

Morpho-functional interpretation of city centre in Bratislava

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Abstract

Bratislava belongs to european capital cities already one decade. This study is spatially concerned on the centre of its metropolitan structure considerably transformed during this period. Examined synthetical expression of morphological and functional qualities should lay an objective counterbalance to further perception research. We describe morphology by ground plan typology and floor index, functions by standard land use typology. First summarisation results in the model area analysed further with focus on physical condition, height and detailed functions. Large reconstruction process is of highest importance but simultaneous physical decay also occurs in some localities. Functional domination of retail, services, administration and business was observed. The core streets differ in localised capital dominated by banking. According to origin the centre is occupied rather by local companies. Synthetical interpretation based on selected morphological and functional attributes is a valuable spatial information showing previously hidden quality.

Key words: morphology, functions, city centre, Bratislava

Introduction

Urbanised space concentrates innumerable human activities. Production and use of artefacts takes place here in various dimensions and purposes. Transformation of natural environment approaches practical replacement by artificial one that is characterised as extremely differentiated. Another evident quality of human settlements is centrality. Next to structure the dynamics is usually stressed as the one of primary importance (Sýkora, 1999a). Cities are dynamic objects underlying both standard and deeper structural changes following wider social dynamics. If a city is complicated and its structure patterned, concentrated and dynamic, its central area will have these attributes in extreme measures. All in close interaction probably have the strength to create a new quality that is not used to be objectively described but that is used to be subjectively perceived. Can such a sensual category on individual or collective base be transformed into an objective information?

Bratislava is a metropolis and clearly changing postsocialist urban structure with attribute of lower situated capital in european context (Sýkora, 2002; Vandermotten, 2002). Reasons for that lay in the general size and functional orientation. On one hand many economic superlatives have been forecasted in integrated Europe for Bratislava, on another hand pessimistic evaluations are often presented. Slow disappearance of

problematic elements have created the image of a lagging city. Also the centre character as if was not reaching expected level. In compare to Vienna, Prague or Budapest, undoubtedly real metropolises of Middle Europe such a difference is too visible. Disadvantage in short lasting administrative function is relevant but also turning out from the problem that should be at first defined and analysed. No attempt is known in case of Bratislava.

First decision for spatial generalisation into the city centre should help us in approaching such an unclear and complex problematics. Centre is understood as the most valuable area in trade dimensions concentrating elite functions. Centre is also the symbol or projection of importance and life of the whole city. Methodological process from analytical view on relevant urban structures towards the synthesis is as well planned as an attempt to express a subjective attribute, centrality. Its interpretation should prepare a base for further attempts to answer what is real Bratislava's centre, its structure and dynamics. We would like to examine the result of postsocialist development in suitable model area and to find the main disproportions between expectations and reality.

Centres, commonly focused by disciplines studying built environment miss in contrary to their prominency any clear definition. Wolaniuk (1997) says: "Metropolitan centre is one of the most important elements of a city. Its size, facilities and functional structure reflect the importance in settlement system and show its individuality". For Carter (1982) the centre is an organisational core with whole city structured around it and a typical element differing the city from others. Centre is an integral part of the city as the multidimensional superstructure with physiographical, morphological, functional and socio-demographical aspects according to Matlovič (1998) or physical, social and functional aspects as Sýkora (2000) understands with recommendations to leave physiography. If we do not aim at social problematics we will be able to see the centre in morpho-functional dimension, well responding to the Urban Core or CBD in Johnston's (2000) meaning. Carter (1982) and Herbert, Thomas (1982) say that geography approaches the centre normatively, searching for objective spatial limits, or behaviorally, analyzing the elements and their location behavior in functional systems. Experiences show that geography investigates at first selected problems using its tools not containing any standard or wider accepted synthesis. Frequent attempts in historical approach represents Riley et al. (1999). Many studies are concerned with structure, trends and processes changing central areas of contemporary cities: Sýkora (2002), Sýkora, Kamenický and Hauptmann (2000), Breitung and Schneider-Sliwa (2000), Glorius, Müller (2000), Kaiser, Friedrich (2000), Sýkora (1999), Kovács and Dövényi (1998), Ruoppila (1998), Rudolph (1997), Lever (1997), Gormsen (1996), Ahrens (1996), Musil and Illner (1994), Lichtenberger (1994), Heinemeijer (1994), Andersson (1993, 1988) or Ellger (1992) to name some of more analysed by Ondoš, Korec (2002).

