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New approach to functional zoning in Kaunas city

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Urban functional zoning is performed for different goals and in different ways. At present, there is a conflict between the monofunctional and polyfunctional types of zoning, their ratio in general plans and the influence of the urban metabolic process on functional zoning. An approach has been put forward, stating that urban master plans should definitely include polyfunctional zones in which the ratio of functional priority is being constantly influenced by the continuous process of urban metabolism. The aim of this study was to optimize the functional zoning of Kaunas city by identifying new polyfunctional zones on the basis of the Kaunas city master plan. A new structure of the polyfunctional zones has been proposed. The ratio of monofunctional and polyfunctional territories in Kaunas city and the influence of metabolism on functional zoning have been described.

Key words: urban planning, functional zoning, urban geography, urban metabolism, Kaunas city

INTRODUCTION

The functional zoning of urban territories is one of the challenges to landscapers. Since the old times, efforts have been made to systemize and differentiate the methodological aspects of planning, which are based on different priorities, methodologies and examples.

The functional zoning of territories often foresees not only optimizing the existing land-use, but also the perspectives and possibilities of utilizing new territories. At the end of the 20th century, the accelerated social and economic processes have also increased their interaction with the landscape. This has led to a rapid change of the landscape, and its transformation. Under the intensified territorial development, a conflict between space, time and economic benefit arises. Therefore, urban development is unseparable not only from ecological and social aspects, but also from political goals and economic activities (Golany, 1976; Kudryavtsev, 1985; Lappo, 1987; Sosnovskiy, 1988; Greed, Roberts, 1998; Pertsik, 1999; Godienė, 2001; Hall, 2002; Burinskienė, 2003; Juškevičius, 2003; Latour, 2005; Bardauskienė, Pakalnis 2010; Burneika et al., 2010; Pakalnis, 2010, etc.).

It is evident that there is a conflict between two approaches to urban landscape management – extensive development in a territory that takes the energy from the surrounding territories, and the opposite approach which claims a more extensive use of the existing usable territory while creating an independent, autonomous system. The latter approach is influenced by the ideas that the use of a territory depends on the distribution of energy (in a broader sense) flows. This conflict regulates urban development.

After regaining the independence, the free market laws have settled. Therefore, under the impact of economic and political factors on planning, the number of true monogenic zones has decreased, and polyfunctional zones have become the main functional element. The development of these zones can be directed or restricted to a minimum, because the prevailing economic and political priorities, influenced by the urban metabolism, present a strange system of a city. A hypothesis has been put forward that in urban master plans polyfunctional zones in which the ratio of functional priorities is determined by energy flows should prevail. The hypothesis has been checked in this study. The object of this research was the functional zoning of Kaunas city. Consequently, the aim of this study was to optimize the functional zoning of Kaunas city by realizing the ideas of polyfunctional planning and urban metabolism, and the main tasks were as follows:

– to discern polyfunctional zones in conformity with the master plan of Kaunas;

– to determine the structure of polyfunctional zones;

– to describe the ratio of monofunctional and polyfunctional territories in Kaunas city;

– to estimate the impact of urban metabolism on functional zoning.

METHODS

The methodology of functional zoning is one of the central planning problems and has been analysed in Lithuanian regional and urban planning studies (Kavaliauskas, 1995; Šešelgis, 1996; Vanagas, 2003; Juškevičius, Valeika, 2007; Kavaliauskas, 2008a, 2008b; Pakalnis, 2008; Jakaitis et al., 2009) as well as in urban geography (Krupickaitė, 1999; Godienė, 2001; Burneika et al., 2010).

The research of urban metabolism is based on industrial ecology, urban geography and urban planning (Wolman, 1965; Newman, 1999). In biology, metabolism is a sum of chemical reactions taking place in every cell enabling the cells to grow, reproduce and respond to the environment. This analogy is used in the urban metabolism research.

Some aspects of urban metabolism research are evident within the theory or strategy of sustainable and balanced development (Burinskienė, 2003; Ciegis, Gineitienė, 2008; Ciegis, Ramanauskiene, 2009; McDonald, 2009). This trend helps to understand how to sustainably develop cities, using the analogies of metabolism in living organisms. Cities transform energy (minerals, environment, and knowledge) into an anthropogenic system containing human biomass and ideas, also producing undesirable objects (waste). This inlet, use and outlet system is a fusion of social, economic, technical and landscape processes. It regulates city transformations influenced by different flows.

