

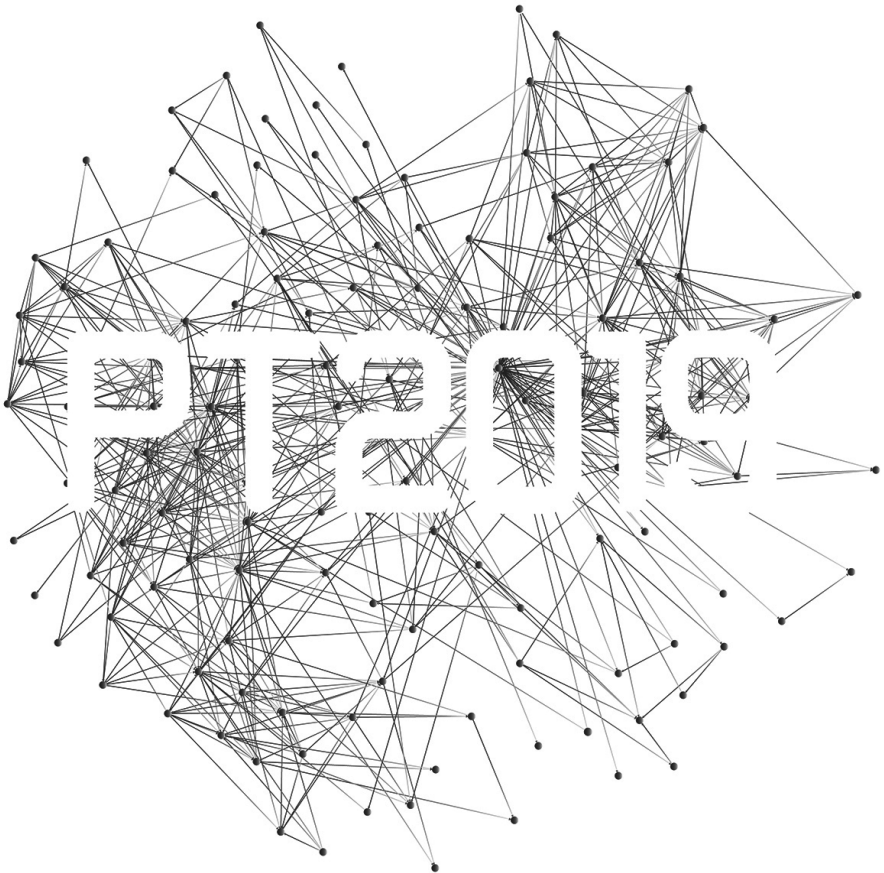
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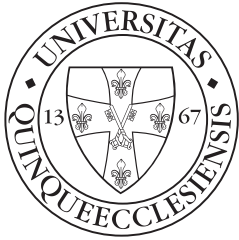
PLACES AND TECHNOLOGIES 2019

THE 6th INTERNATIONAL ACADEMIC CONFERENCE ON
PLACES AND TECHNOLOGIES

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PLACES AND TECHNOLOGIES 2019

**KEEPING UP WITH TECHNOLOGIES TO TURN BUILT HERITAGE INTO
THE PLACES OF FUTURE GENERATIONS**

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TABLE OF CONTENTS

PLENARY LECTURE**44****HERITAGE AND TECHNOLOGY - GENERATING A SENSE OF PLACE**

.....45

Demeter Nóra, BA UC B, MYU, DLA UP

FORM AND ENERGY: INNOVATIONS IN METAL BUILDING**FAÇADES**.....53

Hachul, Helmut

ASSESSMENT AND REHABILITATION OF HERITAGE STRUCTURES**HELPED BY COMBINED NON-DESTRUCTIVE TESTS**64

Orbán Zoltán; Török Brigitta; Dormány András

SEARCHING THE RIGHT DISTANCE BETWEEN THE OBJECTIVITY**OF THE HISTORY AND THE NEED OF THE CONTEMPORARY**72

Stella, Antonello

PAPER**89****HUMAN MIGRATION CRISIS**90

Alwani, Omar; Borsos Ágnes

THE MULTIPLEX TYPOLOGIES OF SHRINKING CITIES 100

Antonić, Branislav; Djukić, Aleksandra; Lojanica, Vladimir

MONASTERY CRKVINA AND MONASTERY TVRDOŠ, TREBINJE,**FEDERATION BOSNIA AND HERZEGOVINA - COMPLEX****RECONSTRUCTION AND DEVELOPMENT** 109

