spatium

urban and spatial planning, architecture, housing building, geodesia, environment

December 2007 15 16

Institute of Architecture and Urban & Spatial Planning of Serbia * 11000 Belgrade, Bulevar kralja Aleksandra 73/II * e-mail:iaus@EUnet.yu

S P A T I U M, International Review,
No. 15-16, December 2007., Belgrade **ISSN 1450-569X**

SCOPE AND AIMS

The review is concerned with a multi-disciplinary approach to regional and urban planning and architecture, as well as with different aspects of land use, including housing, environment, etc. It attempts to contribute to better theoretical understanding of a new spatial development processes and to improve the practice in the field.

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ADDRESS
Institute of Architecture and Urban & Spatial Planning of Serbia
"spatium"
Serbia, 11000 Belgrade, Bulevar kralja Aleksandra 73/II
E-mail: iaus@EUnet.yu fax: (381 11) 3370-203

FINANCIAL SUPPORT
Ministry of Science of the Republic of Serbia

Printed in Serbia by **ARTGRAF, Belgrade**

"Spatium" No 15-16 is prepared on the occassion of the International Scientific Conference
"SUSTAINABLE SPATIAL DEVELOPMENT OF TOWNS AND CITIES"

Conference organisation:

Conference organiser is the Institute of Architecture and Urban & Spatial Planning of Serbia in cooperation with the Faculties of Architecture and Civil Engineering in Belgrade. The Conference is supported by the Ministry of Science of the Republic of Serbia, ISOCARP (The International Society of City and Regional Planners).

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Belgrade, Serbia, 25-26th January 2008.
Venue: Faculty of Civil Engineering – Main Conference Room

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In memoriam

UDC 711.41.122 (497.11)
711.2.122

PATCHWORK OR MATRIX?

TESTING THE CAPACITY OF THE CONTEMPORARY CITY

Aleksandra Stupar, Aleksandra Đukić

Being exposed to the multiple needs of their contemporary users, the cities from all over the world have been forced to activate all capacities in order to intensify their land use, adjust their urban structure and reinvent some forgotten segments (ex-industrial areas, traffic nodes, docks, waterfronts) as generators of multilayered transformations and mutations. Therefore, the purpose of this paper is to analyze and compare different approaches of this practice, as well as to emphasize the relation between the applied global imperatives/trends/myths, local conditions and limitations, and the outcomes. Consequently, the first part will be structured around four key-words which often 'justify' and activate multifunctional and intensive land use - connectivity, profit, identity and sustainability.

The second part will be focused on the case of Serbia, describing a unique postmodern example of the fusion of local and global influences. The multifunctional land use in this case is a result of numerous political and economic problems, the plurality of values and (il)legal transformations of urban structure. This condition has finally affected the rising need for urban redesign, the re-organization and revitalization of city centers, fringe areas, devastated and degraded urban zones, as well as the development of existing transport and communication networks i.e. improvement of urban and regional connectivity. Additionally, the 'model of territorial values' will be explained as a planning tool which could be used in order to increase the level of urban attractiveness, define urban parameters and estimate land values.

INTRODUCTION

Influenced by the process of globalization, the city at the beginning of the third millennium is continuously excited by internal and external economical, political and social stimulations. Displaying the new role, technological infrastructure and evolving identities, it promotes a different set of values and objectives, reflects the space and time contraction and supports the augmentation of reality. Gradually, the city becomes an incomprehensible fusion of multiple levels, time sequences and spatial segments, while its authenticity is constantly challenged and provoked. Consequently, our everyday experience, limitations and growing importance of global-local nexus, create a restructured urban space which should be, above all, visually and economically attractive and efficient.

These urban turbulences reveal the ambiguity of the globalization, emphasizing the tension between global trends, local limitations and questionable outcomes. Hidden behind eye-catching images of the preferable future, the contemporary cities combine various development strategies in order to strengthen four powerful pillars of global success - connectivity, profit, identity and sustainability. However, their real significance is often (un)intentionally mimicked, creating the numerous opportunities for manipulation and further degradation of the living environment.

The city of our epoch has obviously become an experimental tissue where all novelties could be tested, verified, accepted or rejected, but it is quite uncertain what will happen if the urban endurance reaches its limits.

Alluring network society and tempting virtual reality - will they be sufficient to back up and protect our fragile material body?

RESTRUCTURING THE CITY

Under the influence of the new 'globalizing' economy and the information revolution, our urban world has begun its new incarnation. Accepting the post-modern logic of disjunction and numerous possibilities, forced fragmentation and negated wholeness it highlights its differences and individuality, instigates the uncertainty. At the same time, urban nodes, as the new centers of the contemporary community, form their internal and external networks, stepping into the unknown territory of immaterial flows.

Consequently, the genuine, multiple nature of the city and its new character(s) can be discovered through numerous terms describing it as:

- informational city (Castells, 1989);
- telematics city (Hepworth, 1990);
- network city (Batten, 1995);
- dual city (Castells, 1989; Mollenkopf, Castells, 1991);
- intelligent city (Graham, Marvin, 1996; Hepworth, 1990);
- divided city (Fainstein at al., 1992);
- city of collective memory (Boyer, 1995);
- city of spectacle (Short, Kim, 1999);
- entrepreneurial city (Short, Kim, 1999);
- diffuse/compact city ... etc.

The traditional urban centers, their metropolitan areas and different urban regions are functioning simultaneously creating the unique space-time continuum - without visible confines but with multiple centers (for ex. Ile de France region, London metropolitan area, Tokyo with Tsucuba and Yokohama, Flemish Diamond, Randstad Holland, Rhine Ruhr Area, Basque Country). Overlapping and coexisting in the new realm of interconnections, they introduce a different logic of activities and structures, shaping the ambivalent trans-urban systems readable on uncountable levels and perceptible in various scales.

However, in spite of these tremendous changes, the principle of agglomeration could still be recognized, even though it is now related to the production and processing of information. Furthermore, every urban transformation usually mirrors the aspirations of urban center/node - the urban changes will certainly be more radical and visible if the city has an important role in the world system or if it tends to increase the competitive advantages.

The urban structure is also changing. The small, multifunctional segments gradually disappear while the large monofunctional zones become significant constituents. Simultaneously, the monocentric form is substituted by polycentric one, composed of several dispersed points. The driving force(s) of these autonomous and usually self-sufficient cells are activities which support political, economical, cultural and media globalization, i.e. international/national command and control, finance and business sector, culture, creativity and tourism. Nevertheless, these activities complement each other, generate numerous combinations and all together depend on highly advanced technologies and information systems.

Their position in the urban tissue is also influenced by information and communication logistic, which nowadays enables a more flexible approach. As a result, some specialized types of business, financial and command/control activities are relocated to the urban periphery and/or to smaller cities (for ex. Paris - St. Quentin-en-Yvelines, Tokyo - Omiya and Kawasaki). However, the historical urban cores are still playing their symbolical role - demonstrating the tradition and continuity, merging the traces of previous activities with the contemporary features and demands (City of London, Châtelet, Wall Street). At the same time, their development potential is directed towards the new set of activities, mainly based upon culture, tourism, entertainment and art.

The promising synergy between production and consumption, established on the more sophisticated level, is also applied in the former high-class residential areas (West End, Champs Elysées) or new sub-centers (Tokyo - Shinjuku, Berlin - Potsdamer Platz). Additionally, the central zones, with powerful symbolical connotations, become targets of 'Grand projects', raising the urban attractiveness and frequently causing the further spatial fragmentation and social segregation.

The ex-industrial areas, with their abandoned structures and unattractive scenery, are regenerated and/or recycled, while their strategic importance and value are emphasized. Usually they are synchronized with the guidelines of sustainability and adjusted to the demands of the techno-elite. They introduce the new types of spaces and activities, mainly oriented to the new technologies, design, information and fashion industry.

While the extensions of the traditional urban cores become prestigious business nodes, the urban periphery becomes a valuable spatial resource for media production, entertainment, science and specialized services. However, the particular attention is also given to the important transportation axes, which connect airports, seaports and/or complementary urban nodes within the urban region. These transurban spines become a new magnet for business, information economy and some types of tourism (mainly business and congress), using the excellent connectivity as the main advantage (Amsterdam - Zuid, Paris - Roissy).

Evidently, the structure of the contemporary city, shaped by so-called 'flexible capitalism', ad-hoc strategies and 'facing-the-deadline' planning methodologies, reveals the logic of the confusing patchwork, upgraded by the virtual matrixes and simulated experiences. Therefore, the city land represents just one of the uncountable layers to be used by various activities, but still the only one which we can actually perceive by all our senses.

MULTIPLYING THE URBAN EXISTENCE

The world is definitely getting smaller and the new technologies facilitate our networking, confirming the Stanley Milgram's theses (from 1967) about six degrees of separation. Fortunately, tête-à-tête communication is still important, but the movement of flows has different configuration which connects new urban focuses: airport/highway/railway - parking place/subway station - office/apartment building. Evidently, the introduction of new urban/global infrastructure systems is a necessity, but their harmonization with the inherited urban context have to fulfill needs of all consumers, especially those who create the New World order.

Connectivity vs. profit

The high urban connectivity, which could be attained by numerous traffic and information systems, enables the communication in the wider scale and, as a result, the systems of public transportation, systems of business/tourist flows and systems for information interchange (telecommunication networks) open the numerous possibilities for urban integration. Obviously, the information infrastructure, as the most expanded mode of global communication, becomes the important

element of the global urban competitiveness intensifying the circulation of knowledge, symbols and tokens. Due to that, the sense and the perception of the city space are highly influenced by its transport infrastructure (Sudjic, 1993) and the mental maps of passengers are acquiring new dimensions. Although the result could sometimes be a monotonous and incomprehensible city image, the modern traffic networks with their nodes represent a new logic of urban existence, offering new urban landmarks and, above all, reflecting the technological development and urban culture.

Consequently, the first step of the global initiation is usually creation of new city gates (airports, railway buildings) and establishment of economic and information contact zones - the impressive business areas with the vertical accents of office towers. This physical and symbolical frame, as a necessary pre-condition of globally recognizable image, raises the city above its national context and shapes its structure into the monumental landscape.

New city gates become the main contact points between different kinds of communication and transform themselves into the complex mega-structures, as the most vital organs of global centers. These symbols of the global prestige transmit symbolical messages by their attractive architectural appearance, glorifying the power of modern technologies (Osaka, Paris-Roissy), expressing the national dignity (Jeddah, Oslo, Seoul) and/or reflecting the importance of a city in the world hierarchy (London, Tokyo, Hong Kong). At the same time, the railway and subway terminals, although mostly important for regional connectivity, have a twofold role. They could be interpreted as reinvented urban landmarks (Rotterdam-Blaak, Lyon-Satolas, Toyama-Takaoka) or they could be used as symbols of new urban regeneration (London, Bilbao, Seville, Lisbon etc.).

The connectors of capital, with their similar skylines, emphasize the global character of financial and information flows integrated into large business districts. However, even these oases of concentrated multinational corporations are based upon powerful urban infrastructure that should provide excellent physical and electronic accessibility, as a guaranty of global sustainability and progress. The monumental geometry made of steel and glass is the expression of the global potential, but also represents the power of multinational or local corporations, state aspirations and the global 'landmark' which should channel the international financial flows.

Identity vs. sustainability

Today, it is very difficult to establish equilibrium between pro-globalization and anti-globalization flows creating the environment for the coordinated functioning of all identities which represent the unique treasure of the contemporary city. Therefore, the urban space, as a place of the most intense transformations, provides new modes of social interaction, (dis)continuity and multiple identities. Its infrastructure (physical and virtual) emphasizes its ethnical, cultural, social and professional diversity, creates completely homogenized fragments and promotes this unusual collection of local-global values, as a unifying force of the evolving global networks. At the same time, different civil initiatives tend to regenerate the civic life and public space in the alienated and dispersed cities, but their way out from the introverted and passive urban segments is usually hidden behind the computer screen.

However, the global economy has taken advantage of these processes as well, and its play with conscious and unconscious levels of our psychological being becomes a new generator of capital - clearly manifested in the city space as well. Entertainment, consumption and promotion on one side, and the genuine spiritual revelation on the other define a new image of uncountable desires which make our limited existence more fulfilled and justified. The effect, although brief and commercialized, provides a possibility to step aside and to outdistance from the global current which takes all of us in the same direction.

Therefore, the logic of rational-irrational urban animation, which varies between reality and illusion, symbol and simulacrum, has been applied in the 'sacred' and 'profane' nodes whose difference cannot be clearly distinguished. The shopping areas with their 'cathedrals' (for ex. Collezione - Tokyo, Galeries Lafayette - Berlin, Toronto Galleria), fairs and Expo-s, as well as numerous theme-parks which re-create past and future, science or entertainment, become the top-spots for modern pilgrims searching for the new sensations. Unfortunately, beside obvious urban benefits - improvement of infrastructure, activation of devastated urban areas and introduction of new technologies, these places could cause environmental misbalance and/or social segregation which cannot be annulled by (questionable) economical sustainability.

Similarly, the sports competitions (Olympic Games, Championships, World cups) influence the spreading of the globalization using the powerful global financial/commercial apparatus which transforms sport into the new, glamorous kind of industry. The contemporary sports arenas modify themselves into the tools of competition directed by famous world architects and corporations becoming a marketing resource and a display for regional, state and international aspirations and values. They should provide a positive, recognizable image of a city and multiple networking but they could be also seen an important impetus of urban and regional development (Barcelona, Seoul, Athens, Madrid, Atlanta etc.). At the same time, sports arenas could be comprehended as a specific modern theater with an extravagant appearance reflecting the nature and the structure of a society, revealing the tensions and hostility, staging the moment of public catharsis and - attracting the attention of world media.

In contrast to these terrestrial impulses, the global cities also contain 'oasis' dedicated to the spirituality. Various centers of religious gathering are oriented towards introspection, but it does not mean that they do not excite and inhibit the urban space and their users. However, a great number of 'sacred' nodes, besides their usual iconography inspired by accepted canons, adjust their form to the local surrounding and, above all, to the global demands of architectural virtuosity, scenic design, unexpected symbolic and - television broadcasting.

Furthermore, the city space and its activities create and modify collective memory while the

cultural and historical symbolisms are used as ideological messengers. Accordingly, it is not surprising that the humanity again focuses its attention on the urban waterfronts, while their almost mythical role of regeneration, purification and initiation becomes very important for the officially imposed imperative of sustainability. As a result, images of the recently regenerated ports and docks not only reflect the power of capital, but reanimate the role of water which 'opens' the city and connects it to the rest of the world. Consequently, the chance for the balanced and comprehensive development of these areas has been found in the coordinated strategic actions whose final output reveals amalgam of complex and complementary activities and preserved identity. This model, for example, has been applied by Helsinki and Hamburg, where the independent, ecologically acceptable zones were established, while the waterfronts in the lower Manhattan, Sidney, Le Havre, London, Glasgow and along the Pacific Rim (Tokyo, Osaka) have been occupied by global business which develops the new, powerful financial/commercial front of techno-capitalistic power.

In contrast, cities like Bristol, Buenos Aires, Genoa or Jakarta used their own urban heritage, emphasizing the importance of collective memory embodied in the old activities, their spaces and cultural uniqueness. However, the example of Puerto Madero in Buenos Aires is a reflection of global dichotomies which could be found even in a sustainable planning approach. From the beginning, the urban regeneration of this waterfront was oriented towards the promotion and preservation of the old port identity, rehabilitation of the docks and internal restructuring. New infrastructure, along with the whole set of global activities and famous architectural names, certainly has been attracting many investors but for the total success and its future sustainability few problems have to be solved. One of them is economic, social and spatial exclusiveness of this area which again underlines the huge social gaps, the second one is the lack of proclaimed city-river interaction and, finally, there is the question of further investments which is always sensitive, especially in the cases of unstable national economies.

Evidently, urban history could be recalled whenever a city needs new financial resources which would be helpful for further development. The successful renewal and transformation of polluted and abandoned river banks, seashores, ex-industrial areas and old city quarters enables important infusion of capital imposing a new (or rediscovered) urban identity. Molded to attract exclusive clientele, these urban changes have a significant symbolical value for the circle of sustainability because the overcrowded urban nodes are forced to recognize their own hidden potential which has been often neglected and misinterpreted. Consequently, the culture as an important resource of memories, images and events, the purification and regeneration as an opportunity for reanimation of neglected areas, and, finally, the national dignity and reconciliation as catalysts of numerous global and local tensions have been emphasized as the places of urban identity.

The list of activities and interventions, guided by contemporary 'mantras' - connectivity, profit, identity and sustainability, is longer every day. However, the main global aim - a total multi-purpose networking still has to be achieved. Are we ready to take this risk?

FROM THEORY TO PRACTICE

Shifting from the dazzling images of the central urban nodes to the gloomy reality of the peripheral ones is almost as difficult as the actual application and implementation of the theoretical knowledge. However, the methodological and analytical support provided by exact data, mathematical models and scenarios could facilitate the planning process, especially in the environment full of contradictions and uncertainties. Therefore, each city can be perceived as a complex system of crossed network structures which are the result of physical transformations and functional matrices from the past centuries. Due to the increase of content within the urban systems (qualitatively and quantitatively), we have to address the issues of urban development through multiple layers and different aspects. (R)evolutionary changes of the cities (in continuity or discontinuity of development) make the system even more complex.

However, information technologies allow monitoring large numbers of urban components at the same time, increasing the pace of their changes and development. One of the benefits of this method is the possibility to monitor spatial components through layers and to anticipate different scenarios of their activities and development. The changes of urban structures are mostly influenced by markets, and therefore the monitoring of different aspects of development is an essential tool within the planning process.

The situation is even more sensitive in the economically unstable environments, which have to balance between limited financial resources, chaotic regulations and inherited practice, simultaneously adjusting to the new rules of the inevitable global competition. Therefore, it is necessary to stimulate implementation of the scientifically based planning methods and tools, keeping the professional distance but respecting the local conditions and sensing the everyday pulsations.

Urban systems networking – theoretical background

The basic principle, introduced by the method which will be described, is the equivalence of complexity between planning process and urban system itself, because every simplification of this process results in equivalent decrease of urban system's reliability to respond to planned effects.

The analysis of urban networking structures development, from the earliest human settlements up to a present day, leads to conclusion that the most primitive forms of these networks were central point based. More complex were linear (development of physical structures by the side of the road) or in the form of crossroads. Finally, as the number of the elements gradually increased, systems were formed (towns and settlements), eventually resulting in complex network structures (metropolis, regional centers).

Spatial-corridor structures emerged when at least two points and a road were formed. For example, some medieval cities in Europe developed according to this model - there were two nodes – *profane square* in front of the

castle, and *sacramental square* – in front of the church, connected by the main city street. In Serbia, this matrix of network development is mostly present in northern parts of the country, while in central and southern parts network structures developed through multiplication of nodes/points and corridors. In this case, the development of the network started with main crossroads, points where two main streets crossed. After that, number of crossroads was gradually increased, as well as the number of corridors, none of which dominated the others.

Functional networking is a result of spatial networking and they are closely related. Functional networking influenced the development of spatial networking, caused the changes of certain characteristics within spatial networks and *vice versa* - changes within spatial networking influenced the location of activities, based on the complex mutual relations.

Functional network of settlement structure can also be analyzed in number of layers in several different ways. Most commonly used one is the classification according to activities (housing, trade, enterprise, sport-recreational functions, commerce etc). Sometimes classification is conducted according to centrality (city core, city limits area, suburbs, or it can be numerically described). However, finding optimal location conditions for certain activities sometimes requires the network of attractiveness. In that case, specific segments or corridors are numerically described depending on the level of attractiveness.

Functional relations networking was the subject of theorists researching cities and regions (H. Ebenezer, C. Alexander). In his theoretical model of garden city, Ebenezer observed the system of networks connecting satellite garden settlements with the center of the city, while Alexander recognized the urban system as number of functional networks that are cross-related. Studying the courses of network functional development, he concluded that networks became more complex in term of functionality. In fact, due to large number of elements, classes of elements and relations, a great number of combinations emerge. Observed in specific spatial areas and combined with spatial-corridor structures, they provide even larger number of complex structures. Diversity of phenomena within network structures is 'endless', so it is necessary to define different approaches for their identification. There are four basic approaches in defining their structure: formal, analytical, quantitatively-structural and value-measurable approach.

Consequently, the main reason for constructing network structures is identifying and anticipating development courses of urban structures. Establishing urban networks allow to perceive possible network strategies of urban development, to select directions of the activities adequately, as well as to implement them within the planning documentation.

Formalizing network systems – urban network structures

Basic elements of network structures are nodes (points on which relations cross between themselves), relations (defining the relation between elements inside the network) and flows (time-spatial corridors). As a basic networking module, point/node has several different visible forms. In terms of spatial recognition, it can be identified as line, matrix or zone. As a subject framework, it can relate to region, city, settlement, city zone, block, quarter, lot or open public city space. On the level of problem identification, it can consist of different layers: communication, organization, production, formalization. Relations also consist of types and shapes. According to the direction of development, they can be pointed in single/double/multiple directions and according to their characteristics they can be connected and dependent. Additionally, their content defines them as functional, physical, logical and visual.

Network structure directions could have different functions. They can present flows (of users, merchandise, vehicles, energy and information), time-spatial changes or frameworks through which we monitor inter-dependence between points and relations.

Model options for development of cities and settlements - trajectory principles

Model options for urban development according to the trajectory principles are urban planning tools used to test suggested solutions and to make implementation of the plan easier. The advantage of network strategies provides great possibilities for development strategies by combining various relations between different numbers of layers and levels of urban components. During the formulation of development strategies, which are directed towards feasible planning solutions, we should start from the following presumptions - level of network content is changeable, spatial level is adoptable and physical forms must have a high level of diversity.

Development is possible through several types of activities by:

- activating all the resources and potentials at the same time (resulting in continual uniformed development of the area);
- activating single segments (most attractive locations or directions, resulting in sudden development of specific points which will have further effect on development of local areas);
- activating all the potentials but with different intensity (resulting in development which is continual but not uniformed and preventing the development of contact areas from previous case).

Therefore, we can recognize several possible development models for settlements and cities:

- activation of the most attractive points as the very core of the changes;
- activation of the specific nodes that have substantial spatial possibilities – others being activated only after previous are fully completed;
- alteration of the content within nodes according to the principles of previous state;
- relocation of content in order to concentrate on specific points and/or complex linear structures which should spread their influence across the neighborhood areas.

Application of network systems in city planning in Serbia

Network systems were applied within the framework of comprehensive and spatial planning on the territory of Serbia, facing the unpredictable demands of unstable political, social and economic environment. In order to respond to different requests of various users,

a realistic and implementation-friendly documentation was needed. Therefore, its flexibility and adjustability were underlined as much as possible.