Methodology

Considering such a problematical object as a city centre it is critical to decide what aspects should be reflected and how these reflections should be summarised. Our process consists of (1) little scale analysis of morphology and functions as the relevant intraurban structures in central administrative unit, (2) synthetical selection

of model area, (3) large scale analysis of morphology and functions in model area, (4) large scale morpho-functional synthesis. Centre qualities are expected to be spatially dispersed what insists another simplification into the largest compact aggregate. The information for morphological and functional attributes are taken both from referenced sources but mainly from own research. Detailed methodological process description is included further. An example of theoretical morpho-functional synthesis can be found in Ravenscroft's (2000) or Dulla's (1988) works that inspired our research direction. We will apply some parts of multicriterial evaluation according to Tremboš, Minár (1996) and multidimensional arrangement (linear combination). For objectivised view on used parameters we will use simplified expert evaluation.

Spatial urban context

The input area is compactly defined by both self-governmental Bratislava-Staré Mesto and the same state-governmental Bratislava 1 border, spreaded on 985.46 hectares and located in central position among other spatial units. The surface ascends suddenly from the lowest level on left Danube bank in the southern and eastern part to hills in the west. The core area of capital city has exceptional position on national, regional and local level. Although not directly touching the national borders with Austria and Hungary it has extraordinary location in international dimensions (Korec, Galasová, 1994).

According to last available data (2001) the population of 44 798 lived in the area with density 4 546 people/sq.km. During last decade the population declined from 1991 by 8.6%. In age structure the portion of preproducing descended from 16.1% to 11.6% and postproducing from 32.5% to 28.2%. The number of flats of 19 074, with 13.8% in family houses, decreased by 4.7%. From agricultural land use forms only private gardens in western part still appear but are progressively replaced by housing. Relict industry can be observed mainly in south-east in Pribinova zone. Railway infrastructure is located along northern edge. Automobile transportation, although being limited, is very intensive with important intraurban corridors tied to inflowing motorway lines and two of four Bratislava's bridges. Massive agglomeration of retail and services, numerous health care facilities, institutions of education and culture are characteristic as well as large central state-administration sector. Built monuments conserved in historical core and castle hill serve for common city life and tourism.

Search for the model centre – analysis of morphological structure

All components of spatial intraurban structure differ one from another in dynamic attributes. Morphology as material substantiation wearer is usually taken in sense of physiognomical conditions as the most resistant among human substructures. Time-spatial view is typical for research in this field with history materialised in present substantiation and directly visible according to Koter (1979). This theory recognises the outer or physiognomical aspect in architectural form and the inner or clear morphological aspect in ground plan form. Applicable typology should uncover the actual pattern of urban morphology within units rather homogenous inside substantially different spatial

context. Additions and transformations in the morphogenetical periods have formed mosaic of spatial units differing in age and both aspects. Evolution of present densely urbanised area has been long, reflecting material civilisation signs. According to scale and purpose of our research we have decided to use typological estate classification (Šimkovič, 1996) and block material structure (Chudík, 1996, 1994). These sources combined with own research identify several categories: uncovered areas, closed and unclosed compact block estate, compact row estate with special family house type, uncompact row estate, isolated objects in compact or uncompact and homogenous or heterogenous form, special family house type and free production estate. The coverage is highest in case of closed blocks. These are typical for the core and lower situated parts of the area in the east. Many blocks remain unclosed and postwar blocks show much lower coverage. Similar corridor street type is observed in compact row estate. This one is typical for Obchodná, parts of Dunajská, Štefánikova, Leškova, Pražská and Karpatská streets. Many areas are covered by uncompact row form. The castle is typical individual and examples of this form can be found as palaces, churches, administrative or commercial objects in heterogenous blocks across the area. Uncompact individual forms with the lowest coverage are spreaded westwards from the street line Palisády – Moyzesova – Fraňa Kráľa – Sokolská. Progressively reduced green areas are replaced by uncompact heterogenous estate type. Relict industrial blocks can be found in Pribinova zone and another localities. Uncovered areas compose mainly the green axis in the eastern part and were observed dispersely.