The first stage of our research assessed the present situation of the functional zone distribution in Kaunas city and highlighted the problems of functional zoning in the Kaunas city master plan and its corrections in 2006 and 2010 (Kauno …, 2003; Kauno …, 2006; Kauno …, 2010). After marking, the problems of functional zoning were simplified. This distribution did not object the regulation of functional zoning, issued by the Lithuanian Ministry of Environment (LR Aplinkos ..., 2006).

The problems of zoning were clearly visible in the Kaunas city master plan as its zoning classification was not perfect. It was possible to notice the discerned territories of forestry, but it was not clear how they differed from parks and sprouting areas because the Kleboniškis forest, the Panemunės pinewood corresponded to the description of parks, although they are allotted to forestry territories. Agrarian territories were found only in Rokai district, although no agrarian activities had been carried out there for a long time and the territory was covered with small houses. Therefore, discerning this kind of agricultural function on the territory was illogical.

In the second stage, using Arcgis 9.2 software, the Kaunas city master plan was digitalized. The territories were discerned according to the categories described in the first stage. It was obvious that the plan readability problem appeared and some errors occurred.

In the third stage, using Arcgis 9.2 software, the territories were incorporated into polyfunctional zones because the Kaunas city master plan was performed in a detailed way and could be considered as an example of nonfunctional planning. There was no use in discerning separate buildings as differentiated functional zones. Therefore, small zones surrounded by greater functional zones were attached to them. In this way the polyfunctional zones were formed.

In the fourth stage, areas of functional zones were estimated. The structure of the master plan was compared with the proposed optimized structure. The percentage value of the structure was estimated according to functional priority zones (the polyfunctional zoning type was compared with the regulated one). The ratio of monofunctional and polyfunctional areas in the city was discussed. Cutting the layers of the general plan and the proposed structure by means of Arcgis 9.2 software, the structures of polyfunctional territories were described. They were compared by estimating their ratios / size. Two layers of land functional zoning were intersected to find out the structure of the polyfunctional zones. Later, some statistical methods (summarizing, calculating mean values, etc.) were applied.

Finally, each type of the polyfunctional territory structure was described employing the constituent (at the level of regulated planning) functional zones. Standard deviations were estimated and subtracted from the mean value. The recommended minimal percentile part of the functional priority in a polyfunctional zone (at the level of regulated planning) was obtained. The recommended maximum was estimated by adding the standard deviation. At this stage, a correlation in polyfunctional zones between different priority zones was estimated, and the ratio among them was described.

RESULTS

The source of the main data was the Kaunas city master plan with its changes made in 2006 and 2010. The total area of the Kaunas city is 15 694 ha. In the simplified general area (without discerning the type of territory usage) there are 724 zones; 85.3% of them are monofunctional and 14.6% polyfunctional. Residential areas are assigned to monofunctional zones, without taking into consideration the fact that they have numerous objects of public and commercial type. Therefore, it would not be correct to discern the category of "residential territories". It should be considered polyfunctional, and the names of additional functions should be assigned to them.

The solutions of the Kaunas city master plan were made in the mood of compulsory execution. This is clearly seen in the master plan because many zones are dispersed artificially, although they are very close to each other by functional relations and should be evaluated as one polyfunctional zone. The zones become like one organism, and their dispersion cuts down energy flows.

After performing the joining of master plan zones (Fig. 1), especially when very small territories were attached to bigger