Resources and potentials of the cities were measured on three different levels: regional level of development, city level and inter-city level (urban modules level). On each of these levels, the procedure of territorial resource development was conducted in three basic steps:

1. identification of the resources and their inclusion into the network system;
2. spatial-physical territorial analysis (identifying territorial resources and capacities);
3. definition of the resource-planning conditions based on their values and possible expenditure of capacities.

Territorial resource development was conducted for lines (mostly streets or infrastructural corridors), nodes/points (crossroads, open space, parks and squares) and areas (quarters and blocks).

The future course of development was planned considering:

- rental value networks - connecting elements of similar or same value levels, in order to maximize additional values in the present moment;
- balanced-effective networks - based on input/output review of certain elements/segments, keeping the network development in balance ('positive development');
- capacity networks - established for minimal, optimal and maximal capacities across points and lines.

Development was observed through benefits, segment related varying benefits and the change of pace between specific elements. This methodology has been applied on master plans and plans of regulation in a few cities, towns and villages in Serbia. The municipalities have used it as an advanced tool for the urbanization process in the uncertain period of transition. Each city was perceived as a complex system of crossed network structures (mainly as a result of physical and functional matrices), through multiple layers

EXAMPLE A. Kragujevac, Serbia (~ 150.000 inhabitants)

Fig. 1. Network of the regional developmen

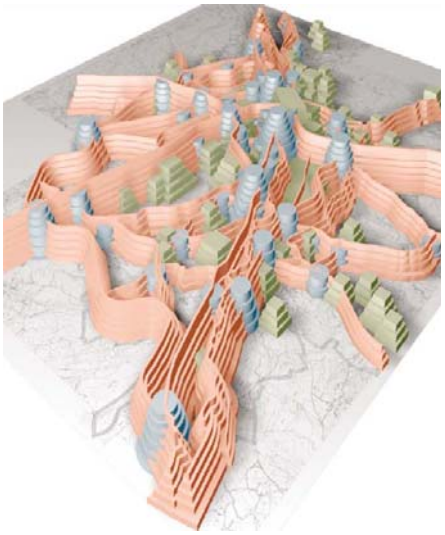


Fig. 3. Evaluation of lines/corridors and nodes/points

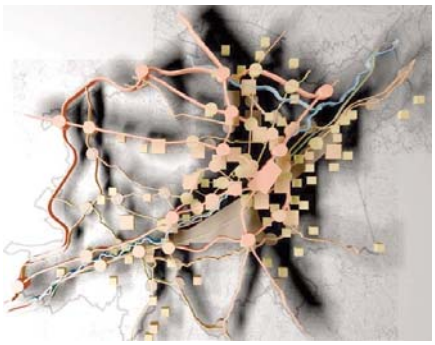


Fig. 4. Urban network - value trajectories

Fig. 2. Value hierarchy of urban nodes

Figure 5. Land value - urban zones

EXAMPLE B. Kostolac, Serbia (~15.000 inhabitants)

Fig. 6. Directing the further development - evaluation of the main arteries/corridors (1st, 2nd and 3rd rank lines)

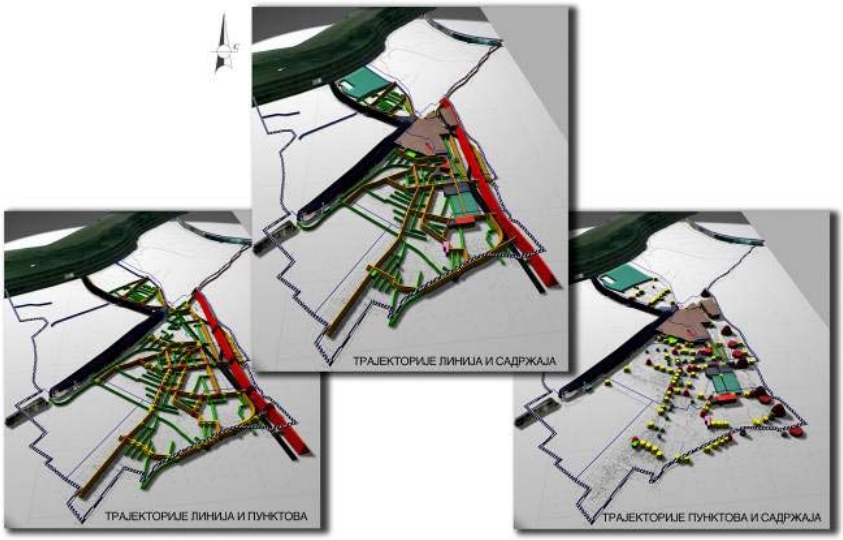


Fig. 7. The synthesis of selected lines, nodes and areas (physical and functional)

and different aspects. The transformation of the urban pattern was also considered and these matrices became the part of network structures. The most attractive parts of the city (main streets, open spaces, parks, main junctions, markets, commercial areas) were 'transposed' into the lines and nodes of the network. They were considered separately and/or combined with each other. At the intersections of these lines and nodes, we got the most attractive places. The lots on these sites could be twice or triple expensive than on other sites in the city.

Planning based upon this method includes some additional variables and provides guidelines that are more precise. All of them could facilitate decision-making process as well as enhance the dynamic of implementation. However, so far mainly some regional centers and smaller towns have used these models, while the development of Belgrade, the capital of Serbia, still presents a mixture of ambitious strategies, political rhetoric and precisely targeted actions.

Solving the urban puzzle?

Driven by the power of capital, guided by the global trends and limited by the inherited problems, Belgrade has started the imposed

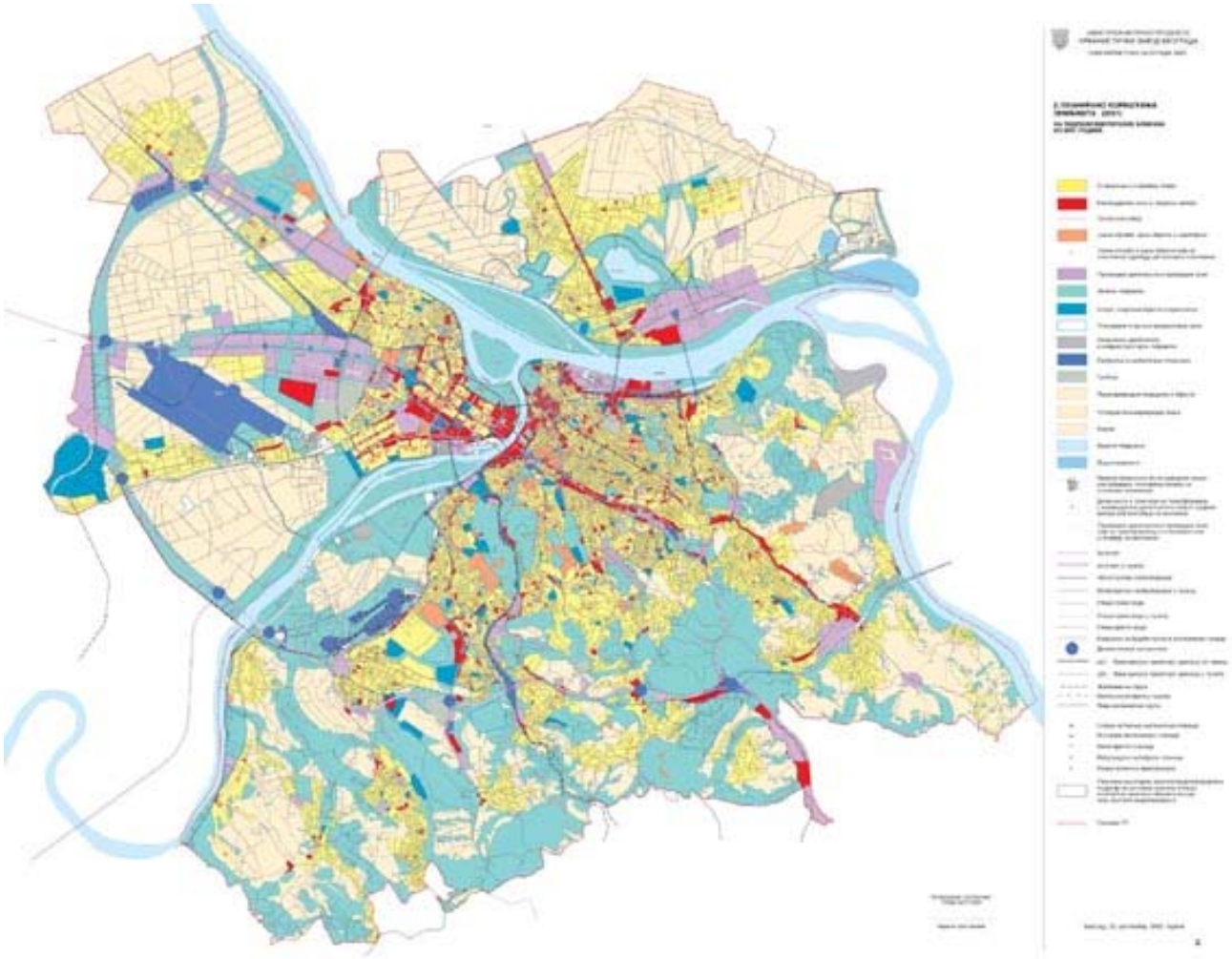
competition - setting up the vital connections, filling the blanks caused by the years of negligence and promoting its forgotten identity. Simultaneously, our capital activated its own experimental tissue - New Belgrade - the part of the city which represents an icon of the Modern movement and a unique legacy of the post-war Yugoslav society.

Since 2001, the macro blocks of New Belgrade have suddenly become a place of accelerating economic bloom. Stimulated by the flows of globalization, this area has commenced its new building cycle and most of its major disadvantages suddenly turned out to be its new competitive advantages. Consequently, the low index of the built up areas has been recognized as a possibility for the future large development projects, while the good traffic connections, accessibility and infrastructure have become a necessary backup for the new activities.

Following the importance of regional recognition, competition and urban needs of the contemporary users, the new Master plan of Belgrade (2003) also defined a more attractive role for New Belgrade, emphasizing its regional potential for the business activities and launching this area as a new hub, able to respond to the numerous requirements imposed by the process of global integration. According to the plan, the central zone of New Belgrade should be considered as an area with the highest potential for commercial activities, steadily evolving into the strong business, administrative and cultural regional center. The blocks around the future railway station and the Belgrade Arena are planned to be exclusively commercial, without housing, which is the result of their attractive location.

The zone between the river Sava, the railway and the natural plateau of Bezanija, as an independent urban segment of New Belgrade, should also redefine its identity and utilize its connections with the central zone. Therefore, the main idea of the plan is to create a linear center along one of the main boulevards, which would stimulate a further development of this mainly residential area. Additionally, it is necessary to activate a number of micro-centers along the river Sava, remove the existing industrial complex and replace the old

Fig. 8. The master plan of Belgrade (2003) - position of New Belgrade and planned land use (http://www.beograd.org.yu/documents/plan2021/02_plan_namene.jpg)



shipyard with more attractive central activities - adjusted to the needs of future users and suitable for the preferred 'global image' of New Belgrade.

The special role should be given to the area of the old Expo pavilions. Although in close proximity to the central zone and river, it has to be transformed in accordance with its historical importance (it was used as a Nazi concentration camp during the Second World War) and therefore protected as a cultural heritage, with appropriate cultural, commercial and public spaces.

Today, New Belgrade is a huge building site which attracts investors from all over the world. Companies from England, France, Austria, the Netherlands, Israel, Greece and Slovenia have been investing there, implementing the ideas of the Master plan which should bring more then a million square meters of new office space. Furthermore, New Belgrade, with more then 230.000 inhabitants, represents one of the most developed municipalities in Belgrade. The number of employed people has grown from 53.000 to 63.000, while the average salary is the highest in Belgrade and the second highest in Serbia.

The area around the Belgrade Arena gradually becomes the Serbian replica of the Wall Street, concentrating the famous European banks. At the same time, the monumental offices of international and local companies have been shaping the new urban scenery which is no longer an allegeable metaphor of socialism but an evolving picture of capitalism.

Recognized as the future business center of the South-eastern Europe, New Belgrade has been orientating itself towards new clientele, changing its 'urban menu' to the needs of the global techno-business elite. Currently, there are several sites under construction and their future purpose and shape reveal the logic, aesthetic and concept already applied in numerous cities which were preparing themselves for the global initiation and recognition. Therefore, Belgrade, as one of the announced European 'capitals of the future', is using all the benefits of New Belgrade area, preparing the fertile ground for its further expansion.

All projects situated in the zone of New Belgrade are introducing new investments, promoting the growth and quality of the primary property market in Belgrade. At the same time, they are creating a new kind of space - from the western grade office buildings to the multipurpose leisure facilities, adjusted to local and international environmental, health and safety standards and requirements. Therefore, their presence is certainly raising the quality of life, offering various environmental opportunities and upgrading the micro and macro area. Simultaneously, the new activities are also playing a role of urban magnets, which should draw the elite consumers and create a fashionable image of this former socialist architectural monument. However, the numerous stimulations are still insufficient to transform the whole area - some parts of New Belgrade remained beyond the reach of globalization flows and they follow their own, almost suburban, rhythm.

Hopefully, there will be enough time for thorough analysis and corrections which will shape New Belgrade into a forward-looking modern city.

CONCLUSION

Living in the several coexisting realms is not a matter of imagination anymore. The conventional understanding of the city has been radically transformed and its topography nowadays represents a multidimensional image of limitless networks, ambiguous nodes and overlapping scales. The patterns of urban activities, as well as numerous functional relations have become pluralistic, complex and diverse, reflecting the contemporary society and its dynamic. Therefore, entangled spaces of the contemporary city could be perceived as vivid patchworks and/or unpredictable matrixes, revealing the collection of activities more or less autonomous from spatial units and traditional material structures.

Consequently, the reinforced symbioses between tangible scenery and invisible flows channels the next phase of the urban (r)evolution - widening the urban horizon, upgrading the electronic interaction and creating the thrilling images of absolute utilization. Obviously, the future city could/should be an ever-changing chimera, the kaleidoscope of experiences and, finally, the powerful combination of various stimuli.

Are we prepared to face a new kind of reality?

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A BIG LABORATORY NAMED CITY

Deddy Halim

The labyrinth is seen as a city. It "formed a circle, and was surrounded with walls and ramparts, but in a place of moats there yawned a gloomy abyss, apparently boundless and bottomless. Light shone only above the city, while beyond the walls it was dark pitch." –

Jan Amos Komensky a.k.a Comenius (1592-1670)

The statement above is written by a Czech educational reformer and the Catholic leader as well in the everlasting classical book entitled *The Labyrinth of the World and the Paradise of the Heart* on 1623. The bottom line of the book is to show that human being is only a pilgrim in this world. Comenius was under frustration and with his deepest spirituality at that time. He wrote it while in hiding and was exiled from his country Czechoslovakia, in the wake of the Battle of White Mountain. The Brethren weren't welcome in Bohemia anymore. Of course, Comenius wrote with a cynical edge to it. He wrote of a young man to symbolize himself trying to find his way in the world but what a strange world it was. As a pilgrim he was a stranger in his own land, wandering around in his world, driven by invisible powers.

Fig. 1 Labyrinth of the world,
Source: Comenius, 1623

Isn't that what urban people experiencing their city nowadays? They become strangers in their own city. They move around from one building to another, automatically programmed in the routine activities day by day, driven by consumptive lifestyle and conditioned by global capitalism. They go shopping inside and outside the malls, the shops, the bars and cafes, one after another just like going through labyrinth and stop for a while in one of its chamber for eventually they continue to the next chamber. They are not aware if their behavior is already conditioned. Moreover, they don't even know what they are doing. In their mind only to find something they need as soon as possible without knowing that actually the thing they are looking for is not necessary important.

CITY LABYRINTH

What the city looks like for their citizen? How do they see their massive physical environment settings? For Londoners, they will see theirselves entrapped in a jungle of concrete blocks while for Jakartans with 13 millions inhabitants, they are undersieged in the chaotic urban sprawl blocks, both inner city and suburban area. The underground philosophies are may opposed to western mental constructions. Nevertheless, either Easterners or Westerners, there still persists underground stream of thought in which architecture is sub ministers itself for its spaces. Both Londoners and Jakartans, whether urban people in developned countries or in developing countries, look their city towards the labyrinth as a form that they interpret. Or, we can also say the labyrinth is the form that tells us: interpret for the city is made for that. The different between both polarization lies on the degree of complexity and the forms of the labyrinth, but the bottom line is the same which people inside the city lives with anxiety in confusing world, between choices and dead ends. Of this perspective urban people is no more than laboratory rats entrapped in a maze to find the best chamber fitted to their live, assumed secure (although not!) and comfort (only in rats mind!).

Fig. 2 Confusing Rat

Source: James McGaug

Fig.3 Slum Blocks Maze in developing country

Source: www.flickr.com

Fig. 4 City Blocks Maze in London
Source: www.flickr.com

Architecture, as for human activities, is unnatural and thus aggress the environment. Each architectural vision involves a wave of violence and the potential for delinquency is present in every architect. The architectural act implies destruction, for each building superposes itself either to an existing one or to nature. But building is also an act of cultural continuity, the city represents its society's culture, it is the way in which the city communicates with its people, with its own language (Van Berkel & Boss, 1994).

The city is also a labyrinth. It is that negative space we see from a bird's eye point of view. It is down there and once in it we don't see but its walls. We are able to know it is there because we live in it. But to understand it we have to visualize it from above. The city is not the buildings on the main square. The city is each square, each street and each garden that makes it up (Cullen 1962). Every city has characteristics of the labyrinth. We have the effective way to get to an appointment in certain spot of place as soon as possible or, the long way if we want to get to know the city by traveling around intentionally before we get to the spot. The city maintains its labyrinth spaces for our pleasure, our confusion, or for the most profound reflections of our mind. It was forecasted and predicted very precisely by Comenius 400 years ago, when cities are not yet developed and no metropolitan existed. Today, thousands of skyscrapers and towers are built, flyovers, toll roads and interchanges superimposed one another, super-blocks arisen with its multifunction architecture, megalopolitan cities are born with their hyper complexities. But the question is: Has Urban People found their exit way from the labyrinth? Or they just become entrapped more deep in their city labyrinth since the maze is no longer horizontal but vertical as well and developed sprawling wildly without any patterns which make human being hardly to understand the cities in their cognitive process. They are wandering around from one labyrinth to other labyrinth.

FROM LABYRINTH TO LABYRINTH

The labyrinth is psychological constructs to be interpreted and its meaning goes beyond a simple form. It is an imaginary space, an intellectual space, a concept, an image, a spatial form, and in its real form, an architectonic space. In the field of Urban & Architectural Psychology, built environments and spaces always seen as mental constructs of people towards their physical world.

If human beings are confronted with a real labyrinth, a constructed one, so the first impression will be that of a wall for it cannot be grasped completely from its base. What makes a labyrinth is the wall that separates the outside from the inside. A labyrinth invites in and it is not such if one is still outside. The action happens inside since the labyrinth stimulates action, movement that implies a course of time and space. If human beings think of a labyrinth they do not only think of a wall, they may think of a serpent in it, of a garden, or a drawing of spirals with one way in and one way out, they imagine it from a bird's eye point of view. This means they always think of a labyrinth from the outside and above. And it is natural if they want to solve its secret for the best position to do so is from where we can contemplate the whole.

A trace in the labyrinth seems to show us the way and invites us or makes us walk through it. This makes it a narrative space or a sequence. For architect Rem Koolhas and his colleagues (1997) architecture is a negative space, in it things happen, life goes on in its absences, in them we expect something to happen; the non-built space signifies and gives value to the architectonic spaces. Historically, at the beginning the labyrinth or a maze in English was essentially a garden created for the amusement of people. One would enter it and try to find the way out as soon as possible. Its intentions were to mislead or to make one loose his way and his bearings. Whoever walks through the labyrinth follows either the right path or the wrong one for there is one good path and one bad one. The idea is to find the way out as soon as possible. The sooner the better for what is called effectiveness, or the optimal way, which actually would be a straight line. Is it not in this same way that modern culture thinks, where the idea of progress is marked by the effectiveness of the straight line which, taken to the extreme, moves our society very fast and gives meaning to urban life?

Fig. 5 Sihlcity in Zurich, labyrinth in the shopping mall
Source: www.flickr.com

In city planning, the labyrinth has evolution from only makes people walk through the whole in order to get to one center into more than one center or sub center or the point of interest. There was only one door out and it is the same one that gets you in, but nowadays there are many doors to go in or out. Many centers position you and make you change your bearing. The places that usually become our identity which could be parks, landmarks, squares and even more cafés, department stores, movie theater in the malls, discotheque, library, museum or any other architectonic built spaces which enable people to identify themselves and affiliate with. Where is the confusion that we thought is intrinsic to the labyrinth? We are faced once again by the

enigma of the labyrinth. This labyrinth is more metaphorical. We cannot get lost on a road that leads to only one place and with only one option to choose from, forward-backward, inside out, unless we don't know if we are walking towards centers or away from it. Today the labyrinth seems to have more sense: Where does good lie and evil? The purpose is not only about finding our way out but to question ourselves as to why we are heading in or out. Thus it is a more reflective figure than contemporary labyrinth.

Urban people are wandering around from one labyrinth to another, starting from their home where they are separated within rooms from their own family, going to work when they drive the braiding roads and entrapped by partition with their workstation, shopping thru the malls from one shop to another, walking in the downtown narrow gangways and alleys, lost in the building blocks jungle and tower and so on. All urban people are living their live from one labyrinth to another.

Trying to labyrinth the megalopolitan cities, the recent competition of Transbay Terminal in San Francisco announced by the Governor Arnold Schwarzenegger and held by the Transbay Joint Powers Authority, a regional government body created in 2001 to bring about the construction of a new transit terminal in San Francisco is clearly shows that urban people, even in the most powerful nation in the world, is still entrapped in the labyrinth, even worst they entrapped deeper and deeper.

King and Curiel (2007) reported three proposals for what would be the tallest building on the US West Coast were unveiled and amid architectural fanfare and political buzz. The three proposals are similar in several ways: cloaks the terminal in glass, and each tops the tower with a translucent or open crown with wind turbines tucked inside it. Although there's no guarantee that any of the towers will be built or the designs to be selected by public officials will reach the vision by the development teams, but the designs and the favorable response from elected officials - showed that the recent startling changes to the city's skyline are only a prelude to what architecture could offer to the city labyrinth. They are no more than proposing another new center as the destination in the San Francisco labyrinth for its citizen and put the highest tower in the west coast (again, could be not built!) to mark the new center from distances. It is absolutely what Kevin Lynch (1960) talked about how citizens perceive their own city. They use the mechanism of human cognitive process to identify places.