Vertical dimension of morphology is considered as important in all attempts to define city centre. In Bratislava an elaboration has been carried out by Chudík (1996). The floor index is based on cadastral data and original research as the total gross floor area divided by whole block area. In vertical dimension the eastern part is considerably higher with relative decrease northwards. Blocks with no or minimal estate are dispersed as well. The western half of the area is dominated by lowest substantation rising locally along L. Svoboda river front and streets Mudroňova, Lovinského, Drotárska, Svetlá, Tichá and Na Hrebienku.

Search for the model centre – analysis of functional structure

Summarizing the experiences of Górká (1974), Liszewski (1978), Mydel (1981), Ira (1984), Kusendová, Lauko (1992), Korec, Husárová (1994) and Korec (2000) and information on land use structure of the area we decided to use following typology: housing functions; service functions – public administration, education and research, sport, culture, sacral functions, health care, accommodation and catering, retail, mixed services, technical infrastructure; polyfunction – with housing under and above 40% of the area; production functions – industry, construction, transportation and stores; recreation functions – forests, parks, gardens; another functions – cemeteries, water areas, areas under construction and finally areas without any use. Significant spatial pattern mixes both horizontally and vertically mainly housing and services. Mono-functional housing was mapped in western half different again in compare to eastern one with rather polyfunctional forms. Services are located in different portion and not rarely solitary as a relict of functionalistic rules of last century. Some functions tend

to locate monofunctionally as administration, education, research or sports. Culture is concentrated mainly in historical core and surroundings. Sacral functions are tied with historical objects on western edge of the core and in some other blocks. Health care occupies other specialised blocks. Accommodation and catering are dispersed but larger hotel complexes are located on the river front, Hviezdoslavovo and Hodžovo squares and Špitálska street. Retail and commercial services form the large agglomerations in the core, along Obchodná street, Kamenné and SNP squares. Industry located in zone Pribinova slowly changes into polyfunction. Northern edge is occupied by railway transportation. Needs of automobile transportation are satisfied in underground parkings of new-constructed objects. Green areas in relative high portion form the environment of whole villa type estate, forest areas Calvary and Horský park and a stripe along Mlynská dolina on western edge. Largest parks are in blocks of the palace garden axis but fill also squares, wider streets and riverside. Important green areas are the castle hill and Podhradie. Gardens spread in western hill part, cemeteries in Karadžičova, Palisády and Žižkova streets. The largest unused area is tied to Pribinova zone. Blocks with present brownfields character are supposed to be developed into modern centre extension. Empty zone on previously demolished core sector in Podhradie lays in the most exposed area. The cadastral information describes the area in 2002 as builded-up by 52.9% and agricultural by 18.9% with gardens dominance in 93.9% of that.