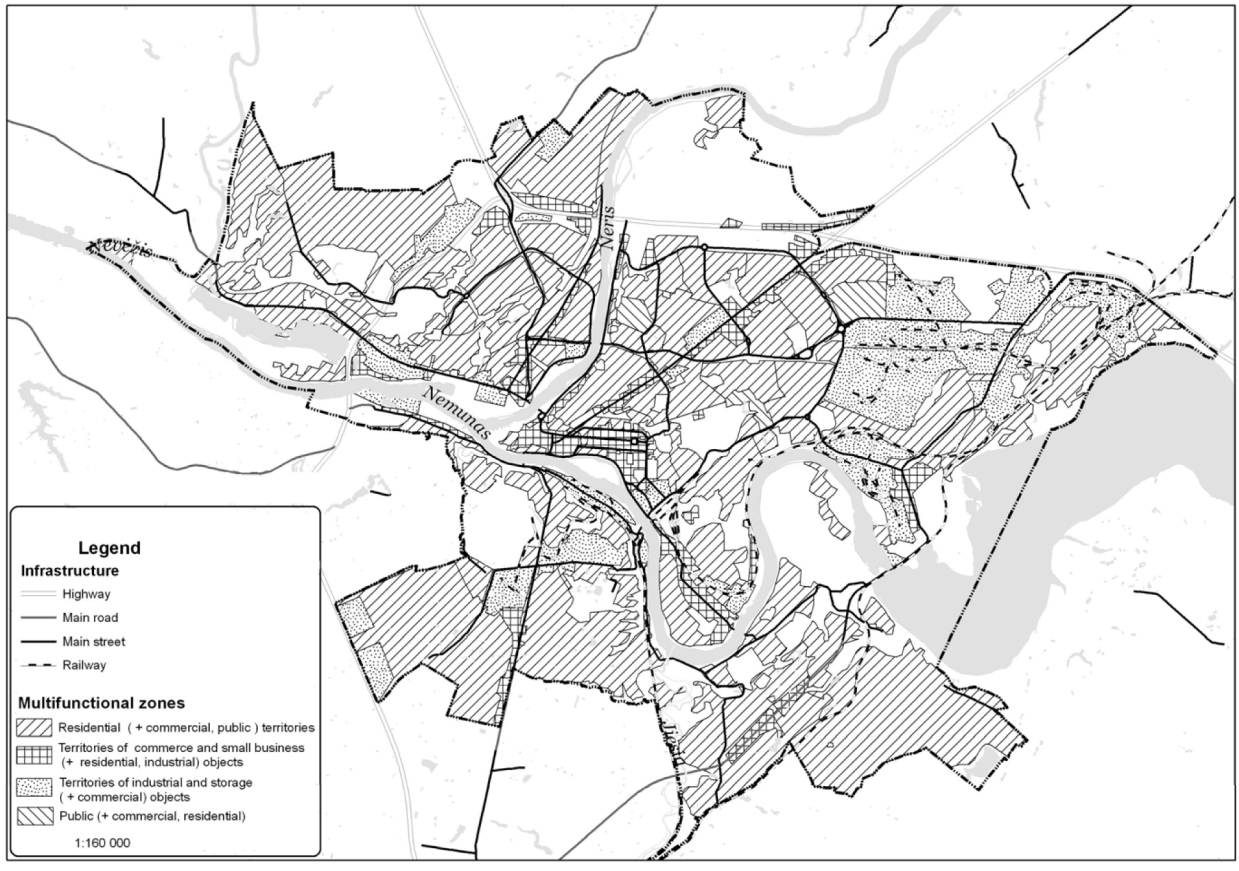

Fig. 1. Functional zones proposed in Kaunas general plan
1 pav. *Kauno bendrajame (generaliniame) plane siūlomos funkcinės zonos*

surrounding areas preserving tough relationships of energy flows, a system of 230 functional zones was created; 61.8% of the zones were considered polyfunctional and 38.2% monofunctional. Taking into consideration the polyfunctionality of residential areas, they could be viewed as having accompanying – public and commercial – functions.

One can see that in the proposed scheme the number of residential territories is greater and they are considered polyfunctional zones. Residential territories prevail and are supplemented by service zones (public and commercial). On average they take approximately 15% of such service zones in Kaunas city residential areas. At the crossing points of these zone flows, there is quite a great number of territories of general use (about 5%). Most of them are in the territories planned and arranged in Soviet times. In the central part of the city, the areas of parks and squares are smaller than in the surrounding territories. In the peripheries, chaotic development prevails; there are a few territories of general use. This tendency prevails in Žaliakalnis district as it could be considered as a peripheral, low-rising development district formed during the interwar period.