Fig. 6. Transbay Terminal by Skidmore Owings & Merril propose a new center as the destination in the San Francisco labyrinth

Source: SOM LLM Rockefeller Group Develoment Corp.

The tower is accompanied by a transit terminal that is intended to become a major civic gateway. Through this facility, San Francisco people can create a statement to the rest of the world while creating a seamless transportation network connecting the Bay Area to the rest of the region and state so that the labyrinth now is extended to the regional scale and cities become only sub centers. In the early planning, it was assumed that any tower alongside would climb no higher than 550 feet. Now, though public officials say the extra height is merited not just to boost the land sales, but to show that San Francisco continues to measure itself against other cities of global status that are seeing super tall towers proposed. Will we labyrinth not only the city and the country but also the world and beyond? Whatever proposals do emerge will be scrutinized by potential foes in a city long wary of high-rises. Indeed, to erect any tower will cast shade on a public park. Again, Comenius is right for saying light shone only above the city, while beyond the walls it is pitch dark.

EXPERIMENT WITH URBAN PEOPLE

According to Roland Barthes (1976), the pleasure of a labyrinth lies in moving through it. The labyrinth is not only the centers but also the whole, walls shape its form but the space that has any sense to us is the space we can move in: the negative space! And this negative space, is it not the one that interests architecture?

Fig. 7 Labyrinth gangways in the ensanche of Bilbao, Spain

For urban people the image of whole city was important because it was seen as a metaphor for the cognitive process. They don't know the city while loosing its petals. To know the city they must understand that it is a whole and only then will they know it. They can not grasp the city labyrinth while in it; they know the city labyrinth from the outside but they must go through it. The labyrinth is a whole, from narrow gangways and alleys to the super highways. From the moment they see the labyrinth able to represent a more abstract concept than form, they can also see it as a representation of a way of thinking, for eventually can reflect their cultures. If they are no longer on the right path and they see that even progress is not marked by the straight line, they still can believe in the circularity of daily living processes or even philosophical, and build a different reality from the one they

live in. Some people will move from one block to another while others jump to next city if they can not hold the labyrinth any longer. It is clear our inability to understand other cultures is due to this simple difference between one labyrinth and other, or to clarify to the conception of one metaphor or other.

Fig. 8 Labyrinth alleys in the old city of Lahore, Pakistan

Manipulating urban people with the labyrinth setting and layout is applied very common among shopping mall managements; from the traditional market to deluxe mall, in the western or in eastern part of the world. The more people lose their orientation the more easy they are persuaded to buy something (Cook, 1970). While their body exhausted and fatigue by being lost, their mind will be easy to be fascinated with eye-catching products just for releasing tension and anxiety of being lost. Even Junkfoods can be most wanted escape since foods release seratonin in the brain to make our mind relax but usually before it backs normal people has driven by consumptive mode. It is exactly like Barthes paraphrased about the pleasure of labyrinth.

Fig. 9 Lost in Maui traditional market, Hawaii

Fig. 10 Disorientation in Narita shopping arcade, Japan

CITY AND CONDITIONING

City is a place to form the behavior of human being. Forming behavior relied on received stimulus which is later given a meaning based on knowledge and experience. The interchanges are the obvious samples how easy individual's behavior can be formed. No matter how complex the labyrinth of the interchange - like spaghetti - will confuse urban people but if they follow the right direction they can arrive to the destination set up before. Not obeying path and direction will cause chaos. Although there are tempting short ways to cut off the lanes but if they won't obey the rule they will suffer traffic and accident. Here we can see that rules and regulations can be used to form urban people behavior where eventually they will internalize the rules and become habits for driving their car programmed unconsciously. Regulations can differentiate good behaviors from the bad.

Fig. 11 Light horse interchange, Sidney
Source: www.smh.com.au

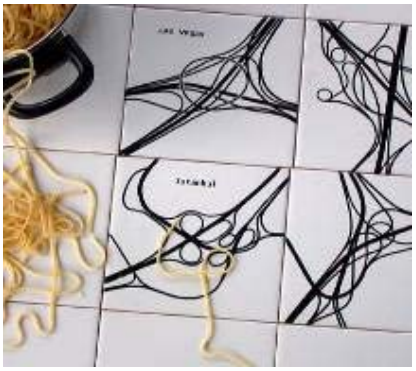

Fig. 12 Interchange & Spaghetti
Source: news.windingroad.com

Fig. 13 Route 10 interchange, Los Angeles
Source: www.ens-newswire.com

How to convert a person whom formerly altruistic and having prosocial behavior into an egoistic individual? Just move him into the city! Slow but sure he will become selfish. Psychologists affirm that behavior of human being intrinsically represents individual interaction process with its environment as manifested that he is a life being. According to behaviorist point of view, attitude and behavioral patterns can be formed through environmental inuring and confirmation process. Starting from this view, inuring and confirmation process can be formed through many instruments of the city such as vehicles, buildings, roads, interchanges, shopping malls, office layouts, furniture settings, information & communication technology, and even television programs.

A city is groups of people living in a large built environment. Of this perspective, city can be seen as laboratory, which its condition can be manipulated depends and urban people are the object of experiment. Some will protest with this understanding simply because they do not want to be treated as an object of experiment since human being can chose and cannot be ordered easily like a Pavlov's dog in Classical Conditioning theory. However, Skinner with his Operant Conditioning theory proved that animals also can chose, and even more they can commit suicide simply because they won't be forced. Of this reason, the term of object of experiment has changed into subject of experiment since experimentee is assumed having awareness towards its behavior. Nevertheless, both Classical Conditioning and Operant Conditioning are having the same goal that is to force the experimentee to do what the experimenter want. The easiest way is to give the experimentee a feeling of pain, physically and/or mentally so that the experimentee will listen and obey. Skinner used electric shock for pigeons and rats to force them choosing a certain knob without current among other knobs with current. But there was also behaviorist like Tolman and Hull who use reward, instead of punishment, to the rats if they perform well in order to obey what is wanted, so that they will repeat the wanted behavior voluntarily which eventually the behavior become habits.

TO SPOIL OR TO THREAT

Basically there are two ways of creating a behavior that is by giving reward or punishment. One creates a spoiling atmosphere while the other creates a threat nuance. Therefore if we want to make a society having certain behaviors as wanted, just create the fear (terror for instance) so that environmental atmosphere makes people will feel painful if they won't behave as wanted (obey the terrorist) or on the contrary just pamper the people so that they are happy to behave as wanted. The first one is done by forcing and the other one is done voluntarily. For example, if we want to make people not crossing the roads promiscuously just give an electrics shock by giving the road median a current. Or spread out the police dressing in disguise in the crowds where they can fine the violator very high as done in Singapore, so that people will feel there is cruel police among them and always spied on them. On the contrary, if we want to pamper the people so that they want to cross the road in the wanted spot voluntarily, we have to make a crossing-line with travelator like found in the airports so that pedestrian will feel more comfort if they cross using travelator.

Fig. 14 Walking thru Travelator in the Kuala Lumpur International Airport

However, the threatening atmosphere is not merely has to accompany with punishment. Thorndike used physical barriers so that certain behaviors difficult to perform. Instead of using electric shocks or spying on people, put tall concrete wall or constrictor fence which cannot be through in the median so that people cannot across. Here we can see that physical objects, like street furniture, bus stops, pavements, up to architectures can be used as conditioning tools. Therefore if we want to create a society with high level of individualism, just put them in vertical dwelling units as higher as possible so that social contact can be minimized. On the contrary, if we want to create a society with strong cohesiveness, just make a neighborhood with traditional houses that allow several families live in one house, so that it can maximize social contacts.

Strategy of pampering is much more human than threatening the people. By giving presents, bonus, and lucky dips to the society, they can be very consumptive as wanted, especially if the atmosphere of the mall and its shops can spoil them comfortably, completed with air conditioning and swaying music. But it can also happened vice versa, where physical environment determined by behavior patterns of the society. A Real Estate in Cul-de-sac or enclave design with exclusive gateways will be more saleable since it can protect the society from the riots, threats, and terrors though in the end it also create disintegration among social classes in society. Therefore instead of behavior determined by physical environment, the physical design accommodates behavior.

Spreading fear and creating threatening atmosphere will easily force people to create certain behavior. This strategy used effectively by mobs, starting from streets, traditional markets, terminals, political parties, and to government level. Hoodlums in the streets can threat people by saying will not protect the merchants from troubles if there is no security money paid to them (though they are the ones who make the troubles!). Police shadows the vendors in the streets who won't give money to them. A member of the senate will be excommunicated and recalled if he won't obey his party's interest. Formerly, public officers in Indonesia would be fired if they didn't choose the ruling party in election. Electric company will stop to distribute electricity if the price won't be raised by the city council, water

supply will be cut if consumers delay the monthly payment, and so on and so on.

CITY PLANNERS: THE EXPERIMENTER

For scholars like us, interpretation of the city and its people implies movement, the journey to the centers of the labyrinth. People that are able to go through the labyrinth and come back are the ones who has understood and deciphered it. For city planners the interpretation of a city is also a creative act for they create it, reproduce it and decode it. This could be the thread that keeps us getting lost inside the construction, mental or real, of space.

Fig. 15 Pampering the rat to enjoy the labyrinth
Source: www.sinnesphysiologie.de

City planners and government officials should apply *reward* approach instead of punishment to treat and to manage their citizen. They have to make a lovable living atmosphere so that they will love their labyrinth and do not want to move to other labyrinth in other city. They have to improve their citizen's welfare and well being. Try to create comfortable transportation modes so that people can experience the city labyrinth cheerfully. Makes the city cleaner, exciteful and pleasantful to live in complete with beautiful green landscape, anticipates anual flooding by building proper waterflow system, provides sustainable waste disposal facilities and so on. For non physical strategy, creates more jobs so that informal sector can be reduced and the city will be cleaner since the illegal booths & vendors will dissapear in the streets, limits personal vehicles so that the traffics will be smoother and the labyrinth is more comfort to go through, controls urban population since we know density is strong correalated with aggresion behavior which stimulate chaos in the city and eventually create many social problems. In short, city planners must try to make urban people enjoy to live in the city, just like an experimenter try to make their rats enjoy their labyrinth.

Seeing the city as a great figure of laboratory, city planners will find that involving urban people implies to the activities happened and could be manipulated in a labyrinth. The space of architecture is a labyrinth built by each and every building made. The architect who wants to get to know his profession gets on his way towards "the promised land", deep into the labyrinth of the city. In the same way they constructed a significant micro-universe, the architect creates labyrinths of meaning in which each element is declaration of its own secret. For each one of us the labyrinth could present itself in different figures, it could represent something subjective or concrete. But above all the labyrinth is a space and open to manipulations. Get experiment!

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UDC 711.4:32 (497.11) 352.075 (497.11)

POLITICAL CIRCUMSTANCES AS A RISK FACTOR IN URBAN DEVELOPMENT OF THE CITY

Vladan Đokić, Zoran Nikezić

This paper is primarily based on the observation of conditions and effects of functioning of Belgrade, the Capital of Serbia, in the period of its multiparty constellation. Although there were no significant intentions of political instrumentalisation of this segment of city functioning that would sacrifice social usefulness and efficiency of development to political marketing in the domain of urban planning, carrying out plans, and construction, , it is appropriate to point to these tendencies and needed to face the problem in order to operate according to the processes of free political competition and not opposing them.

INTRODUCTION

Political competition and rivalry have still not become a part of expected, established, defined constellation (system) at the level of local authority or administration.

Present competitive relations of influence in the process of governing urban development of the city, that can be determined as irrational according to the efficiency and efficacy of governance, should be understood as necessary and desirable part of the process of development directing. Therefore, system of governance and administration should be adjusted to the circumstance in order to achieve maximum effect, instead of searching for a way to avoid competition, disguise it, muffle or exclude it.

In the case that system is not adjusted to political competition as a necessary part of process of directing and governing urban development of the city, the rivalry becomes unwanted since it endangers efficiency of the city functioning, and, naturally, efforts are developed to defeat competition or, even worse, prevent it.

This work treats some of the problems of governance, primarily of urban development of the city in the present conditions, but also expected political competition, which under certain circumstances may evolve to political confrontation. It points to possible fields where such adjustments or reconstruction of local administration system and authority and competence, may be expected. It is a review of problems that need to be solved so that organization at the local level, crucial for urban development of big cities, would become democratic, socially justified and economically effective, therefore politically adequate.

It is convenient to start with supposition that urban planning is the most important item of directing the urban development of each local community. The exact definition of urban planning took from the Encyclopedia Britannica is: "Urban planning is mostly performed through authorities functioning and it requires application of specific observation techniques, analyzes, presuming and assuming. According to this, urban planning can be described as social movement, as an authority function, as technical discipline. Each aspect poses own conceptions, history and theories. Together, those are connected in one big effort of modern society to shape and improve environment that surrounds humans more and more, implicating to the city".

It is considered that the aspect of planning based on authority functioning is the weakest part in our system; and too often the main reason of non-adequacy of plan realization, and of directing urban development of the city. This work, for the mentioned reasons, aspires to point out problems in domain of politics and recharge mutual relations, so to direct reader's attention to some possibilities of its solutions.

POLITICAL CIRCUMSTANCES OF MANAGING THE CITY DEVELOPMENT

Management, as well as directing of the urban development of the city through local authority executing (at level of local community and the city), is public business visible and liable to citizens estimation, also it is "window" through which some political groups, formal and informal coalitions are showing their attitudes, values and programs to public. Each and every political group, either it has pretension to perform alone or together with some other, same orientated group, is demonstrating their values, establishing relations with other political groups and citizens, so it gets or loses its legitimacy by local authority executing.

Public interest in local authority work is a result of, on one hand, knowledge that daily or "small" politics is an indicator of potential "big" politics standing beside, so it is possible to estimate protagonists through local authority performances at global political scene. On the other hand, public attention is provided by nature of the problem that is local authority subjected to, considering extremely significant consequences of local authority decisions on every day life of citizens, on many town institutions and its economy. Not only

regarding communal service prices, quality and contents, the imperfection of authentic landowners relations in regards to decisions made by city government or local community, which can immediately become economical profit or damage. In other words, it can lead to the gaining of owners rights over building, land exploitation right (actually land owning), public land uses right, taking over the construction business, communal equipment and maintenance, therefore exploitation of the most important city resources (land, mechanization and income rights).

a) The fact is that on the level of local community problems (constructing, plans realizations, so as to consequences related to ownerships, economy and profit domain), the problems and interests which are far away from local are distinguishing, more exactly the problems that are connecting every day life with "big" politics interests are being resolved.

Local authority (either in domain of parliament jurisdiction or executives) is realized through activities on daily basis highly enclosing constructing and ownership problems and rights shaped that way, meaning urban plans realizations and other conditions essential for a city development. Regarded to mentioned transparency, obviousness of daily activities and functional result of local authorities, local authority operating becomes the basis of their political programs materialization and straight effects screening.

b) Political opposition to local authorities (either parliamentary or informal) is illustrated in public through the same ground of every day city functioning, criticizing the moves of local authorities and, in some cases, pointing out the other solutions usable in special occasions. In this manner, opposition is following primarily its high interest participating between restricted possibilities as on establishing fundamental strategies and politics, as well as on activities of public confrontation to executive authority decisions and its institutions.

c) At final point, more important role of third sector should be expected, as free conglomerate of citizen's associations, non-profitable nongovernmental organizations, diverse groups of specified interests and more significant influence, proportional to independent surrounding, through medias or by clear lobbing on directing the processes of political rivalry and confrontations, i.e. on local authority decisions.

POLITICAL RIVALRY AND CONFRONTATION

The expression rivalry understands competition, a game with forward defined rules, a fight that is respectable to rules, above all the one that does not permit that fight endangers premises that form the system (long-term interests of city development, meaning many goals with wordlessly or explicitly shaped concordance). Rivalry in politics, economy or even art, has positive connotation and attribute to making the developing processes dynamic.

The expression confrontation is identified with conflict that causes a blockage, deactivating, and also disables action and does not generate alternative possibilities, but it has to be solved at the level on which it has been caused. Short-date and occasional confrontations are included components of rivalry status, although longer confrontations may cause major departs from essentials, undeniable common interest and completely impede some important components of urban development, or even in case of solution shortage, it makes inadequate effects in city space. Principally, confrontation has positive connotation only if it occurs in current process, but negative if it is permanent distinctive of any relation or system condition.

a) Local authority (beyond City Government) mostly controls the reveal of urban plans (Master Plan comes into effect when the Ministry of Constructions confirms decision of City Government, though the rest of plans come to effect by decision of City authorities), while their realizations is under the jurisdiction of administrative authorities and organizations (such as: Secretariat of Urbanism, City Planning, Headquarter of Land Business, Secretariat for Property and Constructing business etc). All these proceedings comply with republic law, i.e. they are in compliance with ahead-defined system with inbuilt jurisdiction of local authorities. Thus, political structure of local authorities has, as the polygon of its own work (as well as the confrontation contents in usual political battle between parties and political groups), city performances that are taken as indicators of political attitudes and program performances, political strengths outlook, offering itself as key in resolving of more covering problems at level of all together community.

b) Considering that, the mentioned local authorities are just the part of bigger political businesses running by parties, therefore the city functioning takes place under direct influence of political programs and it is the game of political interests of those who are involved in local authorities and those who confront it. It is not needed to emphasize to which point it is possible that the results of these interests is away from the real ones of local authority. It is enough simply to remind on clash between city need for long-term defined and financially supported strategy of development, and political structures interests necessarily adapted to the rhythm of local and other elections, or rhythm of annual budget. This kind of interest conflict has to be resolved by establishing administratively legal and economical systems that will for sure grant continuity of urban development and for that reason rectify political rivalry influence that, on this occasion, presents a relation of previous, actual and the following political establishment.

c) Political rivalry induced from the outside projects, projects itself on city operating, in order to appear convincingly (considering that the whole thing is occurring under the eye of public). It may cause artificial attitudes polarization, i.e. it may lead to political confrontation in basic approaches about the mode how to manage the city, what plans are to be made, or more often, how to realize them. One group denies everything proposed or done by the other, as pointing out to the polarization of own main political structures through intended but false polarization of actual problems of local significance. It may come to endanger relatively rational city functioning in meaning of construction only because of those activities. In these cases, easily can happen (and it has been often bearing in mind that confrontations and political marketing existed even before multiparty system founding), that decisions are made for the cause of small and

temporary issues, instead of extensive and predetermined. This certainly presents the nonsense worth of fighting against, to each one responsible for public interest or public welfare.

d) Local situation becomes, in particular circumstances, an instrument or weapon of political marketing, as well as it is required, the instrument of tensing the differentials or calling the attention to compatibilities – independently of real issue state considering local interests, in order that those obviously become ground of political rivalries competition and a political fight device. Decisions, attitudes, priorities – all these can be responses to questions regarding local authority jurisdiction. However, these responses are always segmental and not referred to posed questions only, but to line up of other inexpressible matters. It is normal that each decision has to be treated as publicly expressible manifest, as gesture of larger import than it is presented within local framework, but with constantly forming boundaries of this double implication so that damage would not be larger than benefit.

SOME TROUBLE ISSUES IN DIRECTING THE DEVELOPMENT IN POLITICAL RIVALRY CONDITIONS

Centralization and decentralization of authority in relation to local community, city government and republic are main problems whose solutions would improve the effects of urban development in conditions of political rivalry. It should be expected that existing rivalry would outgrow to more frequent and more significant confrontation that would be included in democratic transformations during transition to strategically different system of urban development.

Various political groups and parties hold different authority levels (local communities, city government and republic). Besides all favorable terms on needs for rivalry regarding programs and ideas, which certainly exists, the way of non alternative development, it may also be noticed a line of serious imperfections of an formal system, i.e. of an redistribution of responsibilities and authorizations which substantially diminish the efficiency and rationality of managing and developing systems of the city.

Law, at one side, and responsibility at the other, mutually related in authority execution at level of local authority are uncoordinated vertically – from local authority, over city government, to republic. Local authority implies a certain least level of legal, financial and technological autonomy coordinated with responsibilities of providing developing framework for local authorities, providing conditions of usual every day life to city and citizens, as well as conditions of ordinary urban development. Currently, nevertheless, huge piece of logical functionally justified local authority obligations is out of reach to its formational authorizations. Local authority, the one that brings out a plan, has very limited possibilities for its implementation in domain of urban planning, so the overhaul plans considered to previous plans or existed state in the field became an important segment of local authority activities.

In this way the situation is not compliant with general world trend that forces reinforcement of local authorities, precisely emphasized in many documents and studies. For example, according to Habitat Conference II, it should be that local authorities are highly independent in particular administrative and financial issues taking into consideration their right to lead astray of own taxes. Alongside, local authorities may turn into landowners that would provide them to own a significant instrument of active land politics running, enabling them a very strong influence on process of directing the inhabitation development.

Mismatching of jurisdictions, close to us, is highlighted through expected political rivalry that exists among singular parties and coalitions, who are actually executing authority duties on different levels (from local, over city, to republic). In cases when authority is performing by the same political party or coalitional parties, there are less troubles in usual operating, although this type of system is directly bound to prove existing of our needs for real politics, and not for simply operative synchronization. Without denying the call for making contacts, or often a common problem solution and compromises, it would still be that the jurisdictions cleaning up is the exact way toward larger and more distinctive responsibility of any authority, as well as toward correlating efficiency with pluralism and democratic procedure principals.

It is comprehensible that even before there were (unrecognized) political confrontations and that they have caused frequent system blockade meaningful exclusions between existent field state and the one documented. Disclosing of confrontations and its resolving require interventions in managing system, particularly in jurisdictions redefining in order to provide "clear accounts" conditions.

Changing of jurisdiction in the meaning of centralization in relation to local community, city government and republic has taken place in the period when the opposition took over local authorities on the level of individual community, and later even the Belgrade city government. It has found an obvious political aspect, even if it does not comply with true interests of some system levels operating. At one side, nowadays there is centralization of city jurisdictions that no doubt may be reduced, in the way that one part can be transferred to the level of local community (probably not in domain of making and bringing the plans, but surely in large part of the domain of their realization). On the other side, there are a number of city management mechanisms, such as immobility ownerships, taxes and fees, services and renounced rights prices, issuing of regulations, decisions realization through communal police and similar matters, that are mostly sited on the republic rank, and which in fact disable the local authority functioning and executing, in the full sense of the meaning.

