higher are written with the most impressive letters (Figure 10).

Figure 10. The city's cognitive map concerning symbolic elements

Looking at the map, it appears that the feeling of belonging to the city is not very high, about 40% of respondents provided the "place of work" meaning assigned to the living space. Urban landscape image is perceived through Danube river (the city's harbor, the shipyard), through the representative architectural monuments (Maria Filotti Theatre), by Salt Lake tourist resort, streets which focuses tertiary activities (Eminescu Street, central core), Braiconf garment factory or supply points such as Piaţa Mare. However, this perception is completed by negative experiences related to the high unemployment or poverty.

The spatial identity (with not very high values attached) it recognized through the significance of the city as the native place, or the association with high school they graduated.

According to the survey, it appears that the image reflected in Braila Municipality through the cognitive map is equated with issues such as:

- stray dogs;
- the mayor (Aurel Simionescu);
- corruption;
- the first place at national educational assessments;

So the setting priorities for intervention in urban territorial organization are concerning public spaces: creating safe children playgrounds in neighborhoods, a better maintenance of green spaces; the improving of functionality related to the sidewalks from neighborhoods, and beyond; a good management regarding the waste storage;

- the built environment: the restoration of heritage architecture and their integration into the city's functionality;
- transport system: the creation of corridors for cyclists, improving the maxi-taxi transport way;
- socio-cultural environment: the diversification and multiplication of cultural activities, fairs, and various recreational activities.

4. CONCLUSIONS

The cognitive map therefore provides a true and subjective city image, functioning as a valuable diagnostic, prognostic tool, possibly adjusting the dynamics of the urban development process.

This analysis may lead to the expectation of an planning urban model, through specific interventions in repulsive areas in attempt to mitigate the regional territorial disparities and a balanced city development.

As an example, topophobe areas overlap with neighborhoods characterized by the lowest level of public utilities and the numerous social problems (delinquency, unemployment). Therefore, these disadvantaged areas should attract the main part of investments for urban planning. In reality, there is an opposite situation; thus urban areas considered "good" focus almost the entire volume of investments, by neglecting those considered "bad".

Also, observing the urban image map we can be properly identify a number of the city areas concerning the investment needs in urban planning. In this way, there can be used two hypothesis:

- the way in which residents appreciate how attractive and repulsive areas of the city are;
- the way of defining the urban center, according to the elements considered representative symbol for the city;

The using mental map highlights the synthetic public opinion on urban dynamics; simultaneously it is demonstrating the importance of involving people in integrated urban development approach. It is thus demonstrated the relationship between the urban community and its habitat and is prevented the tendency of overrating or underrating of some areas.

For Braila's municipality there are directions recommended regarding spatial and urban planning such as:

- spatial coherence by implementing the principles taken from specific studies on urban development;
- rational uses for space resources on demand for territorial expansion by providing control of this process, especially in peri-urban areas;

- protecting valuable buildings (especially those from old town), and not only against natural and anthropogenic risks specific to Braila city;
- functional integration of heritage buildings in the urban landscape;
- increasing of the living quality and services quality (health, cultural, educational, financial, banking, etc.), especially in Lacu Dulce, Chercea, Viziru, Călărași IV (Figure 8);
- developing of the public-private cooperation;
- put in value the brownfields territories; their negative impact is related to the landscape quality, to the decrease of housing attractiveness, the lack of investments etc.;
- the dynamics of the city center by building leisure centers (restaurants, bars);
- the green space increase all over the town;
- playgrounds for children**;**
- a spatial planning for the Danube esplanade (which offers areas that can develop the city by managing them – figure 11), taking into account the need to conserve the heritage (The Violatos Mill - one of the most famous in Europe at the end of XIX century), and the imperatives of modernization;
- the sub-urban transportation improving;
- the increase of cultural and artistic urban life quality;
- a better waste management;
- incorporation peri-urbane area of the municipality in its effective functionality, favoring the emergence of a whole-body unit (with preference aims for developing the north area of Brăila) - according to General Urban Plan, 2013 [25];

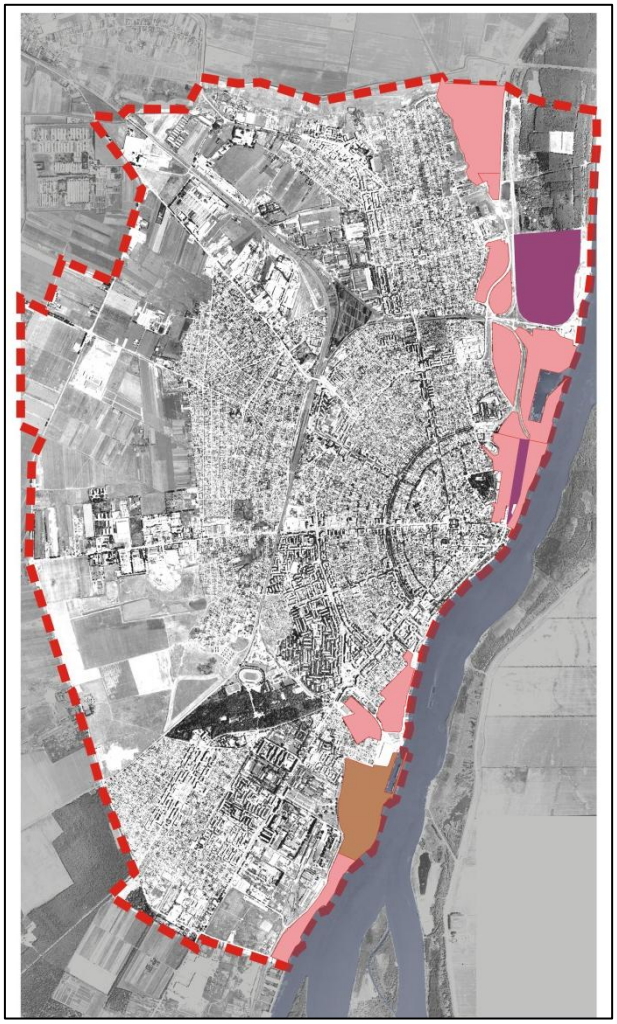

Figure 11. The Danube's esplanade – places that promote the city (Data source: [17])

All these actions are the components of the "rebranding process" for the city of Braila, in which the mental maps are playing an important role. This process is currently only under project status, efforts being made in order to start as many sustainable projects as possible in this direction. The findings of this research could be taken into account by the local drivers involved in urban organization, whereas knowledge can improve citizens' perception of attractiveness and growth strategies urban comfort.

Neglecting or avoiding to consult the mental maps results by the local authorities can lead to dysfunctions in understanding and appreciation the urban space that will become a "setback" area.

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