Special tables reflect the polyfunctional zone structure (Table 1) and the intensity of functional relationships in Kaunas city (Table 2). They should be discerned when the areas of commercial and public zones in these polyfunctional territories do not exceed 30% of the general territory and residential areas cover no more than 65%. One can notice that the correlation between residential and commercial territories is negative and comprises approximately 0.5. This means that in case the area of residential functional zones increases by one part, at the same time the number of commercial territories decreases by half of the area.

The interdependence of residential and public territories is approximately –0.57. This means that while the percentile part of the residential areas is increasing, the number of public territories is decreasing. This distribution is determined by the increased intensity and development of territories. Therefore, the percentile part of public and commercial territories is decreasing while the intensity of their use is increasing. In these residential polyfunctional territories, the correlation between commercial and public territories is only approximately –0.17. Therefore, it can be stated that these territories are independent of each other and are influenced by residential territories.

Infrastructural, commercial and public functions are attached to the territories of industrial and storage objects

Table 1. **Polyfunctional zone structure in Kaunas city**

1 lentelė. ***Polifunkcinių zonų struktūra Kauno mieste***

Zones in the scale of master plan ***Zonos generaliniuose planuose***	**Indicators** ***Rodikliai***	**Zones in the scale of master plan** ***Zonos generaliniuose planuose***				
		Industrial territories (%) ***Pramoninės teritorijos***	**Residential territories (%)** ***Gyvenamos teritorijos***	**Commercial territories (%)** ***Komercinės teritorijos***	**Public territories (%)** ***Visuomeninės teritorijos***	**Other (%) / *Kitos***
Territories of industrial and storage (+commercial) objects *Pramonės ir sandėlių teritorijos (+komerciniai objektai)*	Average value / Vidurkis	85.2709	-	13.7982	0.0848	0.8462
	Standard deviation *Standartinis nuokrypis*	15.1599	-	15.8404	0.2812	1.6541
	Recommended maximums *Rekomenduojamas maksimumas*	100.0	-	29.6386	0.3660	2.5003
	Recommended minimums *Rekomenduojamas minimumas*	70.1	-	0	0	0
Residential (+commercial, public) territories *Gyvenamosios (+komercinės, visuomeninės) teritorijos*	Average value / Vidurkis	0.5784	78.5844	6.2313	9.3729	5.2311
	Standard deviation *Standartinis nuokrypis*	1.4773	12.8288	6.7669	9.6181	9.6424
	Recommended maximums *Rekomenduojamas maksimumas*	2.0557	91.4131	12.9981	18.9910	14.8735
	Recommended minimums *Rekomenduojamas minimumas*	0	65.7556	0	0	0
Territories of commerce and small business (+residential, industrial) objects *Komerciniai ir smulkaus verslo (+gyvenamųjų, pramonės) objektų teritorijos*	Average value / Vidurkis	6.0807	10.9991	75.9382	0.4398	6.5369
	Standard deviation *Standartinis nuokrypis*	10.0957	13.8055	16.2501	1.8134	13.7535
	Recommended maximums *Rekomenduojamas maksimumas*	16.1764	24.8045	92.1883	2.2532	20.2904
	Recommended minimums *Rekomenduojamas minimumas*	0	0	59.6881	0	0
Public (+commercial, residential) objects *Visuomeniniai (+komerciniai, gyvenamieji) objektai*	Average value / Vidurkis	0	25.5675	11.8879	59.03496	3.5097
	Standard deviation *Standartinis nuokrypis*	Impossible to estimate because of small sample values *Neįmanoma vertinti dėl per mažų reikšmių*				
	Recommended maximums *Rekomenduojamas maksimumas*	Impossible to estimate because of small sample values *Neįmanoma vertinti dėl per mažų reikšmių*				
	Recommended minimums *Rekomenduojamas minimumas*	Impossible to estimate because of small sample values *Neįmanoma vertinti dėl per mažų reikšmių*				

in the master plan. Such approach is not correct because in these areas 98% of territories are commercial and industrial, and there are just a few public territories. Therefore, these zones should be considered as territories of industrial (+commercial) objects. Such name is not correct, because these areas by their statistical structure are by 98% industrial and commercial. Therefore, these areas should be identified as industrial (+commercial).