This kind of displacement detected in jurisdictions correlation drastically reduces technological and managing system entirety. It is worth to declare that this entirety has existed earlier and it has not depended on official jurisdiction separation, although the single political scene has been connecting all decision levels. Today, when such political discipline and singularity are exceeded, dislocated strictly defined jurisdictions that were more disturbed for the period of political pluralism ascertaining (saving city government

by centralization of city functions during the opposition overcoming in certain communities) are provoking the real disturbances for operating, functioning and developing of the city.

Cities in some European countries were the symbol of independent political entities with high autonomy level centuries ago. City government supremely expresses fundamental characteristics of national regime. If political democracy exists on national level, like today in the most of west European countries and Japan, cities are enjoying high degree of local autonomy and democratic managing systems. Yet in case of authoritative regime, central government usually reduces or even completely crushes local authority and democratic initiatives. This is how countries with all the power and responsibilities concentrated on certain persons or groups mostly at city government rank are demonstrating the same attitude as in central government.

This standpoint meets the terms of the newest world programs of sustainable development, such as for example AGENDA 21, which is expecting from local authority to present decisional factor in the realization process of the nearly all goals of urban development. According to this document local authority is supposed to set, manage and sustain economical and social infrastructure, as well as environmental infrastructure and some of the future planning processes, also it is supposed to compose local laws regarded to environment and regulative as well as to assist in application and use of national environment law. Each local authority should be able to create dialogue with its residents, local organizations and private corporations and to adopt local Agenda 21. By using consultations, local authority may learn lots from the citizens, local city associations, business and private organizations, as well as to get information that will help to produce best development strategies. This sort of consultations would increase consciousness about problems hold to sustainable development. In order to achieve aims of Agenda 21 programs, law and regulative of local authority, should be applied and modified following the principles of local programs. Furthermore, strategies should be used to support the offers for local, national, regional or international investing.

Especially significance in city functioning should be dedicate to public, as well to openness for the most important events, businesses and problems, and to all the acts that city government are performing to insure city functioning. Decisive assignment in public promotion of city outlook is in the hands of Medias who are seen as actual power sources, more or less independent from formal government executives. This is the reason why the development of independent medias and public opinion in general, so the entire communication with citizens are constituent part of the problem of directing the urban development in the conditions of political rivalry and confrontation, therefore it is recommended to explore this topic separately in framework of corresponding disciplines.

Diversities in political aims and programs, even more in political interests of differently ranked authorities, in conditions of no jurisdiction system, but mixed and technologically unsynchronized jurisdictions, are in possibility to endanger validity of any decision made on the level of local authority, still to completely disable their carrying out and cause long-standing and damaging confrontations. We consider needless to diminish or cover up those diversities, but to build new coordinated system of jurisdictions on the principles of decentralization and logical horizontal correlation of functions at the levels of community, city and republic.

CONCLUSION

At one side, basic troubles that are preventing existing system inadequacy to be misused, are in common sense and ethical aspect of all actors at the scene of local politics and local authority, as well as in an active part of independent medias (if there are some), who are following and indirectly controlling behavior of different groups and all events in daily city life.

At the other side, basic initiative strength that makes city functioning in spite of, and not gratitude to its own structure is in large persistency of the same actors and in huge effort putted so to reduce negative relation of investments and effects caused by current system.

However neither of those is rational support for long-term periods. It is needed to transform formal systems, to coordinate responsibilities, jurisdictions and possibilities of local authority and adjust them to new circumstances of managing the city in the conditions of political rivalry, and then not only to permit city development, but to encourage it.

We are standing at the opinion that the most considerable step to improve the conditions of city functioning from the position of managing in branch of directing the urban development would be decentralization of jurisdictions and their mutual synchronization. Certainly, this would not matter only to urban development, but to entire system of local authority, thus from the bottom to the top on the system organization in the wholeness.

Although importance lay in horizontal distribution of responsibilities and authorizations in relation of local authority executives and their parliaments, even in the matter of professional autonomy management and their possibility of impoliticness, it is moved to the backside at present.

What comes as very interesting issue is how to organize functioning of local authority and its interior organs in one new constellation of authorizations. This problematic issue has to be resolved correspondingly to changes proposed in the lines of their straight consequence (i.e. as reason of their reconstruction).

There are obvious tendencies that local authority executives are becoming more powerful on the damage of their parliaments, as also tendencies that the role of city manager as politically autonomic professional in direct executing authority is becoming more important, so we are facing one of the issues that require special attention and treatment, somewhere out of this work.

The main principle is to incline towards horizontal connection of jurisdictions respecting whole autonomy principles at the lowest authority level (already accepted principles that are making efficiency and

rationality in managing increasing, and more direct democratic deciding referred to relevancies of local authority, not damaging to extensive community.

It can be that some communities that are capable to renew their local framework, are being crushed by local framework of the country. In order to prevent this, it is recommended that the authority is decentralized. Decentralization of authority by the principle of territorial distribution is making that citizens can become active members of society political life. The existence of local authority presents one of the most important suppositions in order to turn big city into democratic community. Choosing the type of local authority directly influence to further institutional types of local authorities in a big city, as well as on the type of relations and connections created in such community.

Therefore, city and local community have to have their own complete and effective local authority, i.e. true authority for the issues regarded to local community development, and already inbuilt in the largest part of European democracy. It is about decentralization of the city referring to the local community and decentralization of Republic referring to the city government. This kind of decentralization should be carried out in the domain of law (regulative), economy (ownerships, income – expense) and system functioning technologies that make city functioning dependent of (energy, traffic, police …). All this mentioned would enable development from the bottom, what is marked as rational and democratic.

Finally, it should be underlined that democracy and strength increasing of local authority, by reducing the level of deciding to the lowest from the viewpoint of managing rationality are not simply the civilization establishment of the developed world that by established procedures are confirming the values of individual and community belonging to. It is about very rational systems that are reducing resistances in realizations of democratically made decisions, mostly hiring community efforts (voluntary and with precise interest) to achieve common goals.

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UDC 711.21.16
711.21:502.131.1
711.5

DEVELOPMENT OF NEW ECONOMIC POLES IN METROPOLITAN AREAS: BELGRADE EXAMPLE

Slavka Zeković, Nenad Spasić, Tamara Maričić

INTRODUCTION

New European paradigms of sustainable economic activity development (based on the Lisabon agenda) have had a profound effect on the creation of new phases and devolopment policies in Serbia, such as spatial-planning and urban policy. The economic and social development policy founded on new knowledge, innovation and entrepreneurship (the development of small and medium-sized entreprises, spin-off companies etc., as „regional catalysts" of development), environmental protection and principles of sustainibility, represents the new paradigm of spatial development. Harmonisation of strategic aims, policies and instruments is an essential factor for the competitiveness of industry and individual regions.

For an effective planning of sustainable industrial development and spatial organization in urban areas in Serbia in the following period, it is necessary to incorporate European strategic frameworks, approaches and spatial planning practises. In the process of economic and social transition in Serbia, coordination to the conditions of EU competitiveness, the development of small and medium-sized entreprises in the industrial sector, services and other business activities, as well as urban policy, is a complex economic and spatial planning challenge. Under the pressure of global processes in economic development, the transition of the socio-economic system into a market-oriented economy in Serbia, among other things, has influenced the creation of new economic poles (spatial-economic clusters) in urban areas, changes in spatial organization of cities, the apearance of new locational-spatial forms of industries, services and various business activities, urban development etc. In the present stage of transition and development, it is necessary to begin with the adaptation of development, spatial and economic policy in accordance with the rules and demands for joiming the EU. The present process of transition and development took place until the end of 2006, without a ratified strategy of development, i.e. until the adoption of „Serbia's Strategy of Industrial Development by 2012". Unfortunately, this strategy does not deal with the questions about the effects of development processes and the process of globalisation on the creation of new economic poles/spatial clusters within urban/metrpoliten areas in Serbia. Therefore, this work is trying to demonstrate the need for the research of new economic poles in urban areas, the need for mechanisms of agglomerating activities in spatial/economic clusters, the typology and parameters of new economic poles, and the harmonisation of sustainable spatial and urban development in Serbia, based on the example of the Belgrade metropoliten area.

PARADIGM OF SUSTAINIBILITY AND VISION OF TERRITORIAL AND URBAN DEVELOPMENT

The latest discussions concerning potential spatial development are not possible without taking into consideration the visions of socio-economic development. However, in economic theory the ideas of certain schools about the vision of economic development have always been divided between free market and/or state regulation. Apart from this difference in opinions, according to Heilbroner R., Milberg W. (1997), a certain crisis of visionry is evident in modern economic thought. In a way, the utopian vision of society and economic growth in a soc.-realistic planning system in the development of post-communist areas has been opposed to political pluralism and market-oriented economy. Hodgson G.M.(1999), finds that an evolving economy and the development of economy occurs inside the context of long-term perspectives, high uncertainty, with an accent on resources, entreprise potentials and institutional evolution arrangements. Hodgson G. M. (2000), also, points out that the utopian paradigm of the central/planning system is replaced by another – a paradigm of market individualism, and that these two should be replaced by „market cognitivism" and by „a learning economy". If we consider the idea that defining a vision is a pre-condition of general progress in spatial organization, the same can be considered as a target point and an essential place in the concept of future development. Two key global tendencies have influenced the socio-economic and spatial changes – the globalization of economy and the transformation of postcommunist economic systems and state into a market economy, political pluralism and the strenghtening of institutional frameworks. The concept of sustainable development, as a challenge in harmonizing economic, social, political, environmental and spatial dimensions could serve as a suitable frame for"depreciation of influences" of globalization processes and socio-economic transitions on all levels of planning. Due to the influences of the latter processes, spatial organization of cities and settlements, regardless of big regional differences, is characterised by a 'Planetary" sindrom of standardizing lifestyles and

organization of work for people , together with a characteristic homogenization of urban structures and processes (the so-called European monotopy, -Jensen O.B., Richardson T., 2004).

From the viewpoint of the proclaimed new competitiveness policy of European area, a dominant role of economy is noticeable, one that is based on knowledge, innovation and entrepreurship, or the so-called „learning economy", in accordance with the the principles of sustainable development. In accordance with the changes in knowledge , innovations, indications of new potentials and ideas, a question can be raised about different options concerning future spatial development. Essentially, it concerns the choice between various uncertain futures of spatial development and the „certain" future of planning.

According to Jakšić M.(2004), the challenge of the 21st century is not in establishng a fixed and final *utopia*, but in creating an *ev-topia*. In other words, instead of *u-topia*(a Greek word meaning an „*imaginary/non-existing*" place) – the creation of an *ev-topia*(a place that evolves, develops), meaning a system of stimulating and applying knowledge and adjusting skills to the conditions, uncertainties and aims of the surroundings. As the mechanisms of perception and acquiring knowledge have a social character, social relations are based on territory, so is the development of economy based on knowledge togeter with mechanisms of spatial planning policies.

Starting from the complexity of spatial development and the aspirations for a certain unification of spatial-planning policies and standards within the European area (on a national and supranational level), parallely with the mentioned system of *ev-topia*, according to Jensen O.B., Richardson T. (2004), on territory exists an even more pronounced phenomenon of *European mono-topia* (in *the sense of unification of places, spatial structures, processes of expanding new economic poles in city periphal areas* etc). In order to overcome the reverse effects of spatial mono-topia, changes are necessary in the understanding of universally effective ways and mechanisms of planning an industrial balance in a defined area, in accepting local conditions, locally „coloured"structure systems and the particularities of a local/regional area. The development should be suitable for the actual conditions of area, i.e. it should depending on stimulating and limiting circumstances, but also on an institutional frame as well. However, the connection beween these elements is determined by the political and social power in interaction with a market-oriented economy, the strong influence of the process of globlisation, and the creation of new economic poles in the city suburbs.

According to Harvey, J. (1996), the main dialectic insights useful for linking the discourse of general development with that of spatial development are founded on:

a) endevours to „map the area" as a precondition for structuring any kind of knowledge;

b) mapping the area, which implies a certain kind of power, as a crucial mode and tool in the political battle and decision-making;

c) on social relations that need spatial frames;

d) on practical experiences of spatial change, in which all knowledge is included;

e) institutions that have been made territorial, mainly for controlling sustainable development, surveillance of territory, issue of authority over land, resources, etc.

f) on innovation (of thought, desires and imagination) as a fruitful source for reshaping a territory and activities, in accordance with different discourses, social relations, power relations, institutional structure and practice.

Principles of sustainable development should be added to these (CEMAT, 2000).

TREND OF EXPANDING ACTIVITIES AND NEW ECONOMIC POLES IN CITY AREAS

Questions concerning the mode of organization and management of development on a regional level and level of metropolitan areas are being raised throughout the EU. Mathias J. (2003), points out the manner in which political actors in peripheral regions of EU are trying to create and implement the strategy of regional development in the context of regional decision-making, by way of EU institutions and national governments, in respect of the globalisation process. At the same time, a „new regionalism" is evident, together with two main models in European integration – neofunctionalism and liberal intergovernmentalism. Amin A., and Massey D. (2003) point out to the radical decentralization and relocation of national political institutions and global economies into less developed regions. Apart from this general European trend of curtailing regional differences, establishing new „economic poles of development" in metropolitan peripheries is also significant in planning spatial development. According to Burdach J.(2006), it is a matter of a new discourse in peripheral growth (metropolitan). Simultaneously, a trend of faster industrial/economic growth of the EU peripheral region can be observed with the integration of new member-states. In other words, a presence of a new discourse of double peripheral growth is evident – a growth of peripheral metropolitan areas and a growth of EU peripheral regions. New economic poles in metropolitan areas are a result of a high participation of the public sector (especially in providing heavy infrastructure, support in curtailing spatial unbalance, etc), but also in attracting foreign and local investments. State intervention, schema of regional planning and local actors have a significant role in their development as well. State intervention in the public sector has an entrepreneurial character, which can be noticed in various forms of public and private partnerships. According to the EU Competitiveness Program 2007-2013, in the target year (2013) for competitivenesss growth, economic growth and employment, a budget of 16,3 billion euros/per year or 33% of EU budget is predicted. The initiated process of relocation, expansion and transfer of know-how, and direct foreign investment into Eastern Europe has influenced the dynamic of growth of GDP in this part of Europe, and of the entire EU. With the expansion of EU, it is supposed that the average GDP per capita for the 15 member-states in EU will be around 10% less, especially because of the growth rate dynamic of GDP of new member-states (according to

Kovačević R., 2004, in the period 2000-2004 growth rate of GDP of these countries was 3,2%, while the rate of BDP of the 15 member-states was 1,8%).

New economic polarities in urban/metropolitan peripheries

In some large cities of Europe, and Serbia as well, (ex. Belgrade, Novi Sad), new economic poles – new economic, commercial, industrial, entrepreneurial zones that have been created by planning or spontaneously in the suburbia (along motorways, main roads) have a priority in the development and spatial organization planning of the area. The reasons for such a trend are manifold – low price of land, available sites, proximity of residential areas, favourable conditions on site etc. The expansion of work/factory zones in big cities is contradictory to the idea of a sustainable compact city, above all, because of an increase in transportation, greater energy consumption, greater costs of infrastructure, negative effects on the environment, ruin of agricultural land and similar. In this way, the tendency of deurbanization has transformed into suburbanization, because the density of population in peripheral metropoliten areas has rapidly grown, as well as the number of flats, the growth of economic activity, costs of infrastructure, ecology etc. In other words, new centres of production and consumption influence the transformation of suburbia (as mainly residential, socially homogenous zones, with lower density in an urban periphery) into post-suburbia (which expresses the transformational process in multi-functional locations). Many different concepts have been concerned with this phenomenon of the transformation of suburbia into post-suburbia, describing it as a „new centrality" outside of the central place, i.e. the creation of a new centre outside the downtown city area. The term „new economic pole" implies various kinds of new dynamic centres with a functional specialization in the metropolitan periphery. The main spatial forms of new economic poles in peripheral urban areas (suburbia) are industrial parks, technological parks, industrial complexes, shopping malls, business-commercial centres, logistics centres, business centres etc.

According to Burdack, J.(2006), the concept of classic spatial models of cities (standardized „rings" and sectors) is being more and more transformed into polycentric forms, created by grouping or networking different kinds of locations for different purposes. A tendency of the breaking up of urban structures into different series of specialized and fragmented localities, by way of clusters of activities disperesed inside a populated structure. In that way, more and more an image of a „functional archipelago" is created in an urban (periphery) fabric, unlike earlier approaches. (for example, in earlier GUP in Belgrade in 1970's, the concept of an „archipelago in a sea of green" was promoted). The cummulative effects of developing new poles lead to a new concept of growth of urban/metropolitan periphery as well. Initial nucleuses of this development are often shopping centres, business-commercial centres et sl., which is a consequence of the transition of an industrial into a post-industrial society, i.e. the transfer of agglomerative advantages of cities onto regional/peripheral surroundings. Based on the experiences of European cities, new economic poles have 5.000-10.000 workers.

Mechanisms of agglomerating in new economic poles

In studies and explainations of the development of functions/activities of spatial cluster in a defined territorial entity ,Agglomerating mechanisms play an important role. For example, new industrial zones and production complexes show various mechanisms of spatial/economic clusters on town and regional levels. According to Burdack J. (2006), three types of mechanisms stand out and they lead to different spatial clusters of activities:

1) spatial branching based on incoherent agglomeration;

2) spatial branching as an industrial complex (coherent agglomeration) and

3) spatial branching based on social networking (coherent agglomeration).

First type of spatial clusters is based on the grouping of functions because of the factor of proximity (to the centre). These clusters usually lead to the reduction of transportation and communication costs, to the reduction of employment costs when hiring local work force, the reduction of costs for using local resources, special services and infrastructure, as well as the advantages of the proximity of the local market. In this formation of branching activities, an absence of special gains is evident because of the presence of other actors. The key factor of agglomeration are the real estate costs. Burdach, J. (2006), calls these clusters some sort of „open membership", in which usually are concentrated business facilities and offices, in which there is mixed use of land, with residential functions, and with main corridors are linked to the central parts of the city or region.

The other type of spatial clusters, like the industrial complex, is based on well-known input-output links among the entrepises in the zone, which mainly have a commercial character. The locational behaviour of entreprises in the complex is directed towards the reduction of costs in the transactions between companies (intercompany cooperation). These industrial spatial clusters are more stable than a simple and incoherent grouping of entreprises. In the industrial spatial cluster there often is one dominant entreprise that „determines" the principle conditionsfor locating the other companies around itself, by way of a kind of hierarchy of relations. These zones are often far away territorially from other built locations, but are always connected by motorways and main roads with their surroundings. Examples of this form of industrial clusters can be seen in many big towns in Serbia – ex. the zone location in the area of motorways and Belgrade airport, in Pecinci, Šimanovci, Indjija, Novi Sad etc.

Examples of spatial clusters based on social networks are local zones/areas, which are favourized by directing social capital, knowledge, networking. These functions of branching, based on social organization of institutions, are often linked to the „Californian school" of regional economy, whose followers are Scott A. Storper, Saxenian (Scott A, 1988). Research of locational factors of agglomerating high-tech industry are very extensive, and demonstrate the differences in attitudes of

theoreticians of planning (Markusen A., Hall P., 1986., Scott, Storper, 1987., Scott A.J., 1997). reject Markusen's theory of unique high-tech industry locational factors, while stressing the factors of highly-skilled personnel and the economy of agglomeration/clustering. Saxenian, A. (1993) supports the views that agglomeration of high technology stimulates synergetic factors, and has many spatial and infrastructural attributes. Examples of this kind of concentration of activities into clusters are high-tech zones (ex. technology parks, industrial parks, high tech corridors, business incubators et sl.).

With the evolution of knowledge and awareness of the greater roles territory and environment play, as limitating factors in planning industrial development, there have been some „contradicting" attitudes in the treatment of locational and environmental aspects of investment moves. According to traditional economic theories, industrial development is primarily determined by capital investment and employment rate, without the role of technical progress and location. However, neoclassic theory of proportional factors (which includes technical progress), indicates the special importance of *locational economies* as a result of expansion of industrial space, and the role of *agglomeration economies – urban economies* in the planning of industrial development.

Typology of new economic poles in urban/metropolitan peripheries

In the typology of new economic growth poles in the urban/metropolitan periphery, the agglomerative mechanisms of functionally-related clusters of companies (functional clusters) and „unrelated" clusters are very important, as well as functional specialization of poles. On the other hand, there is a generally accepted classification of new economic poles into „dynamic" and „stagnant". The first are related to, for example, shopping malls, airport zones of development, technology parks, zones of business-commercial activities in an urban periphery, and the other („stagnant") are usually relics of the soc.-realistic era (classic industrial, work zones, military complexes et sl.).

In European cities, new economic polarities are a result of locational dynamics and reevaluation of the existing spatial organization under the effect of activity of multinational companies and the development of structure on knowledge-based economy (with strictly global relations). According to Dovenyi Z., Kovacs Z. (2006), the post-communist deveopment of eastern-European cities shows a hybrid layout with relics of spatial structures of the socialist era, a phenomenon of structure transformation and new suburban/posturban spatial layout of clusters. The majority of totally developed new economic poles have a clear sectoral orientation. New economic poles are comprehended as a great area of concentration of economic activity, comprised of many „spots", points, branching, and have a specific spatial configuration. They are initial nucleuses of new employment growth in city peripheries, and the first early signal of a polycentric structure of a territory. Spatial economy of periphery urban area is not homogenous. Although, until recently, traditional city peripheries were identified as a mixture of industrial spaces, family homes, traffic corridors and greenery, today they have a more distinct sensitivity to market signals and initiatives in relation to the central city zones. In this space, drawn by the growth of population with a higher education, especially by way of a new infrastructure for research-development institutions, many new high-tech activities of production take place services. There activities of transportation services are developed, logistics, production and wholesale (warehouses, storehouses etc.) shopping malls and various services.

