Belgrade 16 - 17. May

ODRŽIVO URBANO I SAOBRAĆAJNO PLANIRANJE

međunarodna konferencija

international conference

SUSTAINABLE & TANSPORT PLANNING

UNITED NATIONS DEVELOPMENT PROGRAMME SERBIA & BELGRADE LAND DEVELOPMENT PUBLIC AGENCY,
with support of the Ministry of Energy, Development and Environmental Protection

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SIEMENS d.o.o. recognized the importance of the topics of the conference and the significance of involving the academic society and the students in these processes. Siemens, as a friend of the Conference is providing sponsorship to the students' competition in awarding the best team on the competition. A group of maximum four students will visit London and the Crystal palace of Siemens for couple of days during October 2013.

CONTENTS

SUSTAINABLE URBAN &TRANSPORT PLANNING
International Conference
UTP 2013
Belgrade 16-17 May
Međunarodna konferencija
ODRŽIVO URBANO I SAOBRAĆAJNO PLANIRANJE

SUSTAINABLE URBAN DEVELOPMENT & CONCEPT OF MOBILITY MANAGEMENT IN BELGRADE

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ABSTRACT

Urban mobility and accessibility represent major challenging issues in the functioning of the city of Belgrade, both for the city government as well as for the residents. (In) efficiency of transport systems and street network; decreased mobility and traffic congestion followed with air pollution; limited accessibility and/or dependency on car to certain urban areas especially to sprawling informal settlements at the fringe of Belgrade; spent time, effort, price and lack of comfort that many people experience on a daily bases while commuting from home to school, work, health centers, shopping malls, stores and vice verse; questionable land use still planned with traditional formal sector planning; lack of parking or park-and-ride options, as well as lack of information on mobility options, call together toward complex conception of new adaptive planning, governance and management approaches to sustainable urban development and mobility in an integrated way.

Good transportation system and high quality urban environment in the 21st century means choice: quality public transport; safe bicycle traffic; encouraged walking options and pedestrian routes; and good public spaces and place to live in the city where driving a car is a choice and not a necessity. This paper will present contemporary theoretical and practical European approaches in the field of sustainable urban development and mobility management and their applicability to Serbian context trough several case studies from Belgrade as well as achieved results so far, with recommendations for further research, especially for the role of urban planners, urban managers and architects.

Keywords: sustainable development, planning, governance, management, mobility

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ODRŽIVI URBANI RAZVOJ I KONCEPT MENADŽMENTA MOBILNOSTI U BEOGRADU

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APSTRAKT

Urbana mobilnost i dostupnost predstavljaju glavne izazove u funkcionisanju Beograda, kako za gradske vlasti tako i za njegove stanovnike. (Ne) efikasnost saobraćajnog sistema i ulične mreže, smanjena mobilnost i saobraćajne gužve praćene zagađenjem vazduha; ograničena dostupnost i / ili zavisnost od automobila određenim gradskim delovima, posebno rastućim neformalnim naseljima na rubu Beograda; potrošeno vreme, napor, cena i manjak komfora koje mnogi ljudi doživljavaju svakodnevno na putovanjima od kuće do škole, posla, zdravstvenih centara, tržnih centara, prodavnica i na putovanjima od njih; diskutabiln način korišćenja zemljišta planiran kroz formalne tradicionalne sektore planiranja; manjak mesta za parkiranje ili opcije 'parkiraj i vozi' (se javnim prevozom), kao i nedostatak informacija o mogućnostima kretanja, svi zajedno zahtevaju složen koncept novih prilagodljivih pristupa planiranju, upravljanju i menadžmentu održivog urbanog razvoja i mobilnosti na integrisan način.

Dobar saobraćajni sistem i visok kvalitet urbane sredine u 21. veku znači izbor: kvalitetan javni prevoz; bezbedan biciklistički saobraćaj; podsticanje opcija za pešačenje i pešačke rute; i dobar javni prostor i mesto za život u gradu gde je vožnja automobila izbor, a ne nužnost. Ovaj rad će predstaviti savremene teorijske i praktične evropske pristupe u oblasti održivog urbanog razvoja i menadžmenta mobilnosti i njihovu primenljivost u kontekstu Srbije kroz nekoliko studija slučaja iz Beograda kao i postignute rezultate do sada, sa preporukama za dalja istraživanja posebno za ulogu urbanih planera, urbanih menadžera i arhitekata.