In their structure, industrial territories prevail and are accompanied by commercial ones. They could be discerned when the number of industrial objects comprises approximately 70% of the general zoning plan. The correlation between commercial and industrial territories is about –0.98. This can be evaluated as a strong correlation when the increase in the area of commercial objects determines the decrease in the area of industrial territories by the same amount. Public territories comprise an insignificant part. Such structure of functional zones is determined by the domination of economic and political interests in urban planning when production tends to approach service and service production becomes a modern industry. Businesses appear to be in favorable conditions because, being close to each other, they can communicate more easily with producers of tangible material products.

Commercial and small business (+residential, industrial) territories have been discerned because there are 6%

Table 2. **Structure of functional territorial relationships in Kaunas city**

2 lentelė. ***Funkcinių teritorinių santykių struktūra Kauno mieste***

Category of polyfunctional zone ***Polifunkcinių zonų kategorija***	**Correlation types** ***Koreliacijos pobūdis***	**Correlation** ***Koreliacija***
In the territories of industrial (+commercial) objects *Pramoninių (+komercinių) objektų teritorijose*	Between industrial and commercial territories *Tarp pramoninių ir komercinių teritorijų*	–0.98482
In residential (+commercial, public) territories *Gyvenamosiose (+komercinėse, visuomeninėse) teritorijose*	Between residential and commercial territories *Tarp gyvenamųjų ir komercinių teritorijų*	–0.51006
	Between residential and public territories *Tarp gyvenamųjų ir visuomeninių teritorijų*	–0.57964
	Between public and commercial territories *Tarp visuomeninių ir komercinių teritorijų*	0.170178
In commercial and small business (+ residential, industrial) territories *Komercinėse ir smulkaus verslo (+gyvenamosiose, pramoninėse) teritorijose*	Between commercial and residential territories *Tarp komercinių ir gyvenamųjų teritorijų*	–0.48938
	Between commercial and public territories *Tarp komercinių ir visuomeninių teritorijų*	–0.36995
	Between commercial and industrial territories *Tarp komercinių ir pramoninių teritorijų*	–0.23422
In public (+ commercial, residential) territories *Visuomeninėse (+komercinėse, gyvenamosiose) teritorijose*	Impossible to estimate because of small sample values *Neįmanoma vertinti dėl per mažų reikšmių*	

of industrial objects and 11% of residential ones. Public territories should not be discerned as it was done in the Kaunas city master plan, because they cover only 0.55% of the territory.

Like in residential (+commercial, public) territories, the relationship between residential and commercial territories in these zones is about –0.49. Thus, the transition from residential to commercial zones or vice versa is monotonous.

There is almost no relationship between commercial and public territories, although the correlation is higher than in residential (+commercial, public) territories (approximately –0.37), but it does not exceed 0.4 when we could discern a weak correlation.

A very interesting situation appears in the correlation between commercial and industrial territories where in commercial zones there is no correlation (–0.23) and in industrial territories it is very strong (–0.98). Thus, the ratio of these territories cannot be stated unambiguously as there is no monotonous relationship between the percentile part of commercial and industrial zones during transition from industrial to commercial ones.

A linear diagram of regressive dependency shows that there are three different dependencies, and changes in direction and correlations can be observed. It can be stated that it is possible to differentiate polyfunctional industrial zones in a large part of industrial territories. The second section of this diagram shows that while the number of commercial territories increases, the number of industrial territories decreases. In this section the correlation is strongest. In the third part, when commercial objects become prevailing, they do not overtake new areas from industrial zones. Therefore, a correlation between these zones almost disappears.

Techno-energetic flows may be regarded as a matter of movement within the areas that affect the polyfunctional distribution. They form the functional areas and determine the characteristics of the area use priorities. They are built around a polyfunctional composite construction zone. A special carto-scheme (Fig. 2) depicts the polyfunctional areas, and they form material and energetic flows. It is noteworthy that the multifunctional areas of polyfunctional systems are most prevalent in Eiguliai and Šilainiai. The reason may be the dense housing and the large number of people living in these areas.

In the Aleksotas and Freda districts, we can see three multi-systems lacking public facilities and combining the industries of the most northerly territories and the residential multi-system. However, they are very large in this area and attributable to the peripheral zone. The predominance of residential construction causes intensive commercial activity.