EFFECTS OF NEW TRENDS OF DEVELOPMENT OF ECONOMIC ACTIVITES ON SPATIAL ORGANIZATION OF BELGRADE METROPOLITAN AREA

The process of post-suburbanization is a consequence of activity of commercial powers and it takes place in all metropolitan peripheries, including Belgrade. Significant foreign investments and the development of 86.000 entreprises (of which around 1/3 are in Belgrade), illustrate a more significant role of market mechanisms of allocated new economic content in the metropolitan area. According to *Serbia's Strategy for Joining the EU*, (2005) a development of industrial parks is predicted, which would later grow into clusters, with the provision of necessary heavy infrastructure, possibility of fast construction of business and industrial facilities, fiscal incentives and qualified labour. *The National Investment Plan of RS* predicts the construction of 49 industrial zones in towns of Serbia. According to data of *Serbian investment climate assessment* (2004), only in the area of Belgrade, in a „new wave" of construction 20.000 ha of urban land (farmland) has been found to be under construction in the peripheral area. A housing deficit in Belgrade, numerous refugees and dislocated persons, have caused a significant residential pressure onto the suburbs, and uncultivated farmland of Belgrade agglomeration (ex. Zemun corridor, belt of motorways to Surčin, Batajnica, Novi Sad, Avala direction, Borča, Ovča, Pančevo direction etc.) as well as the birth of new small entreprises, and the concentration of economic activity in the mentioned spaces. Metropolitan periphery outside the borders of the city of Belgrade is becoming more attractive for settlements (ex. The zones along the motorway Belgrade-Novi Sad, Belgrade-Zagreb, Belgrade-Niš, Ibar direction, Avala direction, Zrenjanin direction etc.) due to easy access to the corridors, nature etc. In addition, a concentration of economic activity is evident along the motorway from Belgrade to Batajnica, Novi Sad, airport "Nikola Tesla", Dobanovci, Zemun, Pančevo road etc. A great concentration of economic activity has occured outside the Belgrade agglomeration , on the motorway zones _ ex. large industrial zones in Šimanovci, Pećinci, Krnješevcima etc. At motorway exits (corridor X) big shopping centres have been built like „Metro", „Tempo", „Idea", „Rodić", „Mercur", „Mercator", „Veropulos", etc. Municipalities that have better traffic and communication links with their surroundings, and with the central zone of Belgrade, and have an efficient entrepreneurial local authority and administration, are advantaged in attracting new content. In the Belgrade agglomeration, those are municipalities Pećinci, Surčin, Stara Pazova, Indjija and others.

At the start of transition we can equally find both the existing functional territories/areas and areas of economic growth with new functional specializations. A significant part of urban spaces is occupied by industrial and transportational functions and facilities, often they are very negative. Recently, with privatisation, the process of reactivating abandoned industrial locations (brownfields) in eastern-european cities, including Belgrade is gradually being opened. In cities with a market economy, the industry holds 4-10% (Paris 5.2%, London 4,7%) of the entire developed space (Bertaud A., 2006), while industrial locations in eastern-european cities occupy 15,1-43,8% (Prag 13,4%, Varšava 15,1%, Sofija 27,1%, Ljubljana 27,4%, Moscow 31,6%, St. Petersburg 43,8%. In Belgrade , it is approximately 18%. However, the general opinion is that due to the price of construction, parking problems et sl., the new dominant trend is construction in new industrial facilities, on free locations in the urban periphery (greenfields).

Clustery deconcentration of business activity leads to a new relation and movement from the centre of city to the outskirts. The effects of development and concentration of industrial activity and living in the suburbia (post-suburbia), without control of the over-construction phenomenon or urban lots, environmental effects and pollution et sl., have an ever-growing, partly explosive character. Post-socialistic „boom" of the metropolitan periphery is not imminent to only eastern-european and Balkan countries, but to developed metropolitan areas of Western Europe too. The development is shifting from the central compact city nucleus to the inner and outer city peripheries. One of the principle reasons for the socio-economic and spatial transformation of urban areas is the proces of tertialization, i.e. the development of services. The main instigator of these processes are usually foreign investments into the services sector (most often it is the banking sector, insurance, shopping malls, sales and exhibit halls, hotels, storehouses and trade etc). The role of city authorities , municipalities and local investors in this proces is relatively small, usually they have a service function in providing suitable conditions on locations.

The formation of new economic poles as a result of a general tendency for an international shift of production and services from the city centre to the periphery. In other words, the market mechanisms and factors of international proportions, activate the pressure of direct foreign investments into metropolitan/urban peripheries, above all, because of the agglomeration economies, reduction of various costs, acceptable and favourable locational economies in periphery city zones etc. This process has negative repercussions both in spatial-environmental, and in the institutional domain as well. Based on theoretical opinions, experiences from many areas, it seems that the process has a devastating effect on the regional and local institutions, as well as on the local investors, by imposing on them the rules of behaviour, standards, movements and direction of capital. Inside an urban-spatial context, it can be directly observed in the profound changes (quite often in the caving in as well) of the existing spatial organization of a city, city zonings, propositions, rules and regulation standards for using the building land et sl. So, direct foreign investment is the pivot of the development of new economic poles in urban areas (banking, shopping malls, high-tech and business activities, industrial parks, logistics centres and transportation etc). This process has a foothold in the theoretical concept of liberal economy, especially the so-called Smith's „invisible hands" of the market. In other words, the processes of illegal constuction and expansion of cities are only a consequence of bad legal solutions in the field of planning and building of spaces, poverty of citizens, social and other problems, but they are directly fuelled and/or initiated by market mechanisms. The process of suburbanization is „artificially" initiated by economic and social policies as well, but also by inadequate mesures of urban policy and policy of urban land (ex. untransformed system of managing the building land, undeveloped instruments of taxing building land and real estate, tax rates, the fee for land development and usage, local taxes, subventions, concessions, etc.).

In accordance with economic restructuring (tendency towards tertialization) in a spatial urban/metropolitan structure, a stagnation and „disappearance" of classic industrial zones, complexes, entreprises is evident. A functional conversion of these zones is evident, fuelled on one side by the process of privatization of state entreprises in these zones, and on the other side, by the pressure of direct foreign investment. The process of transformation of these „ossified" industrial localities is often complicated, slow, expensive and uncertain, that is why the activities of construction and development of new zones/ecomonic polarities (greenfield investments) in an urban matrix are much more important and large-scale.

The process of globalization and the activity of the „invisible hand" on the market, among other things, is the product of profound spatial, structural, urban and socio-economic changes on all levels. On the territory of Serbia, due to the activity of transitional changes these processes have been significantly boosted. However, they flow spontaneously, randomly and often without adequate planning and management or institutional control. In the period between 1990-2000, due to the many political economic and social happenings in Serbia, „grey" economy was especially promoted, with an explosion of illegal construction and an uncontrolled expansion of cities.

The aim of urban planning policy and the concept of branching-clustery deconcentration activities is to prevent the negative consequences of the doom scenario and entropy of urban territories (conversion of the „boom" development scenario into the so-called „doom scenario"), based on the priciples of sustainable development. Considering the fact that the development of new economic polarities in urban peripheries mainly is not linked to regional and national politics, the concept of polycentric urban structure could alleviate the negative effects of the mentioned tendencies. The development of potential implications of new polarities onto the regional environmnet and development, the manner of coexistence of growth and stagnation areas and/or depression, the disappearance of traditional industrial production, expansion of services, explosive growth of suburbia, is the subject of planning policy of metropoliten area.

Possible development of new economic poles in metropolitan area of Belgrade

The current developing tendencies in the Belgrade metropolitan reflect the growing socio-economic differences through a special „functional archipelago". In accordance with the experiences of the European metropolitan peripheries, the possible scenarios for the future expansion of new economic polarities in the metropolitan area of Belgrade:

- an actual existence of area growth, mainly along important traffic corridors nearby the city centre, will continue in the future as well. Today this process is visible along the motorways Belgrade-NoviSad, Belgrade-Zagreb, next to the airports „Nikola Tesla" (the so –called „aerovill" – Herfert G. 2006.) the Ibar major road et sl.;
- the development of new industrial structures (modern production complexes – industrial parks, technology parks entrepreneurial zones, complexes) mainly by government aid, the arrival of multinational companies, the support of EU et sl. Apart from technological complexes, the new polarities are the shopping malls, distribution-transportation centres, business centres and others.
- the prediction that the residential zone of suburbanization will expand in the future onto the green zones and will demonstrate the adverse side of suburbanization;

-the process of reurbanization in the Belgrade agglomeration is present sporadically, by way of rehabilitation of the existing industrial zones;

- the development of new industrial/business spatial forms of the new economic poles of development in the rural area, with the possible development of a big theme park. The construction of Waterland on the periphery of New Belgrade, the planned construction of Aqualand nearby Dobanovci, along the motorway Belgrade-Zagreb, like specific economic poles. Some European cities within the new poles of development have waterland parks and other zones of recreation and entretainment – „funurbia", „tropical islands" etc.
- and apart from the problems and impossibilities of an accurate prognosis for directing the dynamics and developing processes, it is predicted that the centre of socio-economic trends in the following decade in the belgrade metropolitan will move to te periphery. In accordance with such expectations, and the functional borders in the metropolitan area can be significantly expanded.

CONCLUSIVE REMARKS

The development of economic activities within the new economic poles-spatial-economic clusters in urban areas can be assessed as a consequence of the process of globalization. New economic poles could be some kind of conglomerate of old spatial structures and the development of new locational-spatial and development models in the urban fabric, under the influence of market and the globalization process of economic activity and investment. In this process are evident: the existence of growth area, mainly along important traffic corridors nearby the heart of the city; development of new spatial/locational forms of modern economic complexes (industrial park, technology park, high-tech corridors, complexes), mainly with government aid, foreign investment of multinational companies, et sl.; the effect of large changes onto spatial organizations of metropolitan areas; possible destructive activity onto the institutional framework of the local community, but also turning the local institutions towards „entrepreneurial management"; over-construction of building locations; the effect on the price fluctuation of real estate in certain parts of metropolitan spaces; population mobility from the centre to the peiphery (in residential and work functions); endangering the quality of environment and others.

It is estimated that the absence of harmonization of European development policies, industries, spatial development, environment in future territorial development of economic activity in cities and regions of Serbia could have consequences in :

a) the further process of restructuring and the growth of competitiveness of local economy and teritories, within the new phase;

b) the practice of planning spatial development of economic activity, especially of industry and services (in the approach, methods, spatial planning policies, means of planning and solutions implementation);

c) environmental protection, because of the falling behind in the implementation of the principles of sustainability on levels of different spatial entities and corporative level.

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UDC 728 (681)
711.435 (681)

AN EVALUATION OF THE SELF-HELP HOUSING SCHEME IN BOTSWANA, CASE OF GABORONE CITY

Horatio Ikgopoleng, Branko Cavrić

Botswana like other developing countries faces a problem of acute shortage of housing, particularly for low-income urban families. The current housing problems are the outcomes of the economic, demographic and social changes which the country has experienced since independence in 1966. In particular the urbanisation process which surfaced in the early 1980's. The government has sought to cope with the problem of low-income urban housing by establishing a Self-Help Housing (SHHA) programme in the main urban centres.

The evaluation findings reveal that, on the whole, the impact of the SHHA approach on the improvement of low-income urban housing has been unsuccessful. The major problems of the scheme are lack of serviced land and inadequate finances for plot development. This has been exarcebated by the high urban development standards which are out of the reach of low-income urban families. The evaluation study also reveals that, there are some indications of non low-income urban households living in SHHA areas. The available evidence reveals that the number of those people in SHHA areas is not as big as has been speculated by most people in the country. However this paper calls for more investigation in this issue and a need for more tight measures to control this illicit practice.

The major conclusions are that housing policies in Botswana are not supportive of the general housing conditions in low-income urban areas. Therefore there is a need for urban planners and policy makers of Botswana to take more positive action towards the improvement of low-income urban areas. This would require pragmatic policies geared towards the improvement of those areas.

Keywords: ***Botswana, Low-income housing, self help housing***

INTRODUCTION

During the last three decades, most developing countries have experienced fast urbanisation. It has been a world-wide phenomenon since the early 1950's (Choguill 1993, Tipple 1991, Gugler 1992). The literature by most housing advocates spelt out that urbanisation is the root cause of housing problems in urban areas of developing countries.

The current speed of urbanisation is probably not excessive, but the numbers involved are enormous. The United Nations projects that by 2025 over 4 billion people (86%) of the global population will be living in urban areas of developing countries and there will be 486 mega-cities in the developing world with at least one million population (Choguill, 1996). Over the next 25 years most of the newcomers will be absorbed in towns and cities (Jaycox, 2002). The earth's natural resources can no longer support this current rate of population growth, and the built environment continues to deteriorate as a result of increased demand for housing and social services. Urbanisation in Sub-Saharan countries has not been accompanied by concomitant economic prosperity as it was in developed nations. For example countries like Botswana urbanised from a very poor base.

In the end the urbanisation process produces cities. In turn, "cities are synonymous with growth ... they are subject to dramatic crisis especially in developing countries. Poverty, environmental decline, lack of ... services, deterioration of existing services, ... (lack of) access to land and shelter" (UNCHS/World Bank, 1995), all of which aspects contribute significantly to the development of serious housing problems such as poverty and mushrooming of slums and squatter settlements.

Despite the scale of rapid urbanisation, generally people moving into urban areas seek to improve their standards of living. People migrate to cities mainly to seek for job opportunities, they perceived that urban areas offer better prospects for higher incomes. They often live in squatter settlements where decent housing, and infrastructure and social services are remarkably missing.

SELF-HELP HOUSING: CONCEPT AND RATIONALE

The ideas of Turner (1976) and Mangin (1967) have been very influential in self-help housing. They brought about a shift in policy to one where the poor should be left to solve their own housing problems through self-help

initiatives. It was also influenced by the World Bank and other lending institutions by giving financial and technical assistance to low-income people.

This concept underwent a marked transition between the 1960's and 1970's, it can be traced as far back as the humans' earliest activities in production of their own housing. It is a rural phenomenon where people build houses for themselves in villages. Abrams (1969) dated the concept as far back as the era of cave dwellers.

Self help is a term that has been used to describe the participation of low income households in the production of their own housing. The main difference between self-help and conventional housing is that houses can be occupied before they are fully developed. Self help housing has the advantage that it is flexible, therefore the poor can develop their houses over time. The urban poor can develop their houses gradually because it will result in lower labour costs as compared to conventional housing, because they would invest their own labour in the construction process. It has also been recognised as having the potential for social and community development (Pugh, 1996).

Turner (1976) and Mangin (1967) advocated that instead of eradicating the slum and squatter areas they should be improved. They found this out from their studies in Peru which demonstrated that over time spontaneous housing tended to improve. They described how the development of shacks to standard houses described how neighbourhoods developed incrementally and gradually.

They viewed conventional housing programmes as ineffective in providing housing for the majority of the urban population. The poor under favourable conditions can build houses of their dreams, through self-help they can express their housing needs. They realised that the aspirations of the poor were not different from the middle income, both groups hope to improve their homes over time.

However there are some theorists with Marxist ideas, who criticised self help on the ground that, it is based on the idea that the poor's time is free i.e. they have no time for leisure. Some argued that it is a method of exploitation on low income people in the sense that it forces the poor to provide for themselves while the middle and high income groups are provided for by the government (Choguill 1994, Pugh, 1996). Some felt it displaces other people from their jobs, for example artisans and builders end up losing their jobs in the construction industry. Burgess (1977) argued that it does not bring about equality in society, it widens the gap between the rich and poor.

Despite the arguments against self help, it has become central to housing policies of most developing countries. It comprises over fifty per cent of the housing stock in most developing countries (Pugh, 1996). In the mid-1970's The World Bank promoted the use of aided self-help in low income housing. It did not associate self-help with shelter only, it widened it to community-based organisations.

The new policies of housing that were proposed by the World Bank and UNCHS (Global strategy for shelter to the year 2000) in the late 1980's, focused more on human settlements and their contribution to economic growth and linking it to governments, markets and non-governmental organisations.

THEORETICAL BASIS OF SELF-HELP HOUSING

Land in Self-Help Housing Projects

Land issue is the most critical input in self-help housing. It has many uses other than shelter, it is essential for access to employment, credit, infrastructure and service facilities. Therefore the availability of land is a critical factor determining the ability of the poor to construct their own housing.

The urban poor often face difficulties in obtaining proper land suitable for housing. They often live on the outskirts (city fringes) of the major cities, on land with no security of tenure or land that lacks planning permission from urban authorities because it is located beyond the urban perimeter. These areas are subject to flooding, steep hillsides, swampy areas etc. For example Bangkok in Thailand is located in a flood plain, Dar es Salaam and Manila in Phillipines (Choguill, 1994). These towns are located near a rubbish damping area, which have serious environmental problems to the local people.

The second issue concerns plot tenure, the urban poor often build houses on illegal land (with no legal title) which faces a threat of eviction or their houses being demolished. The low-income need to have faith in land tenure system because it can improve the chances of the poor to increase their access to credit and start contributing to cost recovery of housing services. Mauclasan(1985) argues that the security of land will allow the low income to invest in their own houses.

The land prices are a major factor in determining the use of land for housing. Land prices falls steeply as distance from city centre increases. At peripheral locations, land price may be low enough for a poor family to purchase or rent. However it may have negative implications for other financial costs like transport to employment centres.

Service facilities in Self Help Housing Projects

Rapid growth of urban population in developing countries has led to a corresponding increase in demand for basic urban services. Service facilities are remarkably missing in low-income settlements, if available they are often in poor condition, and hence require considerable rehabilitation. Many urban dwellings lack piped water, electricity and methods of sewage and garbage disposal pose major hazard to public health (Gwebu, 2002). They also lack basic education and health which they can use to improve their income earning potential, this traps them in a cycle of poverty from which it is difficult to break (Rondenelli, 1988).

The other factor is the cost of providing those services. A vast majority of the low-income urban dwellers do not have the capacity to pay for services and because of lack of funds, existing facilities are in most cases not properly maintained. In addition to that the problem has been exarcebated by the concentration of the poor in large cities, they have outstripped the available services in major cities.

Finance in Self Help Housing Projects

The urban authorities of developing countries have small, costly and unpredictable financial arrangements for low income housing. Poor families do not have access to formal credit for house construction (Fruet, 2003). In most developing countries, housing is often accorded a low priority when allocating scarce resources, which have instead been channelled to sectors like agriculture and defence ministries (Gugler, 1992). The urban authorities have exacerbated the problem, by introducing excessively high building standards which are only reached by higher incomes households.

On the other hand the non financial institutions place other constraints on housing finance: The absence of a title deed is one of the main obstacles to normal housing finance, mainly due to poor land administration. The urban poor cannot get mortgage loans because they have no proper security to pledge. This makes it difficult for them to have access to credit.

Most developing countries have upgraded their existing housing stock through slum improvement programmes. Funds were obtained from World Bank on a cost-recovery basis. Such programmes have succeeded in some countries and failed in others. Most governments tended to promote unrealistically high standards of housing and this led to default in rental payments.

The United Nations Global Shelter Strategy calls for support of informal sector credit system. Accessibility to land has been cited as being crucial in enhancing access to credit. Policy makers should be encouraged to restructure their public expenditure so that poverty alleviation programs for example housing should get the lion's share in their overall budgets.

Building Materials in Self-Help Projects

Building materials are an important component in the house construction process, their contribution to the low-income housing can not be under-estimated. They are used both in construction and maintenance processes of housing.

There has been a growing concern over the provision of affordable building materials for low-income housing, They are considered to be one of the main constraints on self-help housing. Although little research has been done on this, the available evidence has shown that, an acute shortage of building materials prevents the urban poor to provide adequate shelter for themselves (Choguill, 1994)

Among developing countries the material that is used for housing is increasingly being imported. The imported materials have high transport costs in distribution and marketing; this makes the price for them too high by the time they reach the urban poor. The price of materials will continue to increase because the current housing policies of most developing countries do not support the use of local building materials. Building standards require the use of modern building materials like corrugated iron, roof tiles, cement etc. The use of these modern materials has serious technological problems for the urban poor; they need highly skilled personnel to use them. Inappropriate building standards/regulations have negative effects on housing and infrastructure, they have led to a low quality of building materials and construction techniques used in informal low cost settlements (Turner 1976). Building standards are largely

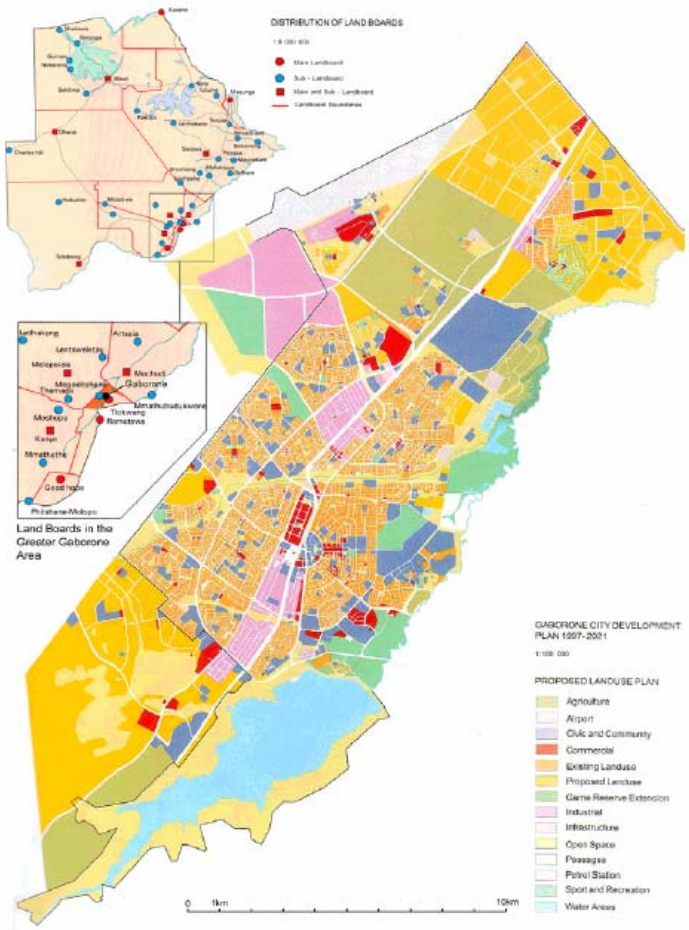


Fig. 1 Gaborone City – National and regional Setting

Source: Compiled from Botswana National Atlas (DSM) 2001, and Gaborone City Development Plan (DTRP), 1997

incompatible income levels and conflict with real local situations (Mabogunje, Hardoy and Misra, 1978). In developing countries few standards are based on local experience as most of them are inherited from colonial powers; these are out of reach of many low-income people. They are also not relevant to local culture and therefore conflict with local norms and values.

BACKGROUND TO THE STUDY AREA

Gaborone is the capital city of Botswana. It is one of the fastest growing city in Sub-Saharan Africa with an estimated population of 200,000. (see Fig. 1) Gaborone like other cities in Africa have grown as a result of urban rural migration. This rapid growth has created social, economic and environmental problems in most of the low income areas (Gwebu, 2002).

Gaborone was chosen out of a total of eight major towns of Botswana, mainly because of the following reasons:

- It has the worst problems of housing and increasing number of squatter settlements as compared to other towns.
- It is experiencing rapid population growth in the country .
- It possesses many of the typical properties of a primate city.