Ključne reči: održivi razvoj, planiranje, upravljanje, menadžment, mobilnost

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Works at the Faculty of Architecture in Belgrade Department of Urbanism from 2009 as Assistant Professor and as assistant from 1999 when he graduated. He got MA in Urban Management and Development in 2005 at IHS, Erasmus University Rotterdam. In 2011 he spent semester teaching at the School of Urban and Regional Planning, University of Iowa. He is a member of the Presidency of Serbian Town Planners Association from 2008.

He is author of scientific studies on urban development and planning in books, journals, and conferences of national and international importance. He has participated in international and national scientific research projects funded by the EU FP6 PARAMOUNT, Serbian Ministry of Science, and consultant of UN-Habitat and GIZ in Serbia. He has won ten awards in urban planning and architecture at international and national competitions and exhibitions. He is the author of several urban master and regional plans and architectural projects.

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Aleksandra Đorđević graduated with a Bachelor degree at the Faculty of Architecture University of Belgrade in 2012. She is currently enrolled at two Masters – Integral Urbanism and Architecture, both on the Faculty of Architecture in Belgrade. During studies she showed great interest in the field of Urbanism and works as a student demonstrator with Assistant Professor Uroš Radosavljević from 2012. Along with colleagues she has participated in several student competitions including the ‘Schindler Award 2012’; ‘Novosti’ award; and, ‘Garden Cities for Tomorrow’ organized by IFHP and chosen for the finalist, etc. During studies she went to professional excursions to Milano, Bern, Amsterdam, Berlin etc. She also took part in international workshop ‘The legacy of conflict in the built environment’, organized by Faculty of Architecture in Belgrade in collaboration with Oxford Brookes University.

SUSTAINABLE URBAN DEVELOPMENT & CONCEPT OF MOBILITY MANAGEMENT IN BELGRADE

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INTRODUCTION

The Challenges of Urban Development

Current challenges of urbanization, demographic changes and migration to more developed countries and thus to urban areas; climate change and impacts it has on human and natural settlements and life; economic and technological transformation of our societies; and growing social differences and inequality around the Globe calls for strategic responses and different approach in the organization of our: every day life, space and time.

The growth of urban regions is fueled by the process of urbanization and economic growth in the vicious circle, usually by enlarging urban territory with the demand for new quality housing, jobs, shopping centers, recreational areas, public facilities and so on. The transport sector plays an important role, enabling those processes by facilitating movement of goods and people and improving accessibility to them. With the urban territorial expansion in radial directions and at the urban fringe, transport and dispersed land allocation with low density development have enormous direct impact on land resources and consumption of energy, both for transport needs in terms of distances traveled, mainly done with the high usage of the private car and with high costs for infrastructure and energy needed for maintenance of desired quality of life. Such development has also high economic, environmental, and social impacts and costs in terms of traffic congestion and time spent commuting; air, land, and water pollution; health conditions and even obesity among population; decreased or no accessibility for particular social groups, namely the poor and low income, just to mention several.

Need for Change in Behavior as a Response to the Challenges

This growth possesses considerable planning, governance, and management challenges for the variety of urban sectors, such as housing, sanitation, water, and transportation. Previous urban planning experience in many countries has proved that the common practice and urban design solutions have a negative impact on overall energy consumption shown above, and existing planning methodology make it difficult to identify and locate resources and capacity for sustainable urban development, climate change mitigation and adaptation measures, and sustainable transport within it. At the same time, many cities around the world and increasing number of citizens and government officials began advocating a smarter approach to land use planning, which should include: a compact community development and urban groups, more transportation choices through increased accessibility and inter-modality in cities, mixed land use, and the preservation and expansion of green and agricultural land (Lalović, Živković and Radosavljević, 2011). This approach achieves a more ecological, economic, and social benefits that contribute to the quality of life in cities, and at the same time serves for the reduction of energy consumption and greenhouse gas emissions.