The Rokai–Vaišvydava–Panemunė multi-system is very wide and connects various polyfunctional areas. It is characterized by a poor infrastructure and long distances among different objects. That area was devastated by the National defence monofunctional priority areas that form a strange system in which monofunctional areas are functionally weakly related.

The Petrašiūnai area is a multi-system with industrial priority and non-intensive residential zones. To the east, we can see the Amaliai–Palemonas residential multi-system characterized by an intensive and steady growth. It is very compact and has commercial and social priority areas.

Dainava district is characterized by the fact that there the residential, public and commercial priorities retain their influence. Here, the formation of a cluster of trade bodies affects the western part of Kaunas city.

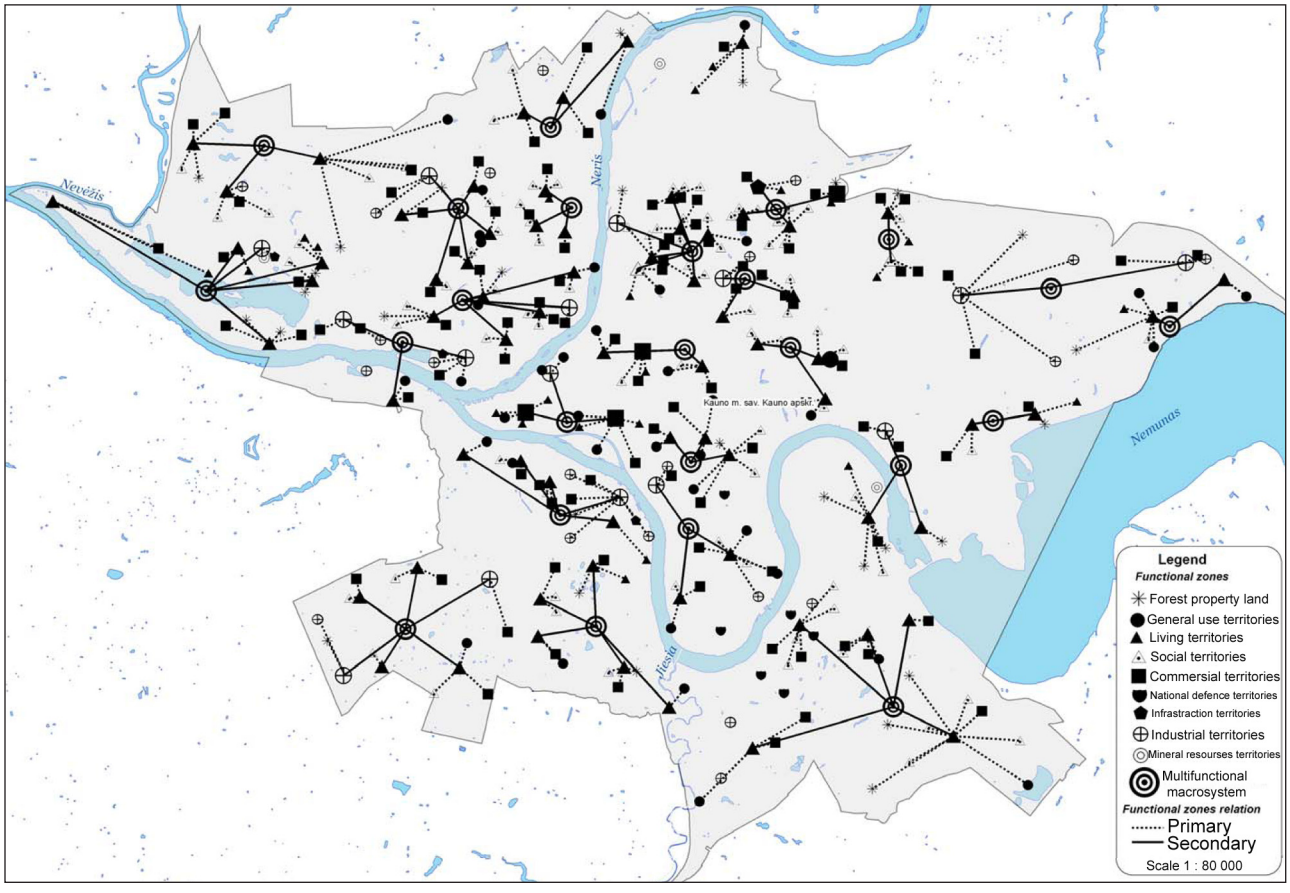

Fig. 2. Techno-energetic flow relations in Kaunas city
2 pav. *Technoenergetinių srautų ryšiai Kauno mieste*