BRIF OVERVIEW OF SELF-HOUSING PROGRAMME

The Self Help Housing Programme was first introduced in 1978. The programme was established to provide an effective means of allowing access to affordable housing for low-income households. With the assistance of international bodies such as the International Bank for Reconstruction and Development (World Bank) and United States Agency for International Development (USAID) (Kalabamu, 2002). Appropriate strategies were examined and the programme was accepted as a viable strategy for urban development

Given that the Batswana (people of Botswana) have always built adequate housing for themselves in rural areas, self-help was seen as the most cost-effective way of providing housing for urban dwellers, particularly the poor. The SHHA programme sought to emphasise self reliance(one of Botswana's four national principles) and the spirit of self-help.

Under this programme which is administered by the Urban Councils, the plots were allocated virtually free of charge, building material loan provided at a subsidised interest rate. Occupiers had to pay a service levy (charge for provision of services). However these services were of very poor quality and the houses were of very poor quality due to lack of building standards.

The programme was further reviewed, the new urban development standards have been introduced, this has meant that low-income urban areas are serviced to higher standards. This has brought changes to plot sizes, cost of plots, tenure system, financial arrangements, construction and maintenance of urban services.

PROVISION OF SERVICED LAND

The empirical studies of Turner and Mangin has been highly influential to Botswana's housing policy. The government has adopted the policy of upgrading and provision of site and service schemes under the SHHA programme and it also calls for cost recovery mechanisms. The site and service schemes involves the servicing of land and its subsequent allocation to low-income families to develop over time using materials from government.

One of the major problems causing shortages of urban housing was identified as shortage of serviced land. The Accelerated Land Servicing Programme(ALSP) was introduced with the intention being to implement an accelerated construction programme for the provision of sufficient serviced residential, commercial and industrial land in urban areas. Through its pricing policy for serviced land under the (ALSP), Government aims to achieve full cost recovery. This is intended to be achieved through cross-subsidy, where industrial, commercial and developers will pay "market prices", first time residential plots in high and middle income groups will pay low income (SHHA) will pay affordable prices.

The Accelerated Land Servicing Programme also coincided with the introduction of the Allocation of State-Land Policy in 1990, whose aims were to speed up the process of State-Land allocation and ensure that land was allocated to Botswana equitably.

Table 1: A summary of the new urban development standards in SHHA areas

	Old SHHA Standards	New SHHA Standards
1. Income Criteria	P800-P7000 per annum	P1800-P12,000 per annum
2. Plot Price	Allocated free. Holder pays a portion of development costs in service levy	Affordable prices
3. Tenure	COR	FPSG
4. Registration	Government is registered owner of land. Holder is registered with the Town Council	Owner is registers in Deeds Registry, in terms of a 99 year lease.
5. Building materials loan	Maximum P1 200 at 9% per annum paid within 15 years	Maximum P3 600 at 10 % per annum paid in 15 years
6.Infrastructure	Pit latrines, Stand-pipes and no electricity	Waterborne sewerage water reticulation to plots. Electricity easily connectable.
7. Recurrent costs	Plot holders pay service levy	Owner pays rates
8. Mortgage	No registered mortgage possible but rights in COR could not be ceded as security for a loan.	Owner may register a mortgage against a plot
9. Building materials	Cement and Corrugated iron	No change

Source: Annual Report SHHA 2005

AIMS AND OBJECTIVES OF THE STUDY

Broad Aim

The main broad aim of this research is to determine whether the primary objective of the SHHA programme has been met in providing an affordable low-cost housing in Botswana.

The objective stated above arises from the concern about the deteriorating living conditions of the low-income households in urban centres of Botswana, particularly in Gaborone. The evidence comes from an increase in number of squatter settlements, signs of poverty among the low-income areas and overcrowding in living units. The other concern arises as to why there is a strong belief that some of the SHHA plots are occupied by middle and higher income groups at the expense of low-income households.

Based on those broad aims, the study met the following objectives as set out below.

Objectives

(a) To examine the sources of finance of finance for plot acquisition and development

The SHHA programme is administered by the Urban Councils in the country. The Urban Council's expenditure is met by Central Government deficit grants. Presently the Central Government has reduced this expenditure to Urban Councils, which means that the SHHA programme is getting less finances from the Central Government. On the other hand the shortage of finances for SHHA programme has been exacerbated by poor cost recovery resulting from defaults in payment of the building materials loans (Gwebu, 2002). In light of those problems, this objective seeks to establish the principal source of finance available to low-income households for the development of SHHA plots.

(b) To examine the existing SHHA plot tenure system, and to determine the extent to which this system inhibits or enhances the development of adequate and affordable housing on SHHA plots. Plot tenure plays a major role in the housing development. It is one of the requirements needed by financial institutions for mortgage. The title is used as security in financial institutions.

The previous form of tenure in SHHA areas was the Certificate of Rights (COR). The COR was an easy method of providing secure tenure, which did not involve the expense of legal fees or cadastral surveys. The main problem with this form of tenure was that it was not accepted as collateral by financial institutions, in case the owner of the plot wanted to secure funds for development of the plot. Recognising the problems associated with this form of tenure, it has been changed to a Fixed Period State Grant (FPSG), This appears to provide a simple, improved form of title deed that would probably be accepted as collateral by financial institutions. This objective will examine the present plot tenure system and establish as to whether SHHA residents have security of tenure. It will also identify the main obstacles that inhibit the acquisition of titles under this new form of tenure.

Plot transfer system

SHHA residents can, if they wish transfer ownership of their plots to other people. The transfer of FPSG plots is a private transaction between buyer and seller and does not require Council's approval as it was the case with the COR.

The development convenant of the SHHA plot states that a plot can only be transferred/sold if the previous owner ha owned for a period not less than ten years. If it sold before ten years elapses the "buyer" pays a penalty of Ten Thousand Pula.

There is a growing concern about the abuse of the present plot transfer system. This abuse is in the form of "fronting". This is a system whereby an eligible applicant obtains a plot for a relative or any other person who is not eligible for the plot under the SHHA programme. This objective will examine the extent of that problem by identifying and assessing the various methods that has been used for plot transfer.

Plot allocation system

Availability of land is one of the factors which enhance the development of housing in low-income areas. There has been some concern about shortage of serviced land in low-income areas. This has affected the whole allocation process to an extent that the waiting lists have began to grow in most urban centres.

The Accelerated Land Servicing programme (ALSP) and the State-Land allocation committees have been introduced in low-income areas to address the problems mentioned above. ALSP is a major development initiative aimed at provision of serviced land to SHHA areas. State-Land allocation committees have been set to speed up the plot allocation process. This objective will establish as to whether these two initiatives have brought any changes in the plot allocation process. This will be determined by evaluating the waiting period for SHHA plots, from the time the application was submitted to the time the plot was allocated.

The availability and maintenance of services

Botswana has experienced rapid population growth in urban centres, this has been caused by migration. For people arriving in towns from rural areas, it is common to stay with friends or relatives or rent a room. This has tended to be concentrated particularly in SHHA areas where lower standard rental accommodation exists for low-income people. This objective seek to find out whether the existing service facilities have catered for that rapid population growth in SHHA areas and determine whether the services are maintained to an adequate standard. The plot-holders will be asked to give their views on the maintenance of service facilities in their areas.

RESEARCH METHODOLOGY

There are fifteen officially registered SHHA areas in Gaborone. Ten out of a total of fifteen survey areas were selected for the survey. The survey areas were chosen according to sizes. They were ranked according to their population and then the first ten survey areas were chosen for this study, so as to get a big representative sample. The areas of investigation were Bontleng, Old-Naledi, New-Naledi, Gaborone West, Ginja, Broadhurst, Tsholofelo, Ledumang, Maruapula and White-City. The locations of these areas were easily definable

by bordering streets with the help of a detailed map of Gaborone City.

Housing and household information was obtained through the administration of formal interviews. In order to ensure an even coverage the proportional allocation technique was used to select the number of households. This is a special form of stratified sampling where the sample size is chosen to be proportional to the stratum size. The technique was such that the number of households to be interviewed from each area depended on the size of that particular survey area. Within each plot, the plot owner was targeted or his spouse.

Documentary information was obtained from Gaborone City Council, University Library, Help Housing Authority Offices, planning journals, Botswana's government reports, development plans, seminar papers, newspapers and from interviews with officers of Botswana government, parastatals and private sector. These sources provided the necessary background details about the study.

Apart from secondary information, key informants such as representatives from SHHA, Councillors, community based organizations, Department of Town Planning, Department of Lands, Other knowledgeable informants were chosen from various parastatals and private sector, these included officers holding key positions with special expertise to the housing sector. These included Botswana Power Corporation, Water Utilities Corporation, Commercial banks, Botswana Housing Corporation, Time Projects and various consultants in housing and construction industries.

FINDINGS OF THE STUDY

Employment status

An analysis of the employment status revealed that 55% of the respondents had informal employment and the remaining percentage is distributed equally among those who are employed by the government and by the private sector. It was discovered in the field that most of the respondents who were not formally employed, were engaged in a variety of activities such as selling vegetables, brewing traditional beer, hair dressing, etc.

Table 2: The number of respondents from each survey area

Name of Area	Number of households	Number of households to be interviewed	Adjusted Sample
Bontleng	5769	9	8
Old-Naledi	20652	32	36
Ledumang	3008	5	6
New-Naledi	1623	2	3
Gaborone-West	16202	24	26
Tsholofelo	4160	6	6
Ginja	1849	3	4
Maruapula	4045	6	5
Broadhurst	1557	2	3
White-City	7751	12	12
TOTAL	66613	100	109

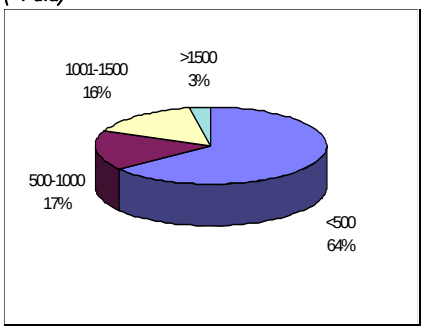
Source: Field survey, 2006.

Given that the majority of respondents were not formally employed and majority (64%) earning less than 500 Pula, it implies that the majority of them have not benefited from the building

materials loan offered by the government under the SHHA programme. The criterion that is used for giving out these loans requires one to be formally employed. They will also face a similar problem in financial institutions whose criterion for housing loans requires one to be formally employed.

Having established information on socio-economic background of respondents, the analysis now focuses on the research objectives.

*Figure 2: The respondent's monthly income (*Pula)*



Source: Field survey, 2005

(a) Sources of finance for plot acquisition and house development in SHHA areas.

The sources of finance were investigated according to employment status of respondents. The employment status of households by source of finance. It shows that on average the majority of plot holders secure finances for house development from their own resources.

Now given that we already know the income levels of plot holders from Figure 2, it is important to establish whether income has an effect on finances of plot development. Table 3 below summarises the monthly income status of households and sources of finance for plot development. It shows that 86% of plot holders who earn less than 500 Pula, still secure finances from their own resources.

(b) The plot tenure system

The aim of this variable is to examine the SHHA plot tenure system. The summary of plot tenure system shows that only 12% of the plot-holders had titles for their plots and 33% are in the process of getting titles. Under the FPSG plot tenure, the plot-holders are required to pay costs for title registration. It is therefore important to find out if the cost for title registration have an effect on the present plot tenure system. This was investigated by establishing whether there is a relationship between plot tenure and the income status of a household. There is a slight differences of plot tenure according to different income groups. It shows that 38 % of the respondents who earn 500 Pula had titles for their plots while 30 % of those who earn more than 1000 Pula had titles. A chi-square test was further done to find out more about the relationship between income status of a household and plot tenure. It suggests that income status has a significant relationship with the type of plot tenureship. This finding reveals that those households with more income are in a better position to acquire titles for their plots as compared to those with

less income. In conclusion it can be argued that few plot-holders have acquired titles for their plots under the present FPSG plot tenure system.

(c) Method of plot transfer

The method of plot transfer was investigated through the various methods of plot acquisition in the study area. It was revealed that 68% of the plots which were acquired through the SHHA programme were transferred to the present owners without titles and 84% of the plots which were purchased were transferred to the owners through the legal method. A legal method of transfer involves a lawyer who is a mediator between two people involved in a plot transfer, the people involved had to pay some legal fees.

As it is shown above that some plots have been transferred through the legal method, it is essential to establish whether there is a relationship between income status of a household and method of plot transfer. A further analysis revealed that the majority of the plots were still transferred to the present owners through the legal method. A chi-square test was done to find out more about the relationship between income status of a household and method of transfer, it was shown that the two are statistically significant. The conclusion that can be drawn from this findings is that there is no evidence of plots being transferred unlawfully given that most of the plots were transferred through the legal method.

d) Allocation of plots

The general approach to plot allocation is on a "first-come first-serve basis". Figure 3 summarises the status of plot allocation in SHHA areas. It reveals that plot allocation is typically very slow, 76% of applicants waited more than five years before being allocated plots. The allocation process may be slow while finance for development may not be available which further exacerbate the problem. The ALSP programme has not made any significant impact in provision plots for low-income aspirant home seeksrs.

Table 3: Respondent's source of finance by type of employment

Source of finance	Type of employment		
	government	informal	private
government	1	1	0
BBS	6	22	9
banks	8	21	19
Small loans from friends and gifts	6	27	22
own resources	80	28	51
No. of cases	17	67	69

Source: Field survey, 2005

Table 4: Means of plot acquisition and system of plot transfer

Transfer	Plot acquisition		
	Purchase	Inheritance	SHHA
	%	%	%
Lease	0	0	11
Legal means	84	44	18
Title	12	0	3
No title	4	56	68
No. of cases	25	10	37

Source: Field-survey,2005

(e) Service facilities

Nearly all respondents obtained water from communal standpipes and relied on pit latrines for on-site sanitation. Figure 4 below, shows that 91% of respondents did not have electricity connected to their dwellings. It is important to note that 44% of the respondents had private phones disconnected from their dwellings. This implies that it might be cheaper for low-income to connect private phones to their dwellings but very expensive to maintain them. During the field survey, most respondents reported that they would like to upgrade services including electricity, individual water connection and waterborne sewerage, but in most cases they reported that they could only afford a very small monthly payment for the cost of such services.

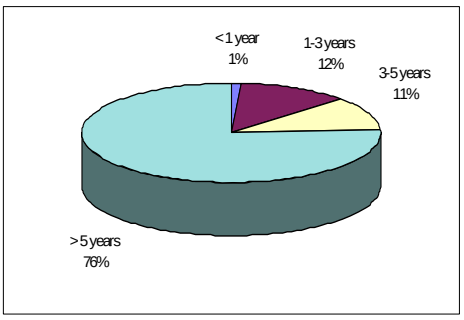
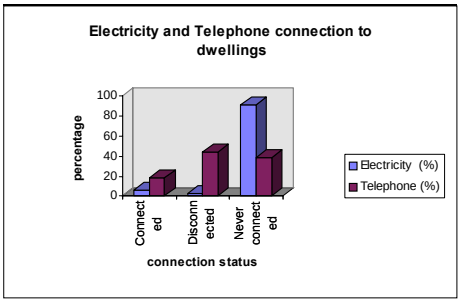


Figure 3: Applicant's waiting period for plots.

Source: Field-survey, 2005

A further analysis was done to investigate the respondent's views on maintenance of services facilities. Most respondents expressed dissatisfaction with maintenance service facilities in their areas, roads (77 %) were ranked the highest of all services that were poorly maintained, it was followed by public phones (69 %) and waste management (64 %) respectively. From the information gathered during interviews, most respondents preferred their streets to be lit, phones to be located in central areas to avoid being vandalised and increase of rubbish bins because at the time of the survey two households shared one rubbish bin.

Figure 4: Electricity and telephone connection to dwellings



Source: Field-survey, 2005

CONCLUSION

The conclusions of the whole study will be made through comparison of the project objectives and the end results. The broad aim of this study has been largely achieved in a number of ways. Sufficient evidence has shown that the SHHA programme has not pursued its

objective of providing an affordable housing to low-income households. The first issue concerns finance for plot development. Lack of finance seems to be the main constraint which prevents house development in SHHA areas. It has also shown that the available source of finance; the building materials have been unable to provide adequate funding to a reasonable and affordable standard. The second issue concerns the acute shortage of land which delays the plot allocation process and consequently frustrating aspirant home owners.

The second broad aim has also been achieved, this concerns the issue of SHHA plots being "hijacked" by non low-income households. The results show that this problem is not big as it has been speculated. The study reveals that there are some suspicions of this illicit practice happening in SHHA areas.

The major conclusions are that housing policies in Botswana are not supportive of the general housing and living conditions in low-income urban areas.

A critical analysis of the SHHA programme has shown that attention will need to be given to the following main points in the preparation of future low-income urban housing programme in Botswana:

There is a need for finance assistance to low-income households in Botswana, this will require an innovative approach that will not only satisfy demand but also involve more private sector participation and cost effective use of resources. The government could assume the costs of plots so that people are faced with housing construction costs or could provide one loan for costs of plot and house development rather than providing one loan for building materials. An emphasis should not be placed on income from employment; this discriminates against those with irregular or informal sources of income. In view of the affordability problems, there is need to ensure fair and equitable allocation and clear targeting of subsidies to lower income households.

The previous form of tenure used by SHHA, the COR is a good form of tenure that satisfies the objectives of the programme. The government should pursuade BBS to modify its policies to permit lending to COR-holders. The commercial banks and building society should also adapt to the nation's needs by lending to lower income.

Land shortage is one of the main obstacles of house development. In order to reduce the existing shortages of low-income housing, allocation of SHHA plots should be resumed at an earliest possible date. All traditional villages adjacent to major centres should be brought within the planning areas of the major towns so as to get more land for low-income housing.

There is a need for development of a coherent housing policy framework. Since a national housing policy was last prepared in 1982, there have been significant changes in housing provision and overall trends of urbanisation. These have created uncertainties, conflicts and loopholes in policy, which have represented growing problems of low-income urban housing. A new policy needs to be developed as a tool for addressing of low-income urban housing problems, it will also require an extensive consultation with the general public. This should clearly pronounce urban and housing policy and target it to the most needy people, to prevent worsening of living conditions in existing low income urban areas.

There is a need for more flexible building standards and design. The use of local building materials should be incorporated in revised building standards in order to reduce construction costs and promote appropriate building construction technology as a tool for cost recovery and affordability. The technology involved should be simple, it should incorporate the use local materials that could be understood by local people. There is need for increasing scope for developing the indigenous construction industry and other services related to housing. There is need for urgent research and production of suitable local building materials such as clay, bricks, mud plastering, suitable sand, grass thatch, clay tiles, poles etc., and a need to reinforce the traditional building technologies.

While it was beyond the scope of this research to prepare a detailed assessment of comparative experiences of self-help housing with other developing countries. Some particular aspects of self-help housing have been identified in some developing countries which can offer useful lessons for Botswana. Some useful experiences of other countries have been identified by Choguill (1994) in his analysis of the 47 self-help projects. He identified factors that promote successful construction of low-income housing. These are, existence of effective community organisation in self-help housing programmes and the need to empower householders; particularly women with construction skills through training so as to implement the policies of self help housing effectively.

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DESIGN AND CONSTRUCTION POSSIBILITIES FOR PHOTOVOLTAIC INTEGRATION IN ENVELOPES OF NEW EXISTING BUILDINGS

Aleksandra Krstić

Sun is the renewable energy source whose usage exerts influence on architectural design. Facade concepts of energy efficient buildings are developed producing new facade structures and components. Photovoltaic systems, as elements of active solar systems are discussed in the paper and particular attention is paid to building integrated systems, as they influence building appearance. Classification and analyzes of PV systems - materials, supporting systems, coatings and design principles are presented in the paper. The purpose of this paper is discussion on design and construction possibilities for PV integration in envelopes of new and existing buildings. Possibilities for structural variability of envelopes with PV integrated systems are described in the paper.

Keywords: PV integration in architecture, building integrated PV, building appearance, design possibilities, design principles, structural variability.

INTRODUCTION

The public become aware of the effects of climate change and environmental pollution. Buildings, as consumers of around 40% of global energy production, mostly generated from conventional energy sources, significantly contribute to environmental pollution. Implementation of Renewable Energy Sources and Rational Use of Energy in building design can reduce energy use in buildings, consumption of pollutant energy sources and thereby reduce CO_2 emissions. Sun is renewable energy source whose usage exerts influence on architectural design and building concepts. Main role take south facing exterior screens. Concepts of energy efficient buildings are developed producing new facade structures and components. Passive, active and hybrid solar systems can be separated. In the case of active solar conceptions building components are classified according to their function, such as: solar collectors and photovoltaic systems. The first transform solar energy into thermal energy while the second convert it into electric energy.

Photovoltaic systems are discussed in the paper. They can be used in design of new buildings or refurbishment of existing buildings in order to improve the energy performances. But it requires proper thermal performances achieved by building construction and detailing. In the developed world, with the existing power grid infrastructure, PV in buildings is regarded as major application area for photovoltaics (Nordmann, 2005). In order to encourage the use of PV in buildings, a well created plan of organizing and promoting PV installations has to be carried out. Government that regulates energy and building, by national indicative targets and legislation can encourage the use of PV in buildings. The government stimulates building integrated PV systems development by supporting research and demonstration programs.. Programs generated for the public support enable citizens to be informed about PV power and PV in buildings. Once people are informed of possibilities to improve their quality of life by investing in environmentally friendly renewables, combined with economically sound projects, there is no limit for citizens' enthusiasm and involvement (Cristiansen, 2006). Major problem is that PV is still more expensive than it need be. The low-cost mass production of PV can be justified through simply regulating that new buildings are solar powered PV (Mallon, 1999). It can also provide a transition of the related industry which could be made open to different building designs and performances and competitive for conventional building claddings. Listed actions require to be carried out by experts among which PV dedicated architects play an important role.

The influence of PV systems on appearances of buildings and settlements is significant. The application of photovoltaic components to building envelopes is a challenge to architects. Production of PV systems is new provocation and orientation for building industry. Design and construction possibilities for PV integration in envelopes of new and existing buildings are

discussed in the paper. Design of energy efficient houses with PV systems requires proper information on photovoltaic systems by the architects and students of architecture. The paper presents initiation and contribution to that process. Classification and analyzes of PV systems - materials, supporting systems, coatings and design principles are presented in the paper. The purpose of this paper is also to describe possibilities for structural variability of envelopes with building integrated PV modules.

RELEVANT ASPECTS IN DESIGN PROCESS

Basic information about material, structure, function and design possibilities of PV systems is sufficient for the design process, and major facts are briefly mentioned in this section. From architectural aspect, different performances of photovoltaic systems can be required regarding: *Location possibilities, Function possibilities, Dimensions and form, Color and appearance of modules, Light permeability, Construction possibilities.* Various possibilities for fulfillment of listed performances result in variability of building envelopes with PV systems.