Arsić, Petar

COLLECTIVE REUSE – CO-HOUSING DEVELOPMENTS IN THE**SERVICE OF PRESERVATION THE BUILT HERITAGE** 117

Babos Annamária

TEENAGERS' PERCEPTIONS OF PUBLIC OPEN SPACES:**EXPERIENCES FROM A LIVING LAB IN LISBON, PORTUGAL** 124

Solipa Batista, Joana; Menezes, Marluci; Smaniotto Costa, Carlos; Almeida, Inês

THE PERCEPTION OF PUBLIC SPACE: IMAGES AND**REPRESENTATIONS OF STREET FURNITURE** 132

Ben Dhaou, Ons; Vasváry-Nádor Norbert

THE DESIGN CONCEPT OF A PRE-FABRICATED APARTMENT**BUILDING** 138

Borsos Ágnes; Kokas Balázs

PROTECTION AND TOURISM DEVELOPMENT OF ANCIENT VILLAGES FROM A SUSTAINABLE PERSPECTIVE - HOUGOU ANCIENT VILLAGE AS AN EXAMPLE	146
Cao Hui	
POP(O)S OF SHOPPING CENTRE - A NEW APPROACH TOWARDS URBAN DESIGN.....	154
Cvetković, Marija; Radić, Tamara	
TRANSCRIPTION OF FORMER ARCHITECTURE	163
Zinoski, Mihajlo; Dimitrievski, Tome	
THE LOCAL LEVEL OF GOVERNANCE IN THE EUROPEAN PROCESS OF ENERGY TRANSFORMATION: CHALLENGES AND EMPOWERMENT CHANCES IN BULGARIA.....	171
Dimitrova, Elena; Tasheva – Petrova, Milena; Burov, Angel; Mutafchiiska, Irina	
URBAN GROWTH PATTERNS AND ENVIRONMENTAL PERFORMANCE: A COMPARISON OF LATE 20TH CENTURY AMERICAN SUBURBAN PATTERNS TO THOSE OF LATE 19TH CENTURY CENTRAL EUROPEAN URBAN FABRIC.....	180
Dougherty, James, AICP, CNU-A, ASAI	
ENERGY CONSUMPTION INDICATORS DUE TO APPLIANCES USED IN RESIDENTIAL BUILDING, A CASE STUDY NEW MINIA, EGYPT	188
Elhadad, Sara; Baranyai Bálint; Gyergyák János; Kistelegdi István	
MANAGEMENT APPROACH FOR SUSTAINABLE URBAN OF EXISTING NEW CITIES IN THE DIFFERENT REGIONS OF EGYPT (COMPARATIVE STUDY).....	194
Elhadad, Sara; Baranyai Bálint; Gyergyák János; Kistelegdi István	
INVESTMENT LOCATIONS MAPING: KIKINDA CITY CASE STUDY	202
Furundžić, Danilo S.; Furundžić, Božidar S.; Borko Lj, Drašković	
“VISIBLE” AND “INVISIBLE” TECHNOLOGIES FOR THE INCLUSION OF VULNERABLE USERS AND THE ENHANCEMENT OF MINOR ARCHITECTURAL HERITAGE	211
Finucci, Fabrizio; Baratta, Adolfo F. L.; Calcagnini, Laura; Magarò, Antonio	
DETAIL ASSEMBLAGES.....	219
Gourdoukis, Dimitris	
CONVERTIBLE UMBRELLA PT2016.....	227
Halada Miklós	

BUILT HERITAGE PROTECTION STRATEGY OF GUANGZHOU HISTORIC DISTRICT BASED ON PUBLIC SPACE UPDATE	235
He Honghao	
THE FRENCH LEGACY IN ALGERIA : THE ARCHITECTURE OF A SHARED IDENTITY, THE CASE OF THE KASBAH: ALGIERS, AND THE COLONIAL CHECK BOARD: BISKRA	244
Hiba, Barbara; Molnár Tamás	
COMPLEX REHABILITATION OF BUILDINGS BUILT WITH INDUSTRIALIZED TECHNOLOGY	253
Horkai András; Kiss Gyula	
PRESERVING ARCHAEOLOGICAL ELEMENTS IN URBAN HERITAGE DYNAMIC STREET - THE MAKING OF PUBLIC STREET OPEN MUSEUM - CASE STUDY: THE STRAIGHT STREET OF THE ANCIENT CITY OF DAMASCUS	261
Ibrahim, Sonia	
FLUIDITY OF CONTEMPORARY CONTEXT AND THE POST-INDUSTRIAL PHASE OF THE FIRST INDUSTRIAL ZONE IN BELGRADE	271
Jerković-Babović, Bojana; Fotirić, Nebojša	
SEARCHING FOR THE CODE OF NEW BELGRADE'S OPEN SPACE: CASE STUDY OF BLOCK 37	279
Jovanović, Predrag; Vuković, Tamara; Mitrović, Biserka	
HUNGARIAN ENERGY+ CUBE	287
Kondor Tamás; Kósa Balázs; Baranyai Bálint; Kistelegdi István; Juhász Hajnalka; Szigony János; Zrena Zoltán	
ACTIVITY BASED-MODELLING AS BASIS FOR SUSTAINABLE TRANSPORT POLICIES	293
Jurak, Julijan; Šimunović, Ljupko; Radulović, Božo; Sikirić, Matija	
THE ARCHITECT'S DESIGN IN THE RURAL STIMULATES THE VITALITY OF RURAL— XIAMUTANG CHILDREN'S LIBRARY.....	299
Kang Xue; Medvegy Gabriella	
THE TRANSFORMATION OF URBAN FORM BETWEEN MODERNITY AND TRADITION, WITH REFERENCE TO ERBIL CITY	307
Khoshnaw, Rebaz	
NEW FORMS OF TOWNSCAPE REGULATION IN HUNGARY	315
Füleky Zsolt; Kolossa József	