The New Town and Old Town neighbourhoods have a bright commercial priority. Residential areas are in the periphery of these areas. There are also major public service units (municipalities, courts and other state institutions). They are the key areas of trade and corporate headquarters. A small green area includes a music garden and the confluence of the Nemunas Island Parks and Nemunas valley slopes, which are essential to the territory. The commercial areas are associated with the station area.

Žaliakalnis has two macro-areas. They are both residential areas with natural clusters, and there are no industrial areas. This is related to real estate prices and the conversion of old factories. In this territory public areas are scarce, as this neighbourhood is served by the center. Therefore, the optimization of these areas should first of all increase the public areas. Also, there is a need to preserve natural areas.

The functional zoning of Kaunas city is in transition from the monofunctional to the polyfunctional planning. Now it is dominated by monofunctional zones, but there are also some polyfunctional zones. One of the first examples of using the method of polyfunctional zoning for the municipal comprehensive planning in Lithuania is the most recent master plan of the Vilnius city (Vilniaus miesto…, 2007). A more intensive application of this methodology in the future will generate the process of mixed planning.

Lithuania needs to replace the current bureaucratic logic of confused plot use by specific purposes, their classification and application to complex planning, as the pseudo-polyfunctional zoning is becoming stronger and replaces the monofunctional and purely polyfunctional zoning.

Urban master plans should lead to a polyfunctional zone system and reflect the metabolic flows, because it shows the area's faculty and activities in the multifunctional zones. It is possible to design all the functions at the lowest cost to meet the emerging needs.

CONCLUSIONS

1. In urban master plans, polyfunctional zoning should prevail and, according to the recommended percentile structure, managerial planning taking into account energy flows should be performed.

2. In the Kaunas city master plan, monofunctional territories prevail because it was designed in the managerial planning style and did not take into account the polyfunctionality of the present and future territories.

3. In Kaunas polyfunctional zones, between commercial and residential territories a reverse dependency can be observed, and it is confirmed by the inner correlation of their percentile part in the functional zones.

4. The correlation between Kaunas commercial and industrial territories is –0.23, whereas in industrial territories it is very strong – even –0.98. Hence, the ratio of these territories cannot be determined unambiguously.

5. When implementing the territorial planning of polyfunctional land use, it is necessary to keep in mind the concept of functional priorities so that the public would be satisfied.

6. Lithuania needs to replace the current bureaucratic logic of confused plot use by specific purposes, their classification and application to complex planning.

7. Metabolistic flows are the movement of materials in the territory, which determines the location of polyfunctional zones, their characteristics and structure.

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NAUJAS POŽIŪRIS Į KAUNO MIESTO FUNKCINĮ ZONAVIMĄ

S a n t r a u k a

Miestų funkcinis zonavimas atliekamas įvairiais tikslais, naudojant skirtingus būdus. Šiuo metu iškyla nauja funkcinio zonavimo prieštara tarp monofunkcinio ir polifunkcinio zonavimo, jo santykio bendruosiuose planuose bei miestų metabolizmo proceso įtaka funkciniam zonavimui. Šio darbo tikslas – optimizuoti Kauno miesto bendrojo plano funkcinį zonavimą išskiriant naujas polifunkcines zonas, remiantis Kauno miesto bendruoju planu. Miestų bendruosiuose planuose turėtų įsivyrauti polifunkcinės zonos, kuriose funkcinio prioriteto santykiui visąlaik turi įtakos nenutrūkstamo urbanistinio metabolizmo procesas. Buvo nustatyta polifunkcinių zonų struktūra. Taip pat apibūdintas monofunkcinių bei polifunkcinių teritorijų santykis Kauno mieste ir metabolizmo įtaka funkciniam zonavimui.