Approaches have been developed, such as 'New Urbanism' and 'Transit-Oriented Development', which seek to reduce travel distance, especially with regard to private vehicles on one hand, and on the other, encourage public transport or transit, walking and cycling, planning of medium density housing, mixed land use and concentration of residential areas within walking distance to town centers and transport nodes. Banister (2008, p.73) stands on the point that sustainable mobility can provide an alternative paradigm for the investigation of the complexity of cities, and strengthening links between land use and transport. Transport planning and land use are challenged to provide solutions to minimize congestion and make transportation in urban areas more efficient, safer and environmentally friendlier, improving the living and working conditions within the cities, as well as, enhancing social and economic growth. The question is how this change can be achieved?

Integral Approach

In the following sections, we offer a brief discussion on the contemporary discussion on the mobility shift towards sustainable urban development, in order to highlight the ever-changing phenomenon of dynamic urban systems and its interrelation to the mobility patterns of citizens, be it families, companies, or government responses and briefly introduce concepts of implementing policies on sustainable mobility, particularly on mobility management and travel awareness that are already widely used in Europe and lately in the US. Although the concepts of sustainable mobility are not new, in Serbian context they are not widely known, even though there are some examples of fragmented actions by city governments and private companies, which can bring the significant behavioral change of all stakeholders. We will present some of Belgrade's urban development and mobility problems and their roots and show promising specific cases, which at the end, if used in future urban sustainable mobility plan of Belgrade and bigger Serbian cities, can lead the path as tested and accepted good examples. We will draw conclusions for key elements in promoting the public acceptability of sustainable mobility.

MOBILITY SHIFT TOWARDS SUSTAINABLE URBAN DEVELOPMENT

We have shown in previous section that some of today's most significant problems, including urban sprawl, traffic congestion, and climate change, are calling to turn to land planning and urban design to restraint from automobile use. Many have concluded that roads cannot be built fast enough to keep up with rising travel demand induced by the road building itself and the sprawl it generates (Ewing & Cervero, 2010).

In the respect of governance of urban areas, cities will have to choose which path to take, since unmitigated level of support for all transport modes and infrastructure will soon become impossible (Hyatt, 2006. p.6). Urban or regional governments will have *predominantly* to adopt one of two approaches for urban development related to transport: *provide more supply* or *reduce demand*. By *providing supply*, we mean developing, investing, and building more of transport infrastructure in an attempt to meet the demands of a rapidly growing personal motorized transport. By *reducing demand*, we consider reorganization, redesign, and planning of policy measures to modify the trend of an ever-faster growth of car use and other personal motorized vehicular traffic. When we say *predominantly*, we are not excluding the other option, but rather putting it in the integral function of the other one.

Good transportation system and high quality urban environment in the 21st century means choice: quality public transport; safe bicycle traffic; encouraged walking options and pedestrian routes; and good public spaces and place to live in the city where driving a car is a choice and not a necessity. Parker and Fields (2012, p.8) states that in order "to create an urban environment in which people can make rational choices between driving, biking, walking, carpooling, and using public transportation requires that these modes of transportation be efficient and intuitive to use". Those modes need to be 'priced to sell' on an equal footing between all modes and that different options should account both for the personal preferences and for the community's sustainability. In that respect, urban planners need to offer a mixture of policies, physical design, and push and pool measures such as incentives, and disincentives.

Adapting Banister's (2008, p.75) main approaches for the sustainable mobility actions, we can summarize policy options that urban and regional governments have in following:

1) **Reducing the need to travel and having less trips** – due to the substitution principle emerging in our every day life thanks to the technology and the use of ICT, for example like mobile working at home or Internet shopping with a greater opportunity for flexibility in travel patterns and travel time. On the other hand, the growing importance of electronic transactions does not imply the disappearance of shopping centers and retail stores as Castells (2010, p.427) would argue, with the trend being opposite: for instance, shopping grow around the urban fringe, with showrooms that address customers to on-line ordering terminals to get the actual goods, often home-delivered. In that way, some activities are substituted, but others, like shopping, are generated, and some replaced by fewer longer distance journeys.