THE ISSUE OF PRESERVATION OF TRADITIONAL RAMMED EARTH HOUSES: CURRENT PRACTICE OF PRESENTATION IN SERBIA AND REGION.....	322
Kontić Ana; Lukić, Nevena	
APPLICATION OF MULTI-CRITERIA ANALYSIS IN THE PROCESS OF ENERGY RENEWAL OF RESIDENTIAL BUILDINGS.....	331
Krstić-Furundžić, Aleksandra; Kosić, Tatjana	
SUSTAINABLE DEVELOPMENT OF THE TOWN CENTER OF VISEGRÁD.....	340
Kovács-Andor Krisztián; Tamás Anna Mária	
SPECIAL REQUIREMENTS OF EDUCATIONAL BUILDINGS	345
Kovács Péter; Kósa Balázs; Molnár Tamás	
ASPECTS OF THE RELATIONSHIP BETWEEN THE ARCHITECTURAL HERITAGE AND NATURE FOR BETTER PLACES IN FUTURE	353
Furundžić, Nikola Z.; Furundžić, Dijana P.; Krstić-Furundžić, Aleksandra	
URBAN REGENERATION OF OPEN PUBLIC SPACES AS A TOOL FOR THE STRENGTHENING OF CULTURAL TOURISM: THE EXAMPLE OF THE HISTORIC CORE OF SMEDEREVO	361
Lazarević, Milica; Djukić, Aleksandra; Antonić, Branislav	
THE STATUS QUO OF HERITAGE BUILDING PROTECTION IN CONTEMPORARY CHINA	371
Liu Sha Sha; Kovács-Andor Krisztián	
RESIDENTIAL DESIGN PATTERNS UNDER HUTONG CULTRE.....	379
Lu Chang	
THE CONTRIBUTION OF INTERMODAL TRANSPORT NODES TO THE VITALITY OF PUBLIC SPACE	386
Madzhirski, Vasil	
POST-DISASTER URBAN PLANNING STRATEGIES DEVELOPMENT OVERVIEW	395
Maiteh, Shaha Mazen; Zoltán Erzsébet Szeréna	
FLOATING BUILDINGS AS NEW CONCEPT OF RESIDENCE IN BELGRADE FOR FUTURE SOCIAL REQUIREMENTS	402
Jacovic Maksimovic, Tijana	
VALORISATION AND REVITALIZATION OF HERITAGE ALONGSIDE DANUBE RIVER: CASE STUDY OF SMEDEREVO CASTLE	410
Vanista Lazarevic, Eva; Komatina, Dragan; Maric, Jelena; Vucur, Aleksandar	

PARTICIPATORY PROCESSES AND DESIGN METHODOLOGIES FOR IMPROVING LIVEABILITY: A COMBINATION USED IN SOME HISTORICAL DISTRICTS IN ROME	420
Martincigh, Lucia; Di Guida, Marina	
ANALYSING THE HOSPITAL PATIENT ROOM THROUGH SOCIAL REPRESENTATIONS.....	429
Marx, Fernanda	
CEBU PROVINCIAL CAPITOL: BALANCING URBAN CONSERVATION AND DEVELOPMENT RIGHTS.....	437
Menjares, Neil Andrew Uy; Solis, Carmencita Mahinay	
INCLUSIVE AND DEMOCRATIC METHODS FOR THE APPRAISAL AND THE EVALUATION OF URBAN INFRASTRUCTURES.....	446
Miccoli, Saverio; Finucci, Fabrizio; Murro, Rocco	
THE INFLUENCE OF AN ELECTRONIC PAYMENT SYSTEM ON PASSENGER COMFORT IN VEHICLES OF URBAN PUBLIC PASSENGER TRANSPORT	455
Milenković, Ivana; Pitka, Pavle; Simeunović, Milan; Miličić, Milica; Savković, Tatjana	
SENTIMENT ANALYSIS OF TWITTER DATA OF HISTORICAL SITES	463
Raspopovic Milic, Miroslava; Banovic, Katarina; Vukmirovic, Milena	
UPGRADING URBAN MOBILITY: THE APPLICABILITY OF CYCLING APPS IN BANJALUKA	472
Milaković, Mladen; Stupar, Aleksandra	
DESIGN PRINCIPLES FOR BETTER OPEN SPACES AT UNIVERSITIES, DESIGN APPROACHES FOR UNIVERSITY OF PÉCS	479
Paári Péter; Gyergyák János; Sebestyén Péter	
THE IMPORTANCE OF STRATEGY IN THE DEVELOPMENT OF HUMANE CITY IN THE 21ST CENTURY – SYNERGIC ACTION FOR LOCAL IDENTITY IN THE GLOBAL CONTEXT: CASE OF NIKSIC (MONTENEGRO)	488
Perović, Svetlana K.	
CONCEPTUALIZING AN ACTIVE LEARNING TAXONOMY IN AN ARCHITECTURAL COURSE FOCUSED ON EVALUATION OF CLIMATE CHANGE EFFECTS	495
Pesic, Nikola	
MECHATRONICS IN ARCHITECTURE: DESIGN RESEARCH METHODOLOGY	507
Petrović, Milica; Stojanović, Djordje	