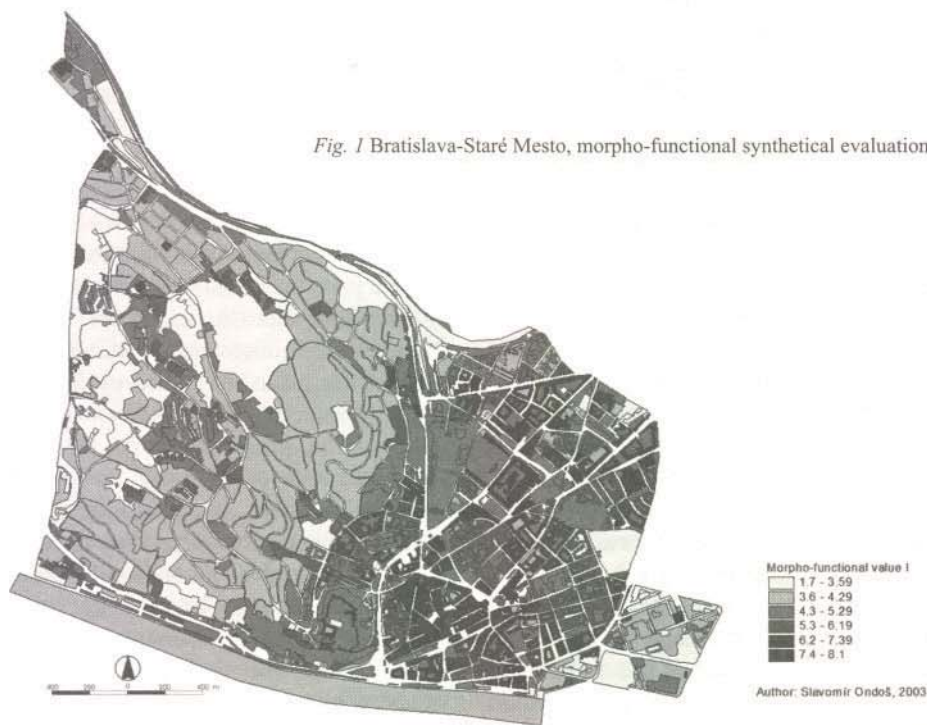
Search for the model centre – synthesis

A number of synthetical processes can be used in search for the model locality responding to theoretical and practical image of a city centre. Available information contains in the same scale spatial data on ground plan form and land use in 1507 microunits. Nominal values were extended by the floor index as an ordinal value. Expected results were confirmed by Chi-square test that uncovered important pair dependency between all mentioned. Code values transformation into further exploitable form was realised by experts evaluation. Randomly selected students of Faculty of Architecture STU in Bratislava (11) evaluated all types in questionnaire into the scale from 1 for untypical to 10 for the most typical in an imaginary urban centre. For ground plan forms the empty areas were evaluated as undecided because of dependency on the function. Block estate was valued as the most typical, row estate forming very similar ground plan as lower one. The worst position was given to all family house types, uncompact heterogenous individuals and industrial estate. The floor index was transformed into the same scale with the values given to original intervals according to their lower closure. Land use codes were evaluated in the same way as ground plan form. For the most typical uses were valued commercial services and culture, education, administration, housing and polyfunctional forms. From green areas only parks were taken as typical, water areas as average but much higher in compare to not typical stores, industry and construction. Railways were valued better as consequence of good integration known from traditional image of busy industrial city centre.

Three progressively valued signs in the same scale were consolidated in a synthesis using the multidimensional arrangement (simple linear combination) resulting into the morpho-functional value I. Weights according to Metfessel's allocation (the value 1.0

devided according to respondent's opinion) were for plan type 0.309; for the floor index 0.245 and for functions 0.445. Synthetised complex turns our interest after expectations into densely covered eastern half of the area. Previously unavailable information on morpho-functional centrality shows areas of further interest in the historical core, its surroundings, outflows and island-like areas northwards along Šancová street and other locations. Map interpretation allows to find all areas that could be relevant in searching for intraurban centrality objectively. According to the Figure 1 we decided to take for the model locality the area of six statistical units (Bratislava-historical core, Reduta, Lýceum, Memorial SNP, Nová Scéna and Charitas). This area can not be understood in normative sense but only as the core area where the signs of centre are expected to be in the clearest and most compact form.

Defined model centre with 8 593 inhabitants (2001) takes 19.2% from input area population and only 2% from whole administratively limited city population. In last decade the population decreased by 16.2% with maximum decline by 19.3% in Charitas unit and Historical core by similar 18.9%.