2) **Transport policy measures and encouraging modal shift** – transport policy measures can reduce levels of car use through the promotion of walk and cycle and different approach in the shift from the traditional transport planning towards contemporary sustainable mobility (Table 1). Tools that are available to transport and urban planners in an integrated way are slowing down urban traffic, reallocating space to public transport, and parking management, in an integral approach with measures for easier use of public transport. The change that urban transport planners together with urban planners will have to adopt is the conception of streets as vibrant urban public spaces for people and non-motorized traffic, shared with vehicular traffic, and not considered and designed dominantly as roads for cars and buses.

3) **Urban land-use policy measures** trough the **distance reduction** and trip lengths – two dominant factors in transportation planning are land use and distance, and when mixed land uses and short distances meet, people will have viable opportunities to live, work, and play without relying on an automobile (Parker and Fields 2012, p.8). Ewing and Cervero (2010, p.267) conducted a meta-analysis of the built environment / travel literature and formed 'D' variables as measures of the built environment in relation to transport: density, diversity, and design, followed by destination accessibility and distance to transit. Mixed use development and concentration of central activities; mid and high densities of population and jobs; business and housing location; urban design of buildings, spaces and route layouts; public transport oriented development; car-free development; proximity and good accessibility of services and facilities can all be used as urban planning tools combined with transport.

4) **Encouraging greater efficiency in the transport system and technological innovation** – most of the proposals for reducing CO2 emissions are related to energy consumption reduction and transition to cleaner and non-fossil energy sources, such as increasing fuel efficiency for cars, individual lifestyle behavioral changes (Echenique et al. 2012, p.136) for reducing consumption and changing transportation habits from the automobile to public transport. Urban planning and transport measures can be taken to restrict access to certain parts of the city for vehicles not environmentally clean.

Concluding from above what should be done for the sustainable mobility to emerge in terms of governance of urban sustainable development, the question arises how things should be done to manage territorial development in a sustainable manner: with what resources (institutions and actors), with and by whom (people, institutional arrangements and partnerships), how (mechanisms and tools), and at what time innovative approaches can be found? This brings our focus to the conception of mobility management and travel awareness for the behavioral change to take place, both for general public and for decision makers that we will show on the example of the City of Belgrade.

The conventional approach – transport planning and engineering	**An alternative approach – sustainable mobility**
Physical dimensions	Social dimensions
Mobility	Accessibility
Traffic focus, particularly on the car	People focus, either in/on a vehicle or on foot
Large in scale	Local in scale
Street as a road	Street as a space
Motorized transport	All modes of transport often in a hierarchy with pedestrian and cyclist at the top and car users at the bottom
Forecasting traffic	Visioning on cities
Modeling approaches	Scenario development and modeling
Economic evaluation	Multi-criteria analysis to take account of environmental and social concerns
Travel as a derived demand	Travel as valued activity and as derived demand
Demand based	Management based
Speeding up traffic	Slowing movement down
Travel time minimization	Reasonable travel times and travel time reliability
Segregation of people and traffic	Integration of people and traffic

Table 1: Shift from transport planning towards sustainable mobility. *Source:* Banister (2008)

URBAN DEVELOPMENT AND ACTIONS ON MOBILITY IN BELGRADE

Urban mobility and accessibility represent major challenging issues in the functioning of the city of Belgrade, both for the city government as well as for the residents. (In) efficiency of transport systems and street network; decreased mobility and traffic congestion with air pollution; limited accessibility and/or dependency on car to certain urban areas especially to sprawling informal settlements at the fringe of Belgrade; spent time, effort, price and lack of comfort that many people experience on a daily bases while commuting from home to school, work, health centers, shopping malls, stores and vice verse; questionable land use still planned with traditional formal sector planning; lack of parking or park-and-ride options, as well as lack of information on mobility options, call together toward complex conception of new adaptive planning, governance and management approaches to sustainable urban development and mobility in an integrated way.