ANALYSIS OF THE WAITING TIME OF PASSENGERS ON PUBLIC TRANSPORT IN THE PERIOD MORNING PEAK HOURS.....	516
Radivojev, Dejan; Simeunović, Milan; Pitka, Pavle; Lazarević, Milan	
THE RELATIONSHIP BETWEEN SPACE QUALITY OF ADDICTION CENTRES AND PATIENT BEHAVIOUR.....	524
Sadoud, Nesma; Zoltán Erzsébet Szeréna	
HISTORICAL PRELUDES OF PARAMETRIC DESIGN TECHNIQUES	533
Sárközi Réka; Iványi Péter; Széll Attila Béla	
TEXTILE MEMBRANE STRUCTURES IN REFURBISHMENT OF BUILT HERITAGE	538
Savanović, Dijana; Krstić-Furundžić, Aleksandra; Josifovski, Andrej	
REBUILDING RURAL PUBLIC SPACE BY VERNACULAR AND ART METHOD IN CHONGQING CHINA.....	547
Shi Yongting	
IDENTIFYING PRIORITY INDICATORS FOR REUSE OF INDUSTRIAL BUILDINGS USING AHP METHOD - CASE STUDY OF ELECTRONIC INDUSTRY IN NIS, SERBIA	555
Stanojević, Ana; Jevremović, Ljiljana; Milošević, Mimica; Turnšek, Branko AJ; Milošević, Dušan	
ENERGETIC RETROFIT OF THE TRADITIONAL APARTMENT HOUSES	564
Sugár Viktória	
„UNITY IN THE MULTITUDE”	572
Šutović, Anastasija	
PARAMETRIC CURTAIN WALLS	578
Katalin Szommer; Sárközi Réka	
ALTERNATIVE COMMUNITY – PROMOTOR OR INHIBITOR OF SUSTAINABLE DEVELOPMENT	582
Temeljotov Salaj, Alenka; Leuraers, Cato; van Dooren, Amber; Bjørberg, Svein	
THE EFFECTS OF THE POPULATION DECLINE ON THE BUILT ENVIRONMENT AND DEVELOPMENT POSSIBILITIES FOR SMALL SETTLEMENTS – A CASE STUDY OF BARANYA COUNTY IN HUNGARY.....	591
Tőke Máté	
URBAN PARTICIPATION AS A TOOL ALL OVER THE WORLD	598
Tommasoli, Lavinia; Luciani, Francesca Romana	
EXPLORING THE SYMBOLISMS AND TECHNIQUES OF DAYLIGHT MANAGEMENT IN HISTORIC GREEK CONSTRUCTIONS	605
Tsikaloudaki, Katerina; Tsoka, Stella; Theodosiou, Theodore; Tsigigoti, Dimitra	

TECHNOLOGICAL SOLUTIONS FOR COVERING ARCHAEOLOGICAL SITES IN ORDER TO PRESENT MOSAICS IN SITU – CASE STUDIES	613
Ugrinović, Aleksandra; Krstić-Furundžić, Aleksandra	
THE RECONSTRUCTION OF TRADITIONAL PITCHED ROOF IN MOUNTAINOUS BUILDING	621
Wu Mengyang; Bachmann Bálint	
RETURN TO THE LOCALISM – TWO PROJECTS BASED ON LOCAL TRADITIONS	628
Zhang Qian; Hutter Ákos	
MEIXIAO VILLAGE YONGXING TOWN HAIKOU CITY PROTECTIVE RECONSTRUCTION DESIGN	635
Zhao Liangyu; Kertész András Tibor	
RELATIONSHIP BETWEEN URBAN REHABILITATION OF BUILT HERITAGE AND LOCAL INHABITANTS, CASE STUDY ON CHONGQING ROAD, TIANJIN	644
Zhao Tianyu; Gyergyák János	
LIVEABLE, MODULAR AND FLEXIBLE – NEW WAYS OF UPDATING AND UPGRADING POST WORLD WAR HOUSING ESTATES	652
Zoltán Erzsébet Szeréna; Gyergyák János	

INVESTMENT LOCATIONS MAPING: KIKINDA CITY CASE STUDY

Furundžić, Danilo S.¹

University of Belgrade, Faculty of Architecture, Bulevar Kralja Aleksandra No. 73, Belgrade, Serbia, dfurundzic@gmail.com

Furundžić, Božidar S.