The morphology of model centre

The ground plan of model centre area is dominated by compact blocks, although unclosed in some cases. Blocks of Obchodná, Gorkého, Jesenského and Zámocká streets have row character and many have integrated individuals. Viewpoint of inner

morphology shows very similar forms across the area so the reorientation into outer architectural signs is necessary. From available characteristics we decided for object's height in number of floors and physical condition in seven qualitative categories taking into account last decade construction activity and decay signs. Newbuildings, reconstructions without and with decay signs, not reconstructed objects with decay, partly and totally destructed objects or present constructions were distinguished. At first 829 buildings were mapped as not reconstructed followed by those with substantial decay (264, 31.8%) and reconstructions with no decay (238, 28.7%). These were observed mainly in historical core and surroundings within a larger complex around Reduta and other clusters around Hurbanovo square. Reconstructions are dispersed along Obchodná street, its southern front especially, Špitálska, Vysoká street, Kollárovo square and Lýceum sector with Panenská street. Older reconstructions (120, 14.5%) were observed with decay signs. Newbuildings (38, 4.6%) can be found in dense areas integrated into older estate and usually exploiting the plots after previous demolition. Some replicas of historical buildings were constructed in core and modern ones on its edge. Larger objects appeared in surroundings and 22 localities were in construction. In case of historical core a chance occurred to compare present conditions to the records by Tomašák (1989). Transitions of highest importance were from lower (3rd and 4th) categories into higher (2nd) what proves the large morphological renewal especially in the historical core. In spatial dimension the rule is simple and reflects gradual decay interrupted only where construction activity appeared. In average more streets (22) upgraded their state in compare to those (9) that downgraded it. Spatial comparison clearly shows process of simultaneous renewal and decay of neighbouring plots.

Examining the height of the objects as the most frequent were found 3-floor objects (215), 2-floor (183) and 4-floor objects (132). Lower portions belong to 1-floor (107) and 5-floor objects (107), 6-floor (73) and higher objects (17) with maximum on SNP square. In average the number of floors varies in ground plan segments from 1.0 to 6.8 with domination in the scale from 2.0 to 4.7. Averagely it was 3.17 floors.

The functions of model centre

The information on functional structure was taken from detailed research by objects recording all present facilities, institutions and other elements including main functional orientation if possible. Housing function could be examined according to similar records in the portion of inhabited objects by streets and squares. Totally 377 (45.5%) objects served for housing, 10 streets exceeded 75%, 3 were inhabited under 25% and 15 had no housing. Functional atomisation according to number of subjects shows averagely 3.06 functional elements on single object from total amount 2 537. Extremely atomised were both Šafárikovo square and Staromestská street. The branch structure could be compiled from 2 318 recorded cases. As first were (578, 24.9%) retailing subjects followed by catering and accommodation (271, 11.7%) and business services (265, 11.4%) on third position. Wholesale (166, 7.2%), culture (151, 6.5%), banking (113, 4.9%), member organisations (99, 4.3%), reality (90, 3.9%) and transportation (79, 3.4%) were situated lower. The structure as we expected is dominated by commercial sector with numerous fashion stores, bars and restaurants, travel agencies and

other services. Retailing is also important as a producer of typical visual qualities or the centre image. A subcategory can be distinguished from group of subjects with little different commercial behavior. Their central location gives them the same advantage of profit maximizing but they are more traced by the users alone. Language education, private medical practices or specialised services give good examples of them. Large area is occupied by numerous institutions and companies, services in intermediation, consulting, law, reality, advertising or technical projection. Frequent are banking, insurance and financial facilities of retail and administrative character, diplomacy and public administration. Functions located in parter take 39.4% of their total count. Averagely by single object only 10 streets or squares exceeded 2.0 subjects and some like Kapitulska street with 0.04 even in very central location had minimum of them. A number of empty objects (49, 5.9%) with no function was also recorded. The study by Buček, Pitoňák (1997) named the financial sector as an initiative actor in the centre modernisation during the transition period but later necessary in competition with administration, private developers, reality agencies or the state. For future variability protection the polyfunction was labeled as necessary. Results of our research support that six years later.