Roots of such urban development can be traced from 1945 with enhanced processes of industrialization, and strong urbanization. This processes produced an urgent need to accommodate a big number of migrants within urban region of Belgrade. In such a way, initial part of New Belgrade was built efficiently in only couple of years, as mono-functional area of housing and basic commercial and recreational facilities. In 1960s and 1970s, processes of suburbanization started to occur, with urban policies for satellite towns at the fringe of cities, together with the increase in car ownership and enhanced quality of life found outside congested inner city. Large-scale developments in inner city were not present anymore, since there was not an urgent need to accommodate the influx of workers or migrants at a particular point in time. The period of transition, in the beginning of 1990s, was the period of artificial deregulation of the market. This period had significant socioeconomic and physical impact on Belgrade, accompanied with lack of housing, urban sprawl often occupying agricultural land, thus forming a specific ring around urban building land, followed by traffic congestion and spatial concentration of growing business and commercial activities in a relatively small inner city. At the end of 1990s, mono-centric development of Belgrade and a high concentration of jobs in the central zone in the city of Belgrade, with a tendency to divert part of the concentration to New Belgrade along with the dispersion of the main residential zones in the peripheral areas of the city produced heavy traffic intensity in radial directions. During rush hours, inadequate and poorly developed street network produced traffic congestion, especially on bridges and major arterial access roads to city center. Without a ring and inner ring road, local traffic partially interfere with the flow of public transport and freight traffic, which produce an increase of noise and air pollution in the city core. Finally, with democratic elections at the beginning of new millennium, the city government incrementally started to fix and reconstruct existing and eventually plan and build new transport infrastructure. Polycentric development of Belgrade emerged in the form of new Central Business Districts (CBD), mainly in New Belgrade, and construction of outer and inner ring roads with business and commercial activities, thus generating mostly automobile traffic.

CASE STUDIES ILLUSTRATING MOBILITY SHIFT IN THE CITY OF BELGRADE

To illustrate the potential shift from the traditional transport planning towards an alternative approach of the sustainable mobility in Serbia we will present some of the examples on mobility management and travel awareness, and parking management from the city of Belgrade. We have researched those topics for last nine years[1]. We will show achieved results so far and draw some conclusions and their applicability to Serbian context.

Several projects, measures and campaigns to encourage a change of attitude and behavior towards greater use of sustainable transport modes, like parking management in combination with public transport, walking, cycling and intermodal combinations have been launched in Belgrade from 2000s. Usually, initiative in promoting and implementing sustainable mobility measures came from public sector of Belgrade and its departments, particularly Secretariat for Transport, public utility companies like Parking Service and Urban Public Transport Enterprise Belgrade, and Belgrade Land Development Public Agency.

Possibilities for cycling as a mode of transport

Although cycling is used today mainly for recreational purposes in Belgrade along the Sava and Danube river, several projects were done, especially in the flat area of New Belgrade to use bicycles for commuting as well. Those projects were the development of new and the expansion of existing bicycle network in New Belgrade and around Ada Lake with more then 60 km of network today. Municipality of New Belgrade has started in 2007 together with Belgrade Land Development Public Agency project for development of cycling tracks with the total length of 50 km. However, a number of users were complaining since the bike tracks in New Belgrade are usually 1 m wide, and there is not enough space for safe overtaking. We have researched trough interviews with car drivers (FABU, 2007), that many of them would be interested in cycling if there are better equipped and arranged cycling tracks with higher safety level and if both all the participants in traffic - namely car drivers and pedestrians are more disciplined.

Another project done by Belgrade's City Government and Parking Servis from 2004 till 2007 was installing of more then 150 bicycle racks near transit stops, public buildings, commercial centers and recreational areas to improve conditions for the use of a bicycle, especially in the old part of town of Belgrade (Lalović, 2011). The preference was that bicycle racks are located near meeting points and always near public transport stops to ensure link with other parts of town, and to prevent their theft. Unfortunately, many of these bike racks are empty, beside the ones in recreational areas.

For the successful development of biking as a transport mode, especially in the old part of Belgrade, other factors beside bicycle infrastructure should include, traffic culture of all users specifically for possibilities of biking in shared street space with public transport and/or cars; supporting mobility management measures, such as car traffic speed reduction measures, possibility of loading bicycles on public transport vehicles; support of home to school traffic and home to work traffic; educational and promotional campaigns in schools both for children and especially for parents; and so on.

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[1] Research was done trough the FP6 EU funded project 'Sustainable Surface Transport' from 2006 - 2010 in which the Faculty of Architecture Belgrade University participated as one of the partners with Ass. Professor Lalović and Ass. Professor Radosavljević as coordinators; on the course ''Mobility in City'' at the Faculty of Architecture Belgrade University designed by Ass. Professor Lalović and Ass. Professor Radosavljević from 2007 till today; and within Serbian Scientific Project "Spatial, Environmental, Energy and Social Aspects of Developing Settlements and Climate Change – mutual impacts" from 2011 lasting in 2014.