CPM Consulting, Kneginje Zorke Street No. 80, Belgrade, Serbia, bfurundzic@gmail.com

Borko Lj, Drašković

Republic Geodetic Authority, Bulevar Vojvode Mišića 39, Belgrade, Serbia, pr@rgz.gov.rs

ABSTRACT

Investing is a prerequisite for construction and development in transitional country, such as Serbia. Foreign direct investment (FDI), which besides capital brings modern management and technology, is particularly important. Various regions and many cities are competing to attract investment, predominantly FDI, in Serbia these days. The City of Kikinda, located in the North Banat district, in Vojvodina- autonomous province of Serbia, participates in this match.

Landlocked Serbia, satisfactory linked with neighbouring countries, has free trade agreements and low operation costs. In addition, the Kikinda City, close to the borders with Romania and Hungary, has attractive greenfield and brownfield locations for investment. The City of Kikinda has assigned the Public Company "Kikinda" (PCK) to make a map of locations suitable for investment.

This paper presents: the Map of Locations for Investment in the City of Kikinda, named shortly: Kikinda Investment Map (KIM).

The PCK has gathered information from a large number of stakeholders, both public and private, and has analysed these data to make estimates and valuations regarding investment locations. The mapping is concentrated on both greenfield and brownfield locations.

The KIM displays 7 categories of locations, which are: infrastructure, industry, agriculture, administration, housing, culture, and tourism. Geographic data, urban parameters and planning documents are given for mapped investment locations in Kikinda.

The Republic Geodetic Authority of Serbia has, as a pilot project, incorporated the KIM into its system the National Geospatial Data Infrastructure (NGDI) and published it on the website (www.geosrbija.rs). Locations suitable for investment in the City of Kikinda are, with the help of the NIGP, pioneering published in the map of Serbia

Keywords: investment, locations, map, Kikinda, Serbia

¹Corresponding author

INTRODUCTION

International trade and foreign investment, as means to penetrate markets, has grown during the last decades. The creation of new states in Eastern Europe and their transition to market countries, followed by reduction in custom duties and availability of working force not expensive, explain the growth of trade and investment.

Investing is a prerequisite for construction and development in transitional country, such as Serbia. Foreign direct investment (FDI), which besides capital brings modern management and technology, is particularly important (Furundžić et al., 2017). Various regions and many cities are competing in Serbia these days to attract investment (SIEPA, 2015), predominantly FDI. The City of Kikinda (CK, 2018) participates in this match.

SERBIA INVESTMENT BENEFITS

The process of transition in Eastern Europe (EE) starts after the fall of the Berlin Wall (1989), when fundamental political and economic changes occurred at the same time. Multiparty political systems, with democratic institutions, replaced the communist system. The market becomes the principal mechanism for the distribution of resources, products and properties. The majority of EE states accesses gradually to the European Union (EU).

The transition of Serbia represents an unusual, complex, slow and delayed process. Causes of delay are internal (Yugoslavia decomposition, military conflicts) and external (international sanctions, NATO bombing). A satisfactory outcome of Serbia's transition requires legal harmonisation, innovative strategies (institutions, administration, agriculture, industry, research and development) and EU financial assistance (Furundžić et al., 2016b).

Landlocked Serbia is a small Balkan country surrounded by eight neighbour countries, four of them inside the European Union (EU). Serbia has a very good geographical position and mild climate. Thanks to motorways (Corridors X and XI) and the Danube River (Corridor VII) with its navigable tributaries (Sava, Tisa) Serbia is well connected with other countries (Furundžić et al., 2017).

Major sectors of Serbian economy are: agriculture, food, textile, automotive, construction, ICT, tourism (SIEPA, 2015). Agricultural products (livestock, crop, fruit) have good quality. The food industry is adequately developed. The textile industry has highly qualified workers and cooperates with the leading foreign garment brands. The Serbian automotive industry, with experienced workers, is in progress. Construction is focused on transport infrastructure and buildings in cities. Serbia is attractive spot for information and communication technology (ICT) industry. International tourism has important role in Serbia.

Serbia, as a gateway to East and West, tries to bring foreign companies and manufacturing industries into the country on the basis of its low wages, closeness to European markets and free trade status with both the EU and Russia.

Serbia has long-lasting links to the EU. Its member states are Serbia's main trading partners for exports and imports. Serbia becomes a candidate member state since in 2012 and begins accession talks. The EU has abolished all customs duties and quantitative restrictions on imports of almost all agricultural and industrial products.

Serbia has bilateral and multilateral Free Trade Agreements (FTA). Such contracts concluded are: Stabilisation and Association Agreement with EU, Central European Free Trade Agreement (CEFTA) with CEFTA countries, FTA with Russia, Belarus and Kazakhstan, FTA with European Free Trade Association (EFTA), and FTA with Turkey.

Operating costs In Serbia put together labour, utilities and taxes (Furundžić et al., 2017). Serbian workers are usually skilled and management speaks English. Office rents are competitive and prices of fuels and motor vehicles maintenance are low. Taxes (corporate, personal income) are reasonable.

There are many advantages to doing business in Serbia. Key factors to consider are Serbia’s focus on EU accession, access to significant markets through free trade agreements, and competitive operating costs.