Functional structure itself gives no answer on who are the actors wearing the functions of the centre. Limited possibilities of direct observations had to be extended using another information source, web business register. The company name with legal form, the seat, record year, branch and origin according to the partners and height of foundation capital were selected as relevant. Records from March 2003 including data on 1 691 subjects were then selected according to the location in the historical core as an example area. Company origin can be examined both by simple structure and capital height. Total sum of capital located in the area exceeds 187 billion Sk. In 1 012 companies (91.3%) domestic representation was found with dominant local portion from Bratislava itself (735, 72.6% of domestic). Only 47.6% of capital sum in contrary had domestic origin, Bratislava in 68.3% of that. Czech republic was represented in 7.6% of subjects and 15.5% of capital, Hungary in 1.7% of companies. Visegrad 4 region covers totally 66.9% of capital sum. European Union formed 29.3% of capital with Italy (22 subjects, 47.4% of EU capital), Austria (105, 24.9%), Great Britain (29, 15.5%), Germany (17, 10.1%), Netherlands (11) and France (14). Non-EU countries of greater importance were Switzerland, Croatia and USA (23, 0.3% of capital) from all 37 countries. European sources totally form 96.2% of capital sum simply divided into domestic or neighbouring countries block of two thirds and EU block of one third portion.

In the branch structure by capital sum the position of banking institutions (75.86%) is uncomparable to any following. Telecommunications (14.54%), culture, sport, renting, insurance and wholesale form second and lower levels. Subjects out of one existing since 1949 have foundation date in 1989–2003 period. In chronological order the number of subjects naturally ascends in 1989–1993 period. Deep fall in 1994 was followed by steady level and fall again in 1998, grow in 1999 and lasting progression since 2000. Explanation of the structure requires knowledge of wider relations. The differentiation into progressive 1989–1993 and 1999–2003 periods in contrary to 1994–1998 stagnating or regressive period is evidential. Analysis of the capital in time

dimension has given similar periods. In spatial relations considerable heterogeneity with the most attractive Panská, Michalská and Laurinská streets was observed. Time-space viewpoint shows primacy in Laurinská and Panská streets during this decade. Another relations, deeper detail and comparisons could give more answers but transparent attractivity motions over the centre, leaving trajectories of different size are recognizable already now.

The morpho-functional interpretation of model centre

Process of morpho-functional examination is similar to searching for the model area. As well we have to unify outcomes of the analysis presented in following features by objects: physical condition and floor height for morphology, number and branch type of functional subjects, functional mixture and parter portion, housing and disfunction. All out of the last one reflect the quality of centre progressively. Original expressions (number of floors, physical conditions in 1–5 point scale, housing and disfunction in 0–1 code, number of subjects and parter subjects, standard deviation from quantified branch classification for mixture and relative class portion for all single subjects) had to be in this case normalised. Weighing of these criteria was carried out with help of experts.

Figure 2 shows differentiation of the model area in the scale received again within simple multidimensional arrangement (linear combination). Although with limited expression strength in response to used attributes the map shows quite sufficient results. In contrary to the most valuable areas the low status parts of the centre, uncovered or with no function are visible. In many cases the blocks remain unfinished with existing substantiation not exploiting the material possibilities or without standards expected in capital city centre. As a consequence further intensification and renewal could be reliably forecasted. In wider context the relation of empty areas to large projects of past decades is clear. Motorway line joining Petržalka with central city is the main cause of large demolitions and blocks that were left empty for decades and covered recently. Historical core is saturated out of few plots and continuously reconstructed. Future construction possibilities are still available in the busiest squares and streets. There are no assumptions of slowing down the dynamics regarding the functional structure, rather conversely.

There are additional areas with prospective morphological and functional qualities of city centre in model area surroundings. Podhradie, a large zone demolished four decades ago, remains with unclear future development. Further stagnation under growing pressure is rather not expected. The centre should be in that case enlarged along the river front westwards. Extension in the north towards the railway station takes in account already published projects of private developers corresponding to city government interests. Bratislava has similar problematical brownfields area as other big cities do. The Pribinova zone and neighbouring blocks are recently projected for intensive modern development. The area among already existing presscentre, theatre, bank and insurance headquarters, shopping centre and new-constructed bridge should be changed in few years into a busy polyfunctional locality. Possible expansion direction is also in the south towards opposite river front where already some large projects on Einsteinova street (Aupark, Atrium, Toyota centres) have been realised.