Parking management and relation to public transport

With the rise of living standard and car ownership and use, problems of urban development described previously, especially mono-centric development, relatively small CBD, and low quality of public transport, residents and car commuters were struggling to park their vehicles in downtown Belgrade. The City initiated several measures to solve overwhelming problems both in supply of new parking facilities and as new regulations for on-street parking.

Beside existing public off-street and car-park garages, Parking Service introduced zonal parking system for three zones with time limitations of one, two or three hours in downtown of Belgrade in 2003 with payment possibilities by parking automates, tickets, and SMS by mobile devices for commuters (Mićević, 2008). Residents or companies could apply for limited number of monthly tickets. The number of 22.000 parking spaces is now available, from the original 11. 000. Paid parking zones without a time limit was introduced within areas with lower traffic frequency in New Belgrade and Zemun, although the demand for parking has risen in New Belgrade with the formation of new business and commercial district, and ones make it difficult to park a car even there today. Although the main goal was to solve the problem of insufficient and unregulated / illegal parking in downtown which was mostly achieved; encouraging shorter stay of commuters; modal shift of commuters to public transport, which was done with questionable results, since stubborn car drivers move their vehicles to other zone after time extent in one; beside greater occupancy of single parking place, and thus higher budget income; grater expectations of car drivers for probability of finding parking place have brought several negative externalities.

First, exactly due to the expectations mentioned, better supply of zoned parking and free parking outside the zones, drivers are encouraged to circulate in search of available parking producing congestion and air pollution for residents, without paying the price for it. Second, with the extension of paid zones, and further plans to extend the supply of additional 20 underground garages in the downtown of Belgrade, shift to more sustainable modes, especially public transport, biking and walking will not be encouraged. On the other hand, without proper alternative in terms of quality and supply of sustainable modes, city government cannot reduce the provision of parking in city centre, both for commuters and residents. City can gradually start to control the demand, and restrict the supply, both trough hard and soft policy measures when developing parking policy in Belgrade. Some of those policy options could be: park and ride options at the outer and inner ring roads locations with connections to public transport; greater differentiation of parking tariffs in paid zones; parking and park and ride information for commuters; parking management at large business districts and during city events; and even reconsider parking standards for new developments moving from minimum to maximum standards, especially in the downtown area.

Initiating sustainable modes: Park & Ride

There were several other measures introduced as the nucleus of Park & Ride, some like pilot projects, and some like temporary solutions. Fast Parks with two floors were installed on several downtown and recreational locations, and the one at Ada Lake served as an option for car park and additional shuttles or free of charge public transport during Belgrade Fair exhibitions (Radosavljević, 2009a). The “Park and Ride” pilot project was launched in 2004 using existing parking lots next to the former hotel “Intercontinental” in New Belgrade and new public transport bus line was added for the transit of car drivers to the congested city centre. Since the service was free of charge at the beginning, it seemed that many people were interested. When after few months charges were introduced, citizens interest heavily decreased. They replied that their comfort is more important, although the price of parking and transit was charged ~ 0,4 euro. The empty busses were operating and the project has been aborted.

CONCLUSION

We have seen both from the conceptual framework of this paper and from the case of Belgrade that if the city wants to develop a sustainable mobility approach it should try to understand the spatial and transport behavior of companies and residents and their need for mobility and accessibility before trying to influence them.

Main policy options for the city of Belgrade towards future sustainable urban development and mobility should be put on the top of the political agenda: whether to *predominantly*: *provide more supply* in developing, investing, and building more of transport infrastructure in an attempt to meet the demands of personal motorized transport or *reduce demand* trough reorganization, redesign, and planning of policy measures to modify the trend of a car oriented society.

Integral approach between sectors should be used for examining policy options in transport itself and related to land use polices. Also, proper alternatives for the modal shift from driving towards sustainable modes must be available both on the citywide and micro residential level, before reducing supply of car oriented options, for instance car parking availability in downtown area.