KIKINDA CITY

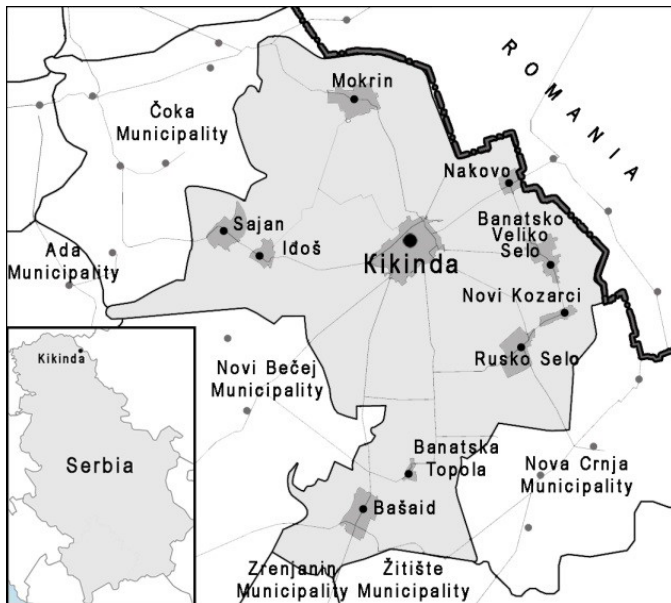


Figure 1: Kikinda Municipality (Kikinda City and 9 villages)

In Vojvodina- autonomous province of Serbia, in the Banat district, there is Kikinda Municipality (Figure 1), which contains the City of Kikinda and 9 villages in its surrounding (Furundžić et al., 2016b). Kikinda City, with population of circa 38000, is the economic and social centre of North Banat (Furundžić et al., 2017).

Kikinda is well planned city (Ilijašev, 2002), with wide streets orthogonally laid and urban infrastructure developed. The City of Kikinda is close to borders (Romanian and Hungarian) and 130 km from Belgrade. Regional roads connect Kikinda with adjacent towns and villages in Vojvodina. The city is connected by rail with the Romanian border, with Subotica, and with Belgrade via Zrenjanin. There is a dock for canal waterway industrial transport.

Banat's fertile farmland ensures successful agriculture (wheat, sunflower seeds, soybean, fruit and vegetables) and existence of natural raw materials (oil, gas, quality clay) provide the development of industry (oil derivate, metal tools, chemical products, tiles and bricks) in the 1980s, before Yugoslavia broke down (Furundžić et al., 2018a). Both agriculture and industry were devastated almost completely during the transition process which was long lasting and

not finished completely yet.

The present economy crisis, however, does not change opportunities for investment in Kikinda. Fertile land, natural raw materials, location near borders, road and rail connections, an urbanised town, existing infrastructure and agricultural and industrial traditions offer a favourable combination for investors (Furundžić et al., 2017).

The Municipality of Kikinda established the Public Company "Kikinda" (PCK) in 2015 with the aim that communal services become more efficient, cheaper and better (Furundžić et al., 2016b). The PCK integrated activities of five previous public companies.

Kikinda has a tradition in industry since the middle of the 19th century and Kikinda's economy has been export-oriented towards Western Europe for decades (KIP, 2018).

KIKINDA INVESTMENT MAP (KIM)

A large-scale map of a city displaying locations in urban space attractive for greenfield or brownfield building venture is, in this paper, called a city investment map. The graphic representation of space objects on a city investment map is therefore simplified, and reduced to common symbols. If investment maps of different cities are available, potential investors can easily compare locations offered and search for the best.

The City of Kikinda assigns the Public Company "Kikinda" (PCK) to develop a map of locations suitable for investment. The PCK engineering department team engages in the project of investment map developing.

The PCK team has collected information from a large number of stakeholders, both public and private. The team has analysed data collected with aim to estimate and evaluate investment locations convenience. Research of investment locations has covered nine villages around Kikinda as well.

After locations selection, mapping starts. The street map of Kikinda is used as a background map for presenting attractive greenfield and brownfield locations in Kikinda. For villages surrounding Kikinda, available local maps are used for investment locations presentation.

Seven categories of locations selected are: (1) infrastructure, (2) industry, (3) agriculture, (4) administration, (5) housing, (6) culture, and (7) tourism. Location for (2) industry can be: greenfield, brownfield, greenfield (dominant) & brownfield, or brownfield (dominant) and greenfield. Every category of location is marked by different colour in the street map and in the legend of map.

The map of locations attractive for investment in the City of Kikinda, named shortly: Kikinda Investment Map (KIM), is developed by the PCK. The developed KIM, but without names of streets and location categories, is presented in Figure 2. Names are omitted in this paper because of figure size limited. The legend of the KIM is presented in Figure 3.

The PCK has developed investment map not only for Kikinda City, but also for nine surrounding villages. In this paper, however, investment map of the Kikinda City is considered only, because investment maps of villages are very small and simple.