Application of PV devices to a building envelope enables zero land consumption. Regarding *location on building,* roof and facade "standoff" and "building-integrated" PV systems are available (Fig. 1a, b and 2a, b). They strongly influence building appearance in a different way. In the first case they are independent devices applied on roof or facade structure. In the second case, building-integrated PV systems are building components which can substitute usual roof or facade cover materials. Development of technologies, materials, support systems and coatings is continuous, giving freedom for architectural design.

Fig. 1a. Roof "standoff" PV system

Fig. 1b. Facade "standoff" PV system

Fig. 2a. Roof "building-integrated" PV system

Fig. 2b.Facade "building-integrated" PV system

Function possibilities for PV systems are various. The main function is production of electricity. Photovoltaic system concept is based on the direct conversion of sunlight to electricity. Batteries store energy for use when the sun is not shining. The basic element of a photovoltaic power system is the solar cell made of a semiconductor material, usually silicon. It is photosensitive and produces electrical current in the presence of photons, or energy from light. The efficiency of mono-crystalline silicon is the highest (14-18%), of polycrystalline somewhat less (12-15%), and amorphous modules have the worst efficiency (4,5-6%). The same features stands for durability. Photovoltaic cells generate commercially valuable electricity operating in parallel with the existing electricity network. Exchange of electricity to and from the network is possible. Individual solar cells are combined to create PV modules that produce a specific amount of power. Many interconnected PV modules (the number varies, depending on the demanded amount of power) are called an array.

While standoff PV systems have poor scope of functions (in addition to electricity production can be used as shading devices), building integrated systems are characterized by functional complexity. As external layer of building envelope, they provide thermal, acoustic and humidity insulation, wind protection, in some cases fire and security protection, protection from sunrays and produce electric energy. Application of building integrated PV modules removes the need for conventional cladding materials and is reflected in investment costs. For example, Thomas Nordmann comments that, compared with an ordinary roof mounted installation (standoff systems), which is placed on top of a conventional roof, part of the basic concept of a true BIPV installation is to share the cost of the building envelope because the installation has a double function (Nordmann, 2005). His opinion is that the main potential of double function in the area of balance of system (BOS) is in the area of module costs and installation costs, where it should be 30% of the total system cost.

Factors that affect PV output and can be influenced by designers are: tilt, azimuth, shadowing, temperature.

System efficiency is influenced by orientation and inclination of PV modules. A favorable orientation is south. Deviation to southeast and southwest up to 30° is suitable. PV modules can be placed in horizontal position, vertical position or inclined. Choice of inclination is influenced by latitude value and orientation. Maximum available irradiation is received by a south-facing unobstructed PV panels oriented at a tilt equivalent to the local latitude, while east and west-facing PV panels perform relatively well at steep angles or vertical orientation and still yield 60% of optimally inclined south oriented PV systems; It points out that a range of orientations and tilts give 95% of the maximum output; A role of thumb is that 1m^2 of monocrystalline PV array reasonably positioned and in an efficient system will give about 100kWh/y (Sich, Erge, 1996). For Belgrade, PV power production estimate is shown in the Fig. 3.

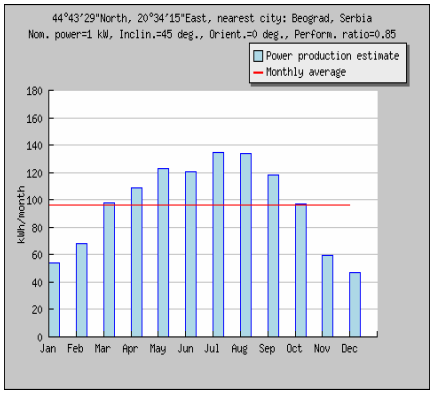


Fig. 3. PV power production estimate, location Belgrade

It is not recommended to apply PV systems on periodically shaded surfaces of building envelope because it results in negative effect on system efficiency and can cause damages, as glass cracks. In order to obtain system efficiency the overheat of PV modules has to be prevented. It appeared that building integrated modules can reach 20-40°C above ambient in conditions of high radiation; For each 1°C increase in cell temperature above 25°C, the power output decrease by about 04-05% (Sich, Erge, 1996). Ventilation, normally natural ventilation, needs to be provided to remove heat from the modules. A role of thumb is to provide an air gap of minimum 100mm.

Variations in *dimensions and forms* of PV modules are dependent on glass characteristics and require further development. Solar cells are embedded with special clear cast resin between two glass panels, air-tight and protected against corrosion. Extremely great changes occur in glass industry where the introduction of modern solutions, i.e. special types of glass enables the design of large glazed surfaces with integrated PV modules, providing pleasant indoor atmosphere as well as building appearance (Fig. 4a). With regard to form, flat modules are mostly in use, but twisted, mostly concave and convex shapes (Fig. 4b), are also available and very frequently present in contemporary architecture.

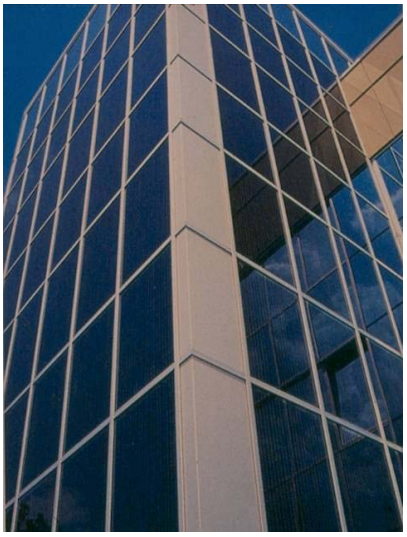
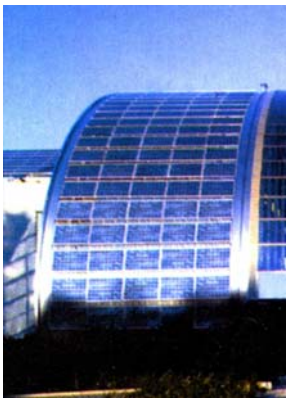


Figure 4a. Large size PV modules

Fig. 4b. Convex shape of PV modules



Talking about dimensions some problems can be noticed. The suppliers in the PV industry produce their modules in individual, non standard sizes. It means that architect is forced to design its application in favor of a certain product before the call for tender. But it is contrary to approach accepted by building industry that elements being specified by size become part of the tendering process. For the building industry we need "open" PV systems, the production of not just standardized modules but modules that will fit in with other industries that use – or could use – PV modules (Nordmann, 2005).

Color and appearance of PV modules depend on material of solar cells. There are two basic types of PV modules commercially available today: those made from crystalline silicon (mono- and multi- or polycrystalline) and those made from amorphous silicon (a-Si). The first type is the dominant commercial product. Mono-crystalline modules are recognizable by their black mono-crystalline cells. Polycrystalline modules can be recognized by blue, glittering polycrystalline cells. They could be opaque and semitransparent. Amorphous modules can be opaque and semitransparent. Amorphous module opaque is recognizable by its brown non-transparent look, while semitransparent by its brown-transparent look. Using double-layer antireflection coatings a broad range of colors of PV modules can be obtained - gold, steel blue, dark blue, pink, green (Spiegel, Bucher, Willeke, 1996), allowing architects' flexibility for integration of PV cells into building facade and providing a good match to the environment.

Various *light permeability* and interesting light effects inside a building can be produced through the use of amorphous, light permeable solar cells or the variation of the arrangements and distances between the cells (Fig. 5a, b). A typical crystalline cell is 100x100mm.

a)

b)

Fig. 5. Light permeability produced through the variation of the arrangements and distances between the PV cells; a) facade permeability, b) roof permeability

Regarding *construction possibilities* different solutions are present in case of "standoff" and "building integrated" systems.

"Standoff" mounting modules and arrays can be applied on new roof or facade construction or refurbished existing building envelope. A key element is standoff bracket, attached directly to the module frame or to rails or channels which support a matrix of modules. Various support systems are available, for vertical, sloped and flat surfaces, as shown in Fig. 6a. The space between the module or array and facade or roof material is ventilated by convection. Cooling the modules and arrays enhances their efficiency. If modules are mounted onto flat roofs building appearance is not affected. Modules applied to facade and pitched roof influence building appearance and visual effect depends on type and design of module and support structure (Fig. 6b).

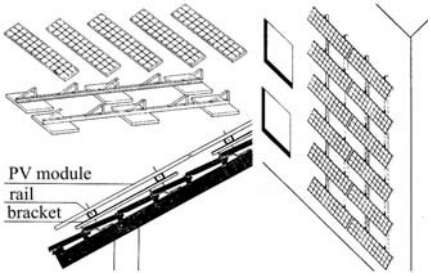


Fig. 6a. Different locations of "standoff" PV modules and support systems

Fig. 6b. Influence of "standoff" roof modules on building appearance

"Building-integrated" PV components replace conventional building materials and labor, reducing the installed cost of the PV system. They are mostly in use for new roof or facade construction while less in case of building refurbishment.

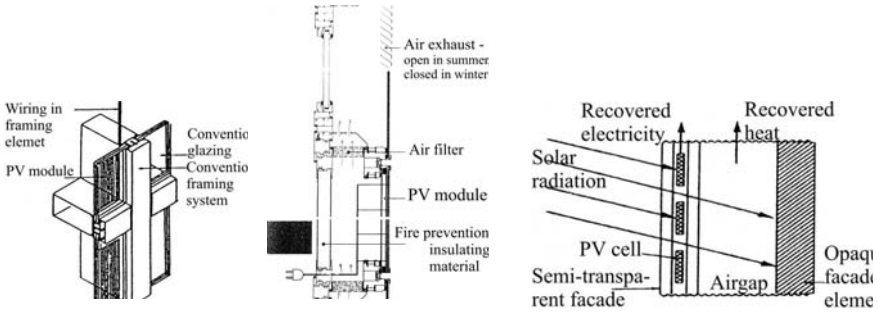
Building integrated modules can be treated as an envelope (Fig. 7a) or as a finishing layer of the envelope structure (Fig. 7b). They provide thermal, acoustic, wind and humidity insulation, sometimes fire and security protection, and produce electric energy and in some cases thermal energy also (Fig. 7c). Due to functional complexity facades with integrated PV modules can be treated as multifunctional structures.

Product development is proceeding in following areas: Facade integrated systems, Multifunctional PV facades, Shading devices with PV and Roof integrated systems.

PV Integrated Facades

Facade integrated systems include integral vertical and sloped glazing modules and arrays. Also, modules integrated to awnings can be considered.

Photovoltaic facade is type of glazed facades. PV modules can be integrated into the most of the contemporary suspended facade systems



a) b) c)

Fig. 7. Different structures of facades with integrated PV modules

a) PV modules as a building envelope,

b) PV modules as a finishing layer of the envelope structure,

c) Structure that produces electric and thermal energy.

(Fig. 7 a, b). Suspended facades (curtain walls) are light structures which are leaned against the building structure and suspends in front of it.

Glazing layer consists of two kinds of structural components - sections and glass sheets as shown in the Fig. 8 (Krstic, 1998). If they are treated as individual components that are assembled in site the glazing is made by simple prefabricated components and needs scaffold for its erection. When the structure is formed as a frame with glass plates filling, glass partitions - panels (complex prefabricated components) they can be joined directly and indirectly. Wooden, metal and plastic sections can be used. Metal and plastic sections are light and have smaller measures than wooden sections. Metal sections, customary in use have to be constructed of two parts solving the heat bridge problem and preventing condensation. By diversity of dimensions, shapes, colors and materials (wood, plastic or metal) of sections and frames it is possible to make different facade designs. They can also be hidden by glass, making a new appearance.

Fig.9. Assemblage process of large size PV modules

Multifunctional Photovoltaic Facades

Development of multifunctional solar facades

Fig. 10. Large mono-crystalline and multi-crystalline encapsulated PV modules as well as semi-transparent amorphous-silicon thin film solar cells, which can control the light entering the building, are presently considered as excellent models. Assemblage of multifunctional modules (M-modules) by using curtain wall technologies is acceptable and usage of frame structures is favorable (Fig. 8).

Fig 10. Multifunctional Photovoltaic Facades

Shading Devices with PV

Shading devices, with integrated PV cells,

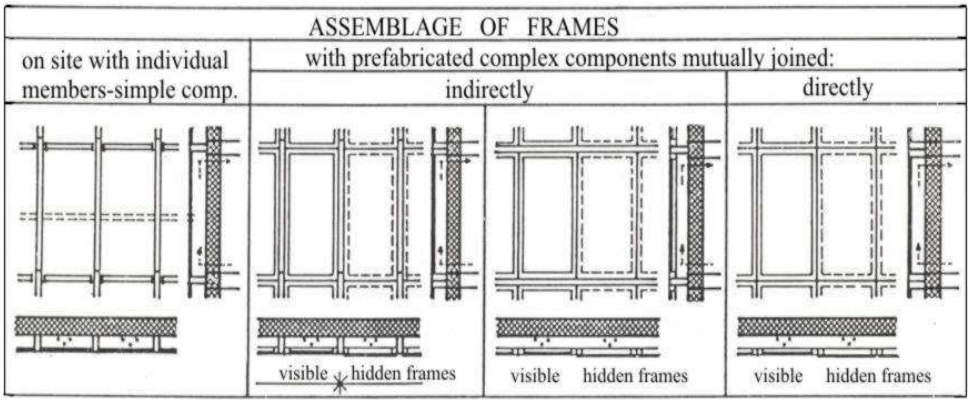


Fig. 8. Suspended facade assemblage possibilities

Glass sheets are PV modules. The appearance of modules depends on the material they are made from, crystalline silicon, mono- and polycrystalline, or amorphous silicon, "opaque" or "semitransparent". PV modules can be produced in sizes that provide large areas to be covered without a horizontal glass separation (Fig. 4a, 9).

that produce electrical and thermal energy and provide protection against inclement weather, light and noise is actual and interested in industrial production. Solar module consists of three layers. The external glazed layer where PV modules are encapsulated and internal layer, as an insulating partition are separated with the layer intended for air flow. The thermal energy – hot air supplied in the middle layer can be used for building heating using a system based on a ventilated PV wall principle, as shown in

convert solar energy into electric power and at the same tame prevent admittance of sun rays and overheating of a room in summer, or allow passing sun rays into room in winter. PV modules, as shading devices, are placed in front of the glazed surfaces in such a way to provide sufficient lighting of the room, operable windows and ventilation of facade structure. As facade external layer, usually movable, PV shading elements can perform as

weather protection and combine, convertion of sunlight into electricity and useful warmed air. Solar cells are integrated into safety glass.

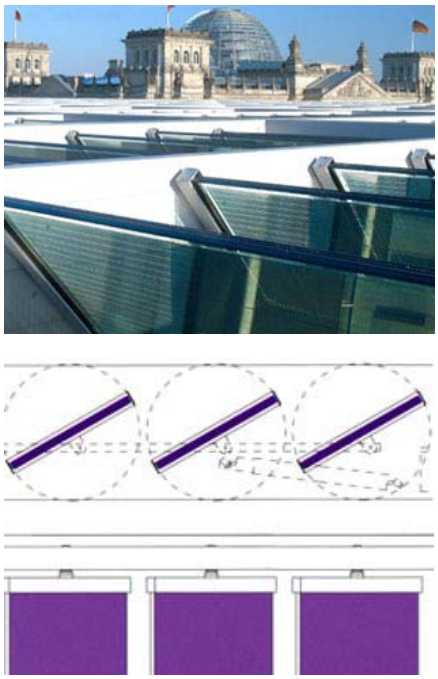


Fig. 11. Roof shading devices with PV cells

Shading is provided by semi-transparency of modules or cells arrangement. The most effective are horizontal overhangs for south orientation while for east and west orientations are suitable vertically placed shading elements. Shading devices with integrated PV modules influence a building, roof and facade appearance (Fig. 11, 12). In the case of movable shading elements building envelope becomes a changeable structure adaptable to day and season changes - "alive" structure. Movable PV shading elements applied on glazed roof proved as excellent protection against sun rays. Further they enable creation of vivid effects by sunlight, daylight and shade to the interior.

Fig 12. Facade shading devices with PV cells

Roof Integrated Systems

Roof integrated PV systems can appear as: integral roof modules and roofing tiles and shingles (Krstic, 2006). Integral roof PV modules appear as glazed structure, while roofing PV tiles and shingles appear as roofer. Both can cover whole roof surface or can partly substitute roofer.

Integral roof modules are usually combined to create arrays as shown in the Fig. 13. This roof system concept is similar to facade integrated system in sense of modules structure and techniques of mounting. With appropriate mounting and sealing techniques, the array serves the roof's weatherproofing function. The mounting system consists of frameworks of extrusions which provide support for the modules, a watertight seal and air channels which discharge heat buildup through a ridge vent. Air gap is placed between external glazed PV layer and internal solid, light or massive, roof construction. Such structure with opaque modules is customary solution in case of solid, non-transparent, roof. For transparent roof, the usage of "semitransparent" PV modules mounted like suspended wall structure is customary solution. In the first case PV modules represent a finishing layer of the envelope, while in the second they are a roof envelope. In the first case, if warmed air is distributed into the internal space, roof structure can be treated as solar collector that produces electric and thermal energy.

Roofing tile elements, with integrated photovoltaic modules resemble and replace a normal roof tiles, providing weather protection. They can be mounted directly on the battens and overlap each other at the top and bottom (Fig. 14a). The frame of the solar roof tile is made of high quality acrylic glass, colored to provide protection against ultra-violet radiation. The photovoltaic cells in mono-crystalline silicon are enclosed between a reinforced fiber-glass layer and the external glass covering. Because of weather protection, top and bottom headers are needed. The complete construction covers area equivalent to 5 normal tiles. The problems of condensation and overheat can be avoided by improving the internal air circulation under PV roof tiles. The assembly can be simplified to such an extent that it can be mounted by regular craftsman.

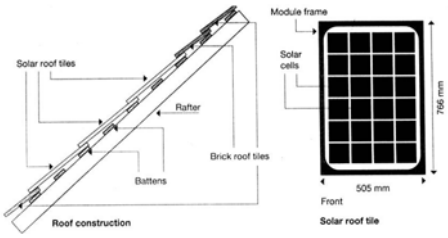


Figure 14a. A type of roofing PV tiles

Fig. 13. Integral roof modules

PV shingles, as well as bituminous shingle roof cladding, need roof boarding to be constructed with ventilated air gap underneath (Fig. 14b).

Fig 14b. Roofing PV shingles

Roofing PV tiles and shingles have more acceptable price than integral roof modules. Their shapes and dimensions fit into standard roofers.

CONCLUSION

Building integrated PV modules, that convert sunlight into electric power, contribute to less consumption of conventional fuels that are environment polluters. The electricity produced by every square meter of PV can effectively displace emissions of more than two tones of CO_2 to the atmosphere over its lifetime; wider use of PV power in buildings can help to reduce such environmental impacts of buildings that are responsible for generating over 50per cent of all emissions of greenhouse gases globally (Roaf, Fuentes, Thomas, 2003).

Dissemination of PV integration in building has to be supported by government, building industry and experts among whom PV dedicated architects play an important role.

In order to encourage the use of PV in buildings, design and construction possibilities for PV integration in envelopes of new and existing buildings are discussed in the paper. Presented classifications and analyzes of PV systems - materials, supporting systems, coatings and design principles, as well as possibilities for design and structural variability of envelopes with building integrated PV modules, point out that application of photovoltaic components to building envelopes is a challenge to architects. Production of PV systems is a new provocation and orientation for building industry.

Designers have a key influence on the following factors that affect PV output: tilt, azimuth, shadowing, temperature. System efficiency is strongly influenced by orientation and inclination of PV modules. A favorable orientation is south. Deviation to southeast and southwest up to 30° is suitable. PV modules can be placed in horizontal position, vertical position or inclined. Choice of inclination is influenced by latitude value. The best solar yield is usually obtained on surfaces oriented to the equator and tilted by the degree corresponding to the local latitude. It is not recommended to apply PV systems on periodically shaded surfaces of a building envelope because it produces negative effects on system efficiency and can cause damages, as glass cracks. Various possibilities for design of PV integrated roof and facades are available giving freedom for architectural design.

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UDC 519.816:004.42]:338.48

THE ANALYTIC HIERARCHY PROCESS AS A SUPPORT FOR DECISION MAKING

Milanka Filipović

The first part of this text deals with a convention site selection as one of the most lucrative areas in the tourism industry. The second part gives a further description of a method for decision making – the analytic hierarchy process. The basic characteristics: hierarchy constructions and pairwise comparison on the given level of the hierarchy are allured. The third part offers an example of application. This example is solved using the Super – Decision software, which is developed as a computer support for the analytic hierarchy process. This indicates that the AHP approach is a useful tool to help support a decision of convention site selection.

Keywords: ***analytical hierarchy process (AHP), attributes, convention, site selection***

INTRODUCTION

Tourism is one of the largest and fastest growing industries in the world, today. It is an increasingly important source of income, employment and wealth in many countries. However, its rapid expansion also has a detrimental and environmental (and socio-cultural) impact in many regions.

Tourism can be considered as one of the most remarkable socio-economic phenomena of the twentieth century. From an activity "enjoyed by only a small group of relatively well-off people" during the first half of the last century, it gradually became a mass phenomenon defined as "the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for vacation, business and other purposes not related to the exercise of an activity remunerated from within the place visited" during the post-World War II period, particularly from the 1970s onwards (UN 2001a, World Tourism Organization (WTO) 2000). The consequence of this phenomenon now reaches an increasingly large number of people throughout the world and can be considered as a vital dimension of global integration.

The convention sector is one of the fastest growing and most profitable areas of the tourism industry. Solving the most salient determinants in selecting or organizing a destination for conventions and monitoring following up on their success is an important research topic.

The convention industry is globally recognized for its valuable economic contribution to tourist destinations and its significant growth potential. The attractiveness of convention tourism has spurred destinations to proactively pursue the meetings and conventions market.

The convention site selection was considered by several authors. They denoted that the conventions may be hosted almost anywhere in the world. This fact is a result of an intensive competition among potential host destination sites. So, it is of great importance to those competing to understand the crucial factors affecting the convention site selection process. The past studies related to the convention site selection mainly focus on identifying important attributes for the desirable location in the process of selecting convention destinations. Professional judgment and factor analysis are the main methods used, but although these studies have helped to identify many factors, little has been learned about the relative importance of each one. This makes it difficult for destination managers to know where and how they should invest resources to enhance a destination's competitiveness.