Controversial policies should be adopted gradually in stages (Banister, 2008, p.78), especially if there is a strong opposition from car drivers for reducing parking; shop owners worrying to lose costumers, and so on. Generally in Serbia, and particularly in Belgrade, this incremental process should go in steps, since during the Serbia's accession to the EU we are adopting most of the European legislation looking to the newest cases, and Europeans have adopted certain laws and policies in a course of time, first testing them and gradually informing, including and preparing urban population for certain policies and measures.

This should be done outside the existing technical knowledge of urban and transport planers in a much wider political and social arena: trough the active involvement of different stakeholders in a participatory process that would allow communication among them and understanding of policy options and specific measures in order to: develop their understanding; search for their values and preferences; include those preferences if possible; and, eventually get their support. For those tasks, urban and transport planners, urban managers and architects should act as facilitators of the process and their new education skills should include managerial techniques and methods, as well as new forms of communication, such as easy understandable policy options, visually clear maps and drawings, common or expert language depending on the target group, like children and elderly, just to mention few.

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Main References:

Banister, D., 2008. The sustainable mobility paradigm. *Transport Policy,* 15 (2), pp. 73-80.

Berg, L. V. D.,1987. *Urban Systems in a Dynamic Society*. Aldershot: Gower.

Castells, M. 2010. *The Rise of the Network Society*. Second edition with a new preface. The Information Age: Economy, Society and Culture, Vol. I. Oxford: Wiley-Blackwell.

Ewing, R., and Cervero, R., 2010. Travel and the Built Environment. *Journal of the American Planning Association*, 76 (3), pp. 265-294.

Echenique, M., H., Hargreaves A., J., Mitchell, G., and Namdeo, A. 2012. Growing Cities Sustainably. *Journal of the American Planning Association*, 78 (2), pp. 121-137.

FABU Faculty of Architecture Belgrade University, 2007. *Cycling tracks development project - Belgrade (Serbia)*. [online] ELTIS The Urban Mobility Portal, Available at: <http://www.eltis.org>. [Accessed 19 March 2013].

Hyatt, J. ed., 2006. *Sustainable Mobility Guide for Municipalities*. Budapest: Hungarian Young Greens.

Lalović, K., 2011. *Bicycle storage facilities near public transport stops and places of meeting points, Belgrade (Serbia)*. [online] ELTIS The Urban Mobility Portal. Available at: <http://www.eltis.org> [Accessed 19 March 2013].

Lalović, K., Živković, J., and Radosavljević, U. 2011. Urban Governance Challenges in Planning and Implementation of Climate Change Adaptation and Mitigation Measures. *Proceedings of the scientific international conference: Architecture & Urban Planning-Civil Engineering-Geodesy /Past, Present, Future*. Banja Luka, pp. 2333-2345, ISBN 978-99955-667-60.

Mićević N., 2008 (updated 2012). *Parking management in Belgrade, Serbia*. [online] ELTIS The Urban Mobility Portal. Available at: <http://www.eltis.org> [Accessed 19 March 2013].

PARKING SERVIS, 2013. *New underground garages*. [online] Available at: <http://www.parking-servis.co.rs>. [Accessed 19 March 2013].

Parker, H. and Fields D., 2012. Campus Controls. *Planning,* February 2012. pp. 7-11.

Radosavljević, U. 2009a. *"FAST PARK" in Belgrade.* [online] ELTIS The Urban Mobility Portal. Available at: <http://www.eltis.org>. [Accessed 19 March 2013].

Radosavljević, U. 2009b. *Vase Carapica Street only for public transport and taxi vehicles, Belgrade, Serbia.* [online] ELTIS The Urban Mobility Portal. Available at: <http://www.eltis.org>. [Accessed 19 March 2013].

Radosavljević, U., Lalović, K. & Mrđenović, T. 2010. Perspectives for urban experts in future urban development and mobility practice in Serbia' in Schrenk, M., Popovich, V. & Zeile, P. (Eds.) *Cities for Everyone: Liveable, Healthy, Prosperous - Promising vision or unrealistic fantasy? Proceedings of the scientific international conference: REAL-CORP 2010,* Vienna, pp. 541-547, ISBN 978-39502139-9-7.

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