For the mapped investment locations in Kikinda (Figure 2 and Figure 3), the PCK develops information base with spatial data, urban parameters and planning documents available on demand.

At the present time Kikinda offers greenfield and brownfield investment locations, which are private propriety or propriety of the Municipality of Kikinda (Furundžić et al., 2017). The Public Company "Kikinda" has detail list of locations attractive for investments.

In Kikinda, for example, greenfield locations are: New industrial zone "Rasadnik", New industrial

zone – subzones 1 and 4, Sports complex “Jezero” and Old lake, Former military camp; brownfield locations are: Company “Graditelj”, “Banini 1”, “Gigraphix”, “Univerexport”, Meat industry “PIK”, Factory “Prima product”, Car service (KIP, 2018).

The Kikinda investment Map (KIM) presentation is awarded with the Recognition of 27th International Urban Planning Exhibition in Ruma (Furundžić, Vujović, 2018b).

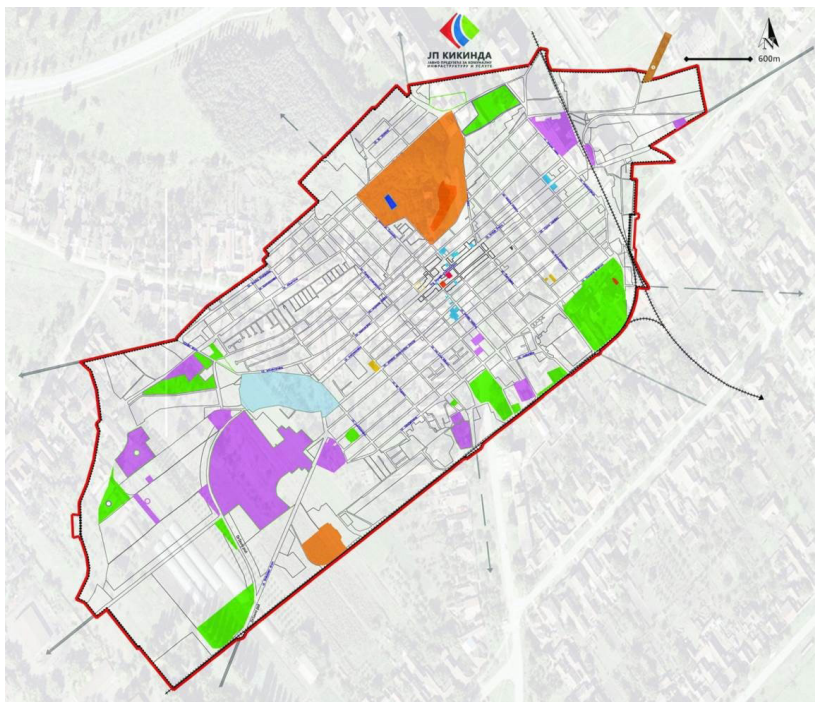


Figure 2: Kikinda Investment Map (KIM)

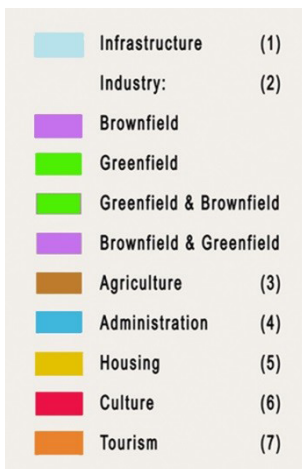


Figure 3: Legend of Figure 2

ORTHOPHOTO PRESENTATION OF KIKINDA INVESTMENT MAP

The Republic Geodetic Authority (RGA) of Serbia performs professional and administrative works relating to geodesy, such as surveying, mapping, and cadastre recording (RGZ, 2018). The RGA work refers to state survey, basic geodetic works, topographic mapping, real estate cadastre, utility cadastre, cadastral public information system, address registry, property valuation, national spatial data infrastructure, and geodetic works in engineering.

Spatial Data (SD), also known as geospatial data, is data about a physical object that can be numerically represented and mapped. Data about objects in the spatial universe include identity, location, shape and orientation, and other information. Range of objects is wide – terrain, infrastructure, roads, buildings, property lines, hydrology, ecosystems. All objects can be described in terms of point, lines, and polygons. Geographical data are spatial data. Geographic Information System (GIS) is a system designed to capture, store, manipulate, analyse, manage, and present all types of geographical data, namely spatial data.

Orthophoto, or orthophotograph, is a uniform-scale photograph which represents accurately the Earth's surface. Consequently, an orthophoto is a photographic map. Unlike an uncorrected aerial photograph, it is possible to measure true distances directly on orthophoto like on other maps. An orthophoto may serve as a base map onto which other map information can be overlaid.

The European Union (EU) delivered directive on establishing the “Infrastructure for SPatial InfoRmation in the European Community” – denoted with acronym: INSPIRE. The Spatial Data Infrastructure (SDI) represents establishing conditions for exchange, access and use of spatial data across various levels of state administration and throughout various sectors (INSPIRE, 2007). The Republic of Serbia (RS) started creating national SDI within the RGA.