Pažymėtina, kad daugelis gyvenamųjų teritorijų turėtų būti laikomos polifunkcinėmis zonomis. Jose vyrauja gyvenamosios paskirties teritorijos, o jas papildo aptarnaujančios zonos (visuomeninės ir komercinės paskirties). Kauno miesto gyvenamosiose zonose yra vidutiniškai 15 % šių aptarnaujančių zonų. Šių zonų srautų susikirtimų taškuose yra gana gausu bendro naudojimo teritorijų, apie 5 %. Jų daugiau sovietiniu laikotarpiu suplanuotose ir įrengtose teritorijose. Centrinėse miesto teritorijose parkų, aikščių plotai yra daug mažesni nei aplinkinėse teritorijose. Periferijose vyrauja žemaaukštis, stichinis užstatymas, kuriame yra labai nedaug bendro naudojimo teritorijų. Tokia tendencija vyrauja ir Žaliakalnio rajone, nes jį reikėtų vertinti kaip tarpukaryje susiformavusį, periferinį, žemaaukščio užstatymo rajoną.

Metabolistiniai srautai vertinti kaip materijos judėjimas teritorijoje, kuris turi įtakos polifunkcinių zonų išsidėstymui. Jie formuoja funkcinių zonų savybes ir nulemia tos zonos naudojimo prioritetus. Taip formuojamos mišraus užstatymo polifunkcinės zonos. Galima pažymėti, kad multifunkcinės polifunkcinių zonų sistemos labiausiai paplitusios Kalniečių, Eigulių, Šilainių ir Vilijampolės rajonuose. Tai sietina su tankiu apgyvendinimu ir dideliu skaičiumi žmonių, gyvenančių šiose teritorijose.

Kauno miesto funkciniame zonavime dar vyrauja monofunkcinis zonavimas, bet atsiranda polifunkcinių zonų. Ateityje jų daugės, nes planavimo procese įsivyrauja mišraus planavimo kontekstas. Funkcinių zonų kategorijos ir tipai turėtų būti pritaikyti prie Lietuvos Respublikos teisės aktuose numatytų standartų, kurie jau atspindi polifunkcinio zonavimo mokyklą. Miestų kompleksiniuose (bendruosiuose) planuose turėtų atsirasti polifunkcinių zonų sistemą atspindinčios schemos, nes jos parodo tos zonos visavertiškumą, veiklos multifunkcionalumą ir problemines vietas. Pagal ją būtų galima projektuoti visas funkcijas mieste taupant lėšas ir siekiant mažiausiomis sąnaudomis patenkinti iškilusius poreikius. Remiantis polifunkciškumo intensyvumo schemomis būtų galima nustatyti, kuriose vietose formuojasi aptarnavimo centrai ir kurios zonos tampa multifunkcinės. Pagal tai galima pritaikyti infrastruktūrą, reglamentuoti jų plėtrą.

Miestų kompleksiniuose (bendruosiuose) planuose turėtų įsivyrauti polifunkcinis zonavimas, o pagal šių zonų rekomenduojamą procentinę struktūrą būtų atliekamas tvarkomasis planavimas, kuris atsižvelgtų į materialinius srautus. Dabartinis Kauno miesto bendrasis planas yra tvarkomojo planavimo stiliaus, kuriame dar neatsižvelgiama į dabartinį ar numatomą teritorijų polifunkciškumą. Metabolistiniai srautai, turintys įtakos polifunkcinių zonų išsidėstymui, jų savybėms ir struktūrai, kol kas nėra įvertinti.

Realizuojant teritorijų planavime polifunkcinį žemės plotų naudojimą būtina nepamiršti funkcinių prioritetų sąvokos ir aiškaus jų nustatymo, kitaip gali kilti pavojus polifunkciniam zonavimui virsti instrumentu, tenkinančiu ne visuomenės, o tik grupinius ar privačius interesus. Taip pat Lietuvoje reikia iš esmės pertvarkyti ir pakeisti dabartinę logiškai supainiotą biurokratinę sklypinę tikslinių paskirčių, naudojimo būdų ir pobūdžių klasifikaciją bei jos taikymą kompleksinio planavimo dokumentuose.

Raktažodžiai: miestų planavimas, funkcinis zonavimas, miestų geografija, urbanistinis metabolizmas, Kauno miestas