Conclusion

Interfering processes deeply changing postsocialist Bratislava have affected all elements of the city understood systematically and examined spatially. The model centre in a more complex way as concerned follows the need to approach the understanding of reality objectively since simplifications in too positive or negative light are not rare. Centre is considered as symbol creating and primary morpho-functional phenomenon. Decision to apply the process on model area only lays in the experience of normative searching studies. Ideal universal method has been left by the authors alone. Unexact nature of the centre and, as it seems practical impossibility of ideal objectivity caused that exact centre concept was replaced by its approximation. Synthesis of morphological and functional attributes resulted in model area with remaining heterogeneity, similarly

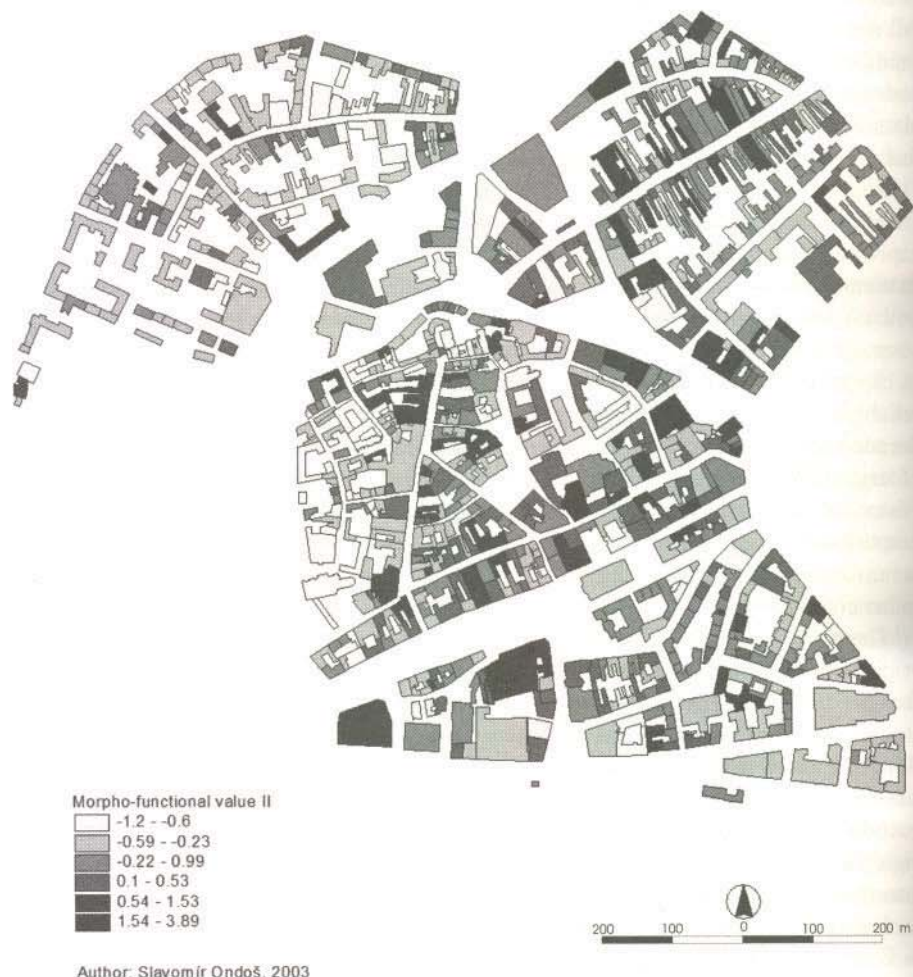


Fig. 2 Bratislava-centre, morpho-functional interpretation

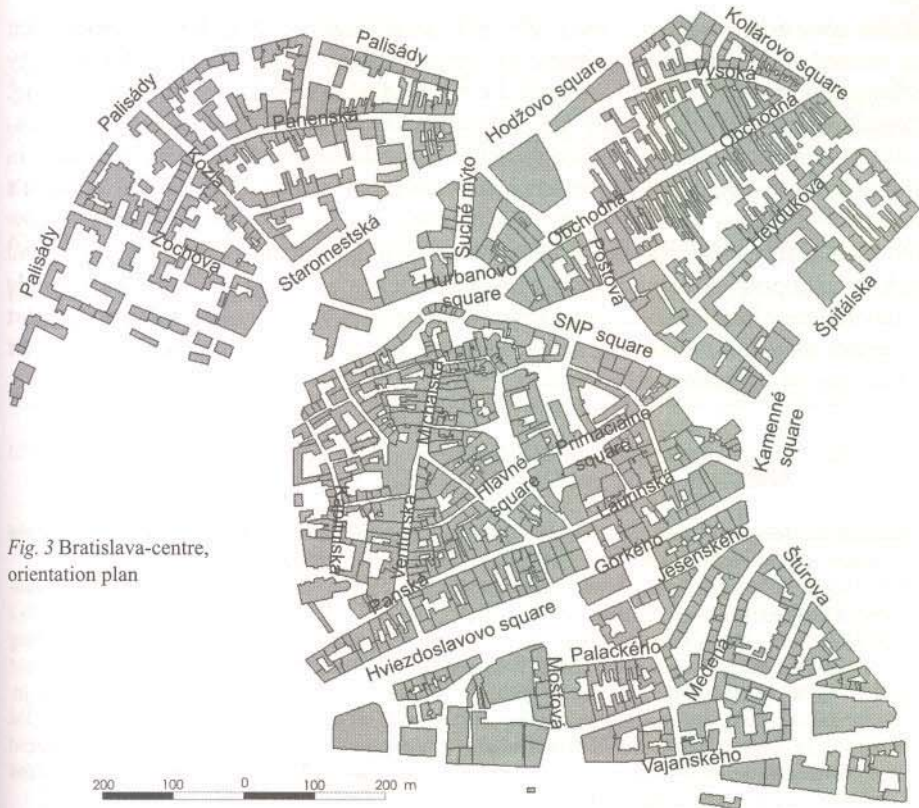


Fig. 3 Bratislava-centre, orientation plan

not avoided in case of older studies. Important morphological changes were proved as corresponding with analogical results from neighbouring countries. Massive renewal is typical in island-like areal and linear formations. Compactness of the location pattern decreases with growing distance from the core, selected streets and by architectural types. Although intensive adding into empty plots was observed, the situation is still far from that in Prague where the physical capacity was reached. Too much substantiation stagnates underdeveloped, contributing to negative image of the centre and consequently of the whole city. Functionally the model area was described as very heterogenous. Mainly commercial saturated localities border to less occupied or unused localities depreciating the standard in their surroundings. Detailed information on example area in the core enabled us to go further in time and economical dimensions. The foundation capital although of limited power is the only available value describing economical resources in large scale. The streets of Bratislava's centre sharply differ in number of subjects, functional orientation, diversity and attractivity for capital. During last period the centre has increased both morphologically and functionally, shifting towards typical functional spectrum.

The perception of the city or its specific area is a behavioral problem. Any precise objective model not taking this in account can not alone answer the questions implying the problem of Bratislava's image. Standard approaches resulted in the "photography"

of the area with resolution previously not taken. The resulting spatial information on intraurban structure is applicable in urban planning where, as far as known, any comparable evaluation out of theoretical concept presented by Dulla (1988) is missing. Contemporary analyses for city regulations stand also on isolated substructural evaluations without use of similar synthesising method. Consolidated view presented in Figure 2 clearly suggests what could be the main problem standing behind Bratislava's substandard image, as often noted: fragmentation, irregular spatial mixture of low and high quality localities, isolation of image creating elements of the city centre and lack of uninterrupted integrational focal point, a beating heart. In addition, possible comparisons of these results to findings on behavioral basis should be able to support or reject direction towards presented hypothesis or at least contribute to further discussion on suggested indications.

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