The RGA established the Centre for Geospatial Data Management (CGDM) with section for the National Spatial Data Infrastructure (NSDI). The NSDI has developed new portal GeoSrbija (www.geosrbija.rs), which brings together all spatial data at the state level.

The RGA has merged the Kikinda Investment Map (KIM), received from the Public Company Kikinda (PCK), into its orthophoto map of Kikinda district.

As a pilot project, the RGA has incorporated the orthophoto presentation of KIM into its system the National Geospatial Data Infrastructure (NIGP) and has issued it on the website (www.geosrbija.rs). Locations suitable for investment in the City of Kikinda are, with the NIGP help, published pioneering in the map of Serbia.

The orthophoto presentation of Kikinda Investment Map (Figure 4) and this map legend (Figure 6) are given. Note that colours of investment locations categories in orthophoto map (Figure 4) and its legend (Figure 6) are slightly different than in the background map (KIM, Figure 2) and its legend (Figure 3). Also note that the investment locations categories names omitted in the KIM (Figure 2) are not omitted in the orthophoto KIM (Figure 4).

Using the NIGP website (www.geosrbija.rs), from the orthophoto KIM (Figure 4) Kikinda investment locations separated (Figure 5), having the same legend (Figure 6), can be derived. Plan (Figure 5) of separated investment locations presents their space distribution in the City of Kikinda.



Figure 4: Orthophoto presentation of Kikinda Investment Map



Figure 5: Kikinda investment locations separated



Figure 6: Legend of Figures 4 & 5

CONCLUSIONS

For the City of Kikinda building opportunities promotion, the Public Company "Kikinda" has innovatively developed Kikinda Investment Map (KIM) and donated this map to Republic Geodetic Authority (RGA) of Serbia. The RGA has merged the KIM into its orthophoto map of Kikinda district.

The RGA has, as a pilot project, incorporated this orthophoto presentation of the KIM into its system the National Geospatial Data Infrastructure (NIGP) and issued it on the website (www.geosrbija.rs). Locations suitable for investment in the City of Kikinda are, with the NIGP help, published newly in the map of Serbia.

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REFERENCES

- CK. (2018). "City of Kikinda – Invest in Kikinda." <<http://www.klerkikinda.rs/index.php?lang=eng>> (Accessed: Jan. 4, 2019)
- Furundžić, D.S., Ivaniš, D., Furundžić, B.S. (2016a). "Integrated Communal Company Organization Case". (In Serbian). In: Bešević, M., ed., 4th International Conference Contemporary Achievements in Civil Engineering, Conference Proceedings, Subotica: Faculty of Civil Engineering, pp. 779-784.
- Furundžić, D.S., Jakšić-Kiurski, D., Petrović, I. (2016b). "Communal Companies Merging as Smart Approach: Kikinda Town in Serbia Case Study". In: Schrenk, M., et al, REAL CORP 2016 – Proceedings of 21st International Conference on Urban Planning, Regional Development and Information Society, Schwechat: CORP, pp. 161-170.
- Furundžić, D.S., Furundžić, B.S., Vujović, V., Ivaniš, D. (2017). "Investment opportunities in Serbia: Kikinda case study". In: Bijedić, Dž., et al, eds., International Academic Conference – Places and Technologies 2017, Book of Conference Proceedings, Sarajevo: Arhitektonski fakultet, pp. 57-67.
- Furundžić, D.S., Furundžić, B.S., Ivaniš, D.; Jakšić-Kiurski, D., Petrović, I. (2018a). "Rural Revival Financing in Serbia: Kikinda Municipality Case Study". In: Schrenk, M., et al, REAL CORP 2018 – Proceedings of 23rd International Conference on Urban Planning, Regional Development and Information Society, Schwechat: CORP, pp.369-378.
- Furundžić, D.S., Vujović, V.A. (2018b). "Kikinda Investment Map". In: Marićević, J., ed., 27th International Urban Planning Exhibition, Ruma, Serbian Town Planners' Association, Catalogue, p.05.06. (The Map is awarded with the Recognition of exhibition.)
- Ilijašev, B. (2002). Kikinda, vekovi prolaze – grad ostaje. [Kikinda, Centuries Pass – Town Remain.] Kikinda: Istorijski arhiv.
- INSPIRE. (2007). <<https://inspire.ec.europa.eu/documents/directive-20072ec-european-parliament-and-council-14-march-2007-establishing>> (Accessed: Jan. 4, 2019)
- JPK. (2018). "Javno preduzeće Kikinda". <<http://www.klerkikinda.rs/index.php?lang=eng>> (Accessed: Jan. 4, 2019)
- KIP. (2018). "Kikinda Investment Potentials". <<http://www.klerkikinda.rs/>> (Accessed: Jan. 4, 2019)
- RGZ. (2018). "Republički geodetski zavod". <<http://www.rgz.gov.rs/>> (Accessed: Jan. 4, 2019)
- SIEPA. (2015). "Invest in Serbia Info Pack". Belgrade: Serbia Investment and Export Agency.