Priority factors and attributes affecting the convention site decision making can be viewed as a complex multi-criteria decision-making (MCDM) problem. The convention site selection for every convention in particular is also multi-criteria decision making based on assemblage of those attributes. The analytic hierarchy process (AHP) as a new approach to the MCDM methods is offered as a possibility tool for the convention site selection to be understood as a decision-making process. This could further assist decision makers in allocating limited resources for strategic investment such as marketing, positioning, and so on. The AHP is a pairwise comparison procedure designed to capture relative judgments in a manner that ensures consistency. This article presents a decision-making model based on the AHP for the convention site selection. By using the proposed model, it is not only possible to provide a general understanding of decision factors, but also to determine the relative value

significance of critical attributes affecting site selection.

Preview of the past studies on convention site selection is given in Section 2. Section 3 presents the AHP method in details. Section 4 describes the development of the AHP model, then reports and discusses the estimation results from the proposed AHP model. Finally, Section 5 provides some concluding remarks.

CONVENTION SITE SELECTION

Introduction

As stated in the introduction, tourism is a vital dimension of global integration today. Consequently, it is a way of developing the local environment, with all the welfare and complex problems which immerge. The convention industry is globally recognized for its valuable economic contribution to tourism destinations and its significant growth potential [9], [18]. The attractiveness of convention tourism has spurred destinations to proactively pursue the meetings and conventions market. Conventions may be hosted almost anywhere in the world, resulting in keen competition among potential host destination sites. Because of the growing competition, it is of great importance to those competing for business to understand the crucial factors affecting the convention site selection process. Comparing alternatives for every particular convention can then be considered.

Convention site selection was considered by authors like Crouch and Louviere [8], Clark and Mc Cleary [6], Kim and Kim [15], Chacko and Fenich [4] and many others.

Crouch and Louviere denoted in [8] that the conventions may be hosted almost anywhere in the world. This fact is a result of an intensive competition among potential host destination sites. Because of the growing intensity of competition, it is of great importance to those competing for business to understand the crucial factors affecting the convention site selection process. Past studies related to convention site selection mainly focus on identifying important attributes for the desirable location in selecting convention destinations. Professional judgment and factor analysis are the main methods used [6], [15]. Analysis of these studies helped in identifying many factors, but little has been learned about the relative importance of each one [4]. This makes it difficult for destination managers to know where and how they should invest resources to enhance a destination's competitiveness.

Prioritizing factors and attributes affecting convention site decision making can be viewed as a complex multi-criteria decision-making (MCDM) problem. The analytical hierarchy process (AHP), a widespread MCDM method, could facilitate understanding of the decision-making process and thus assist determining the relevant characteristics, such as membership characteristics, executive characteristics, past experience, association policies, environmental conditions, and convention objectives. Previous studies have contributed to identify many of this topic's selection factors ([2], [4], [6], [7], [10], [13], [15], [17], [19], [21]). In [7] it is found that most information on site selection from the past studies was based on anecdotal and experiential evidence and industry experience. So, although identification of important site selection factors are central in most publications little is known about the relative importance of each factor [4].

Convention site selection models

The convention site selection process is potentially very complex because of many variables that influence the decision [6].

Based on their comprehensive review of the site selection literature, the 5-step - conceptual model of the site selection process is proposed in [7] and it is identified by several categories of site selection factors, together with various antecedent conditions and competing sites influences. The five steps are:

convention preplanning,

site selection analysis and recommendations,

site selection decision,

convention held, and

post convention evaluation.

The factors affecting the site selection decision can be broadly divided into site-specific and association factors and there is a relationship between the importance of site selection factors and the structure of association.

The conceptual model of convention site selection proposed in [7] consists of eight primary factors along with several dimensions, resulting in the identification of 36 attributes that govern the choice of a convention site. The eight factors are:

4. accessibility (including cost, time, frequency, convenience, and barrier attributes),
5. local support (including local chapter, convention and visitors' bureau/convention center, and subsidies attributes),
6. extra conference opportunity (including entertainment, shopping, sightseeing, recreation, and professional opportunities attributes),
7. accommodation facilities (including capacity, cost, service, security, and availability attributes),
8. meeting facilities (including capacity, layout, cost, ambiance, security, availability, and experience attributes),
9. information (including reputation and marketing attributes),
10. site environment (including climate, setting, and infrastructure attributes), and
11. other criteria (such as risks, profitability, association promotion, and novelty attributes).

In [11] the convention site selection criteria are classified into two primary categories: the convention destination site's environment addressing a city's capacity to host an international convention, and the meeting facilities.

In [15] a summary review of the major criteria for convention site selection is provided concluding that meeting room facilities, service quality, restaurants, transportation, and attractiveness of the destination are the major attributes. Because the AHP and the choice model tap the nature of decision making in different ways, it is reasonable to expect results from the two methods to be useful, to complement and not to contradict each other.

ANALYTIC HIERARCHY PROCESS

Introduction

Establishing criteria for decision-making is a difficult and responsible task. In the past a single criterion optimization has usually been debated, that single criterion being – economic. Today we almost always deal with multi-criteria optimisation i.e. the decision making with respect to more than one criterion. For solving those problems various mathematical methods were developed [20]. In those methods the decision - maker has to define the structure preference for making a choice. The definition of the structure of preference is a separate problem within the multiple criteria optimisation.

Psychology shows that the human brain's reaction is one - dimensional, i.e. that the brain is capable of comparing elements only two by two; that is why it is so difficult to subjectively rank lots of objects simultaneously. The problem is becoming even worse if there is more than one criterion. It is believed that humans generally are not capable of making a choice from a set that is infinite.

As a completely new approach to solving decision making problems, mathematician *Saaty T (1980)* developed a new method which he named the Analytic Hierarchy Process (AHP).

The AHP approach is one of the more extensively used MCDM methods. The AHP has been applied to a wide variety of decisions and the human judgment process [16]. The approach is used to construct an evaluation model and has criterion weights. It integrates different measures into a single overall score for ranking decision alternatives. Applying it usually results in simplifying a multiple criterion problem by decomposing it into a multilevel hierarchical structure. Obtaining solutions in the AHP is not a statistical procedure, because it can help either a single decision maker or a decision group to solve an MCDM problem. Description of the basic Saaty's method is given in detail bellow, together with some of its extensions and the appropriate references.

The basic characteristic

As stated in the introduction, mathematician *Tomas Saaty* [22] developed, during 1980s, a completely new approach to solving decision - making problems, and named it *Analytic Hierarchy Process* (AHP). It is considered that the AHP method is mathematically well expounded. As a method for multiple criteria decision – making, AHP is closely related to the way an individual intuitively solves complex problems by decomposing them to more simple ones.

Applying the AHP procedure involves three basic steps:

1. decomposition, or the hierarchy construction;
2. comparative judgments, or defining and executing data collection to obtain pairwise comparison data on elements of the hierarchical structure; and
3. synthesis of priorities, or constructing an overall priority rating.

Decomposition into a hierarchy is based on previous studies and empirical experiences. Note that AHP demands that the problem be structured by the participants in the decision-making process, although it is not essential that all participants in the planning process agree on every component of the problem [23].

In addition, it is important that all essential elements relevant to the problem are covered within the hierarchy structure. In its most typical form, a hierarchy is very often structured from the top (objectives from the managerial standpoint) through the intermediate level (criteria and sub-criteria that subsequent levels depend on), and on to the lowest level (which is usually a list of alternatives). AHP uses information from the literature and empirical experiences to define a general structure, and implements pairwise comparison information from decision makers to model decision making.

Once a hierarchy has been developed, it can be moved to data collection, thus having the pairwise comparisons needed to determine the relative importance of the elements in each level. The decision makers begin the prioritization procedure to determine the relative importance of the elements in each level.

The criteria and sub-criteria are not equally important to the decision at each level of the hierarchy, and each alternative rate differently in each criterion. AHP can provide an analytical process that is able to combine and consolidate the evaluations of the alternatives and criteria by either an individual or a group involved in the decision-making task.

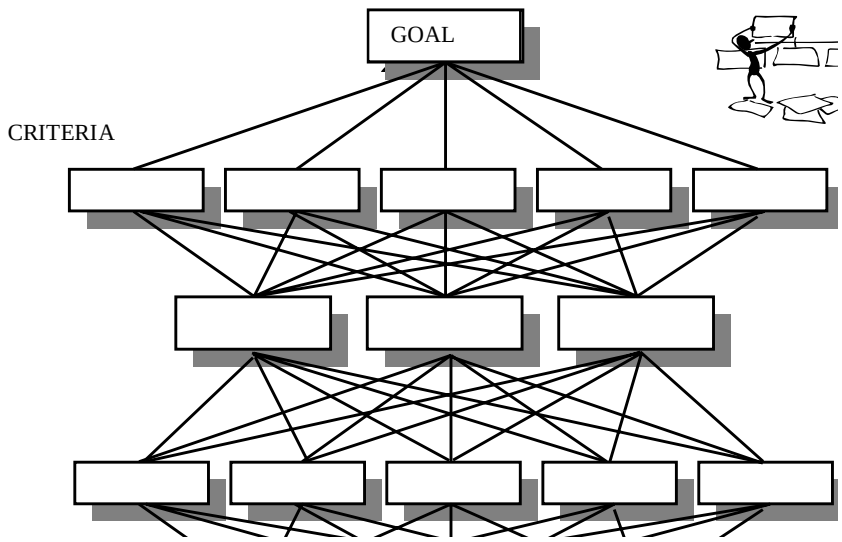


Figure 1. Abstract Representation of a decision Hierarchy

It is noted that two elements being compared at a given time greatly reduce the conceptual complexity of an analysis. This simplification involves assumptions that are considered reasonable. Given a pairwise comparison, the analysis involves three tasks:

4. developing a comparison matrix at each level of the hierarchy starting from the second level and working down,
5. computing the relative weights for each element of the hierarchy, and
6. evaluating the consistency ratio to check the consistency of the judgment.

AHP handles the problem of multiple criteria decision - making as a hierarchy of elements that are important for reaching a decision. The goal is on the top of that hierarchy, the criteria are on the level below it, and the alternatives are at the bottom (figure 1).

Since the psychological experiments (Miller, 1956.) indicated that an individual cannot simultaneously compare more than seven elements (plus or minus 2 elements), Saaty defined a scale of pairwise comparisons with values ranging 1 to 9, with step 1. Saaty's scale is considered to be a standard for AHP (although there are other scales - linear, potential, exponential etc). The hierarchy does not need to be complete, any given middle-level element is not necessarily a criterion for all the elements below it.

Each level can represent a different aspect of the problem. The decision-maker can add or leave out some levels and elements in order to clear out the priorities or to concentrate on the specific segment of the problem. The general criteria can appear at higher levels of the hierarchy and the more specific ones can be unfolded deeper down.

This method elicits preferences through pairwise comparisons in which the decision maker considers the relative importance of two factors at a time with respect to a common higher-level criterion evaluating relative weights. For each comparison the decision maker indicates the intensity of preference of one factor over another as a point estimate on an appropriate scale. Pairwise comparisons (on the same hierarchy level) are semantic or numeric in nature as defined by Saaty's scale in table 1. A final aggregation of local weights is preformed to rank and choose alternative.

Table 1: Conventional and fuzzy scales

$$S = \left\{ \frac{1}{9}, \frac{1}{8}, \frac{1}{7}, \frac{1}{6}, \frac{1}{5}, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}, 1, 2, 3, 4, 5, 6, 7, 8, 9 \right\}$$

Conventional scales	Definition	Fuzzy scale
1	Equally preferred	$\tilde{1} = (1-\delta, 1, 1+\delta)$
3	Weakly preferred	$\tilde{3} = (3-\delta, 3, 3+\delta)$
5	Strongly preferred	$\tilde{5} = (5-\delta, 5, 5+\delta)$
7	Very strongly preferred	$\tilde{7} = (7-\delta, 7, 7+\delta)$
9	Absolutely preferred	$\tilde{9} = (9-\delta, 9, 9+\delta)$
2,4,6,8	Intermediate values	$\tilde{2}, \tilde{4}, \tilde{6}, \tilde{8}$

For solving in additional problems caused by qualitative elements that are difficult to include into normative methods, versions of the AHP are developed in interval [1] and fuzzy environments ([3], [12], [24]). The „fuzzyfication" of the basic Saaty's method is performed using triangular fuzzy numbers (as they are more simple than trapezoidal) and fuzzy arithmetic. A very good preview of techniques in AHP in fuzzy triangular case can be seeing in [24] for example, and in [14] a fuzzy case application is offered.

The complete process is fuzzyficated: from the Saaty's scale (see columns 1 and 3 in table 1) and pairwise comparisons to all the operations with matrixes. Various fuzzy versions of AHP differ in methods of fuzzyfication of the scales and the method of de-fuzzyfication of the results.

De-fuzzyfication is performed using the methods of centroid, different types of geometric comparisons of triangular fuzzy numbers, or various methods of integration combined with **α** – scalarisation and using **λ** – index of optimism of the decision-maker [15].

Eigenvector method and the consistency

Under the semantic preference from the second column of the table 1 the appropriate numerical values from the first column could be written in square matrix of comparison $A = (a_{ij}) \in R^{n \times n}$, whose elements are taking one of possible 17 values in the table 1. If we denote the priority vector as $w = (w_1 \quad w_2 \quad w_3 \quad \dots \quad w_n)^T$, than the next formula holds:

Note that if the element E_i preferred to the element E_j totally a_{ij} times in total, it can

$$A = \begin{bmatrix} 1 & a_{12} & \cdot & \cdot & \cdot & a_{1n} \\ \frac{1}{a_{12}} & 1 & \cdot & \cdot & \cdot & a_{2n} \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \frac{1}{a_{1n}} & \frac{1}{a_{2n}} & \cdot & \cdot & \cdot & 1 \end{bmatrix} = \begin{bmatrix} \frac{w_1}{w_1} & \frac{w_1}{w_2} & \cdot & \cdot & \cdot & \frac{w_1}{w_n} \\ \frac{w_2}{w_1} & \frac{w_2}{w_2} & \cdot & \cdot & \cdot & \frac{w_2}{w_n} \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \frac{w_n}{w_1} & \frac{w_n}{w_2} & \cdot & \cdot & \cdot & \frac{w_n}{w_n} \end{bmatrix} \quad (1)$$

be expected that the element E_j will be preferred to the element E_i $\frac{1}{a_{ij}}$ times in total. Since $a_{ji} = \frac{1}{a_{ij}}$ and $a_{ii} = 1$ holds for all $i, j \in \{1,2,...,n\}$, matrix ***A*** is positive and the elements from its „upper triangular sub-matrix" are reciprocal to those from its „lower triangular sub-matrix". The following equation could be constructed:

$$Aw = nw \qquad (2)$$

The solution of this equation is the right eigenvector of the matrix A, consists of positive elements of the matrix A and it is unique, disregarding possible multiplicative constants. It could be made as the additive normalization in a way to unification the eigenvector. If all the elements of the matrix A are known, the evaluation system can be established and the solution is the normalized version of any column of matrix A.

In practice, the matrix A is very often inconsistent, in fact almost always; in this case the solution of the following equation:

$$A \cdot w = \lambda_{max} \cdot w \qquad (3)$$

is vector

$$w = \lim_{k \to \infty} \frac{A^k e}{e^T A^k e}, \; e = (1 \quad 1 \quad ... \quad 1)^T \qquad (4)$$

The matrix $W = \left(\frac{w_i}{w_j} \right), \; i, j = 1,2,...,n$ is the consistent approximation of the matrix A. It means that the expert evaluations are given with a small account error. The appropriate eigenvalue λ_{max} is not n, furthermore it holds that $\lambda_{max} \geq n$ (equality stands in case of consistency). Deviation of expert evaluation for consistent approximation is expressed by $\lambda_{max} \geq n$. *Saaty* suggests the following as a measure of inconsistency:

$$CI = \frac{\lambda_{\max} - n}{n - 1} \qquad (5)$$

CI is called the consistency index. *Saaty* compares this value with random index, denoted with RI (see table2) an average CI of a large number of randomly generated reciprocal matrix of the same order. The calculated vector w is accepted if the ratio $CI : RI$ is les than or equal to 0.1, otherwise the preferences are considered not to be consistent enough to serve as a basis for decision- making.

Table 2: Random index (RI) for matrices of order (n) 1 to 15

N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48	1.56	1.57	1.59

Software support

Several computer programs are developed as a support for analytic hierarchy process. One of them, the Super-Decision, is developed in 2003 by William J. Adams from Embry Riddle Aeronautic University, Daytona Beach from Florida and Rosanne W. Saaty from Creative Decisions Foundation from Pittsburgh.

A hierarchical decision model has a goal, criteria that are evaluated for their importance to the goal and alternatives that are evaluated for the level of preferences in respect to the each criterion

A hierarchical decision model has a goal, criteria that are evaluated for their importance to the goal, and alternatives that are evaluated for their importance with respect to the each criterion. The goal, the criteria and the alternatives are all elements in the decision problem, or nodes in the model. A *Super-Decisions* model consists of clusters of elements (or nodes), rather than elements (or nodes) arranged in levels. The simplest hierarchical model has a goal cluster containing the goal element, a criteria cluster containing the criteria elements and an alternatives cluster containing the alternative elements as shown in the Error! Reference source not found.. It is necessary to input names for every level particularly, and there is possibility to describe each of them. When the clusters are connected by a line it means the nodes in them are connected. The pairwise comparisons are being done after that. Several methods of prioritizing are offered. The checking consistency as a tool is offered, too.

A few types of models are offered, and they could be appropriate for usage in those forms, or could be a little modified. New models can be created easily. The set of the offered models consist of application examples in car industry, education, fishery resource allocation, water reservoirs, national missile defense etc. The new idea to applying this software is appeared as a result. For the application purposes, it would be interesting to consider the case of convention site selection as follows.

CASE APPLICATION

Development the evaluation hierarchy

The convention site selection evaluated by five factors divided into seventeen attributes applied in Taiwan is chosen as **a**n application case in our environment for this paper. The case aims to evaluate how academic professors and directors of tourist agencies prioritize the elements affecting convention site selection. A simple four-level hierarchical structure is constructed first, and the fourth level consists of destinations for convention. Of course, initial determination of the number of levels and variables is a research problem and it can be various in every particular case. Based on reviewing the literature on convention site selection and opinions of a smaller group of academic professors and tourist agency's directors a proposed hierarchy is constructed as shown in the figure 2 (basic levels without alternatives).

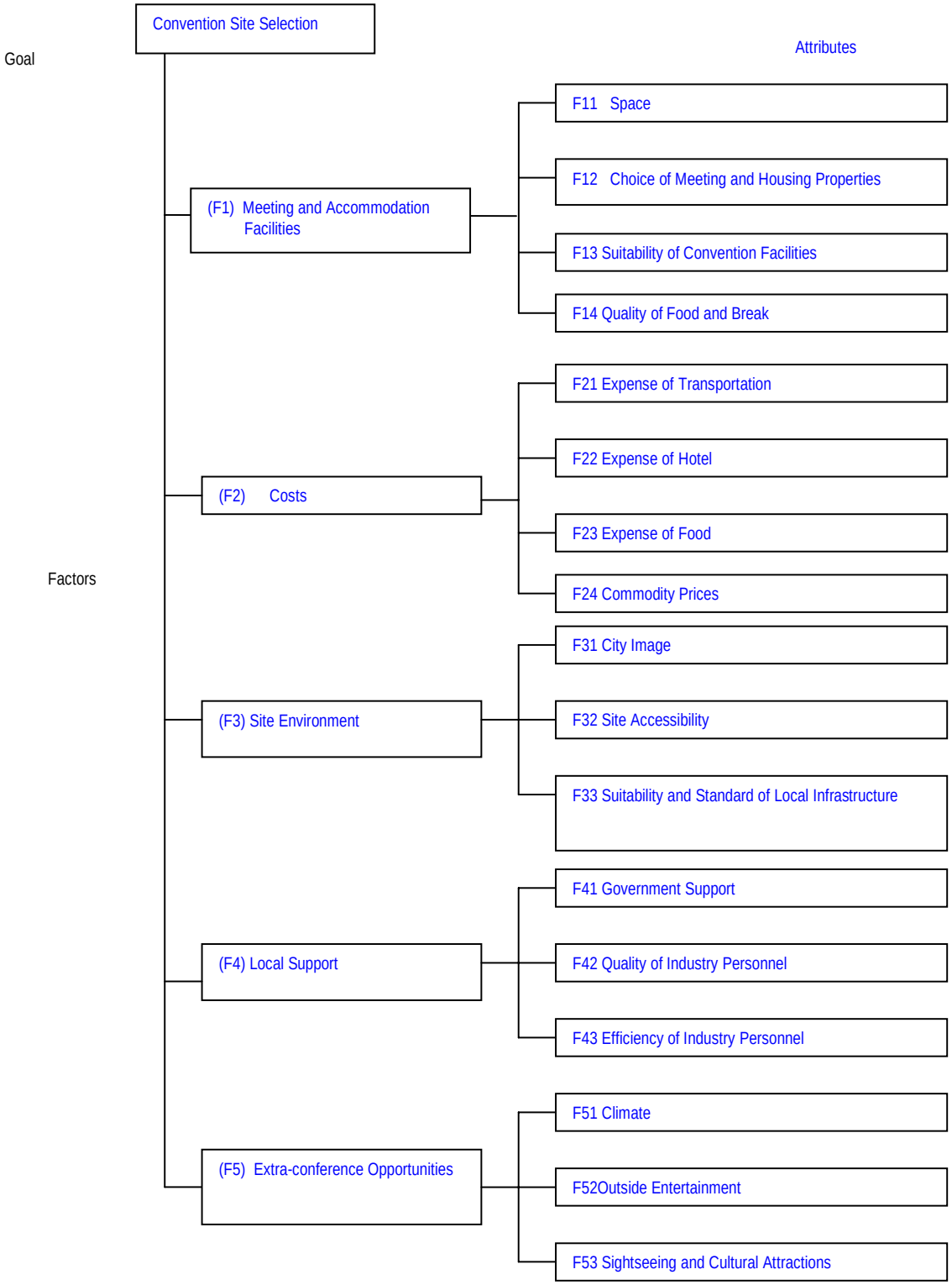


Figure 2. The hierarchy of convention site selection

The highest level of the hierarchy is the overall goal: to construct an evaluation structure for convention site selection with weights corresponding to criteria. Under the overall goal, the second level represents the criteria (i.e., factors) affecting convention site selection, including meeting and accommodation facilities, costs, site environment, local support, and extra conference opportunities. Various sets of sub-criteria (i.e., attributes) associated with each factor in the second level are linked to the third level. The meeting and accommodation facilities factor consists of four attributes (space, variety of meeting and accommodation properties, suitability of convention facilities, and quality of food and beverage). The costs factor is subdivided into four attributes (transport expense, accommodation expense, food and beverage expense, and commodity prices). The site environment factor is made of three attributes (city image, site accessibility, and suitability and quality of local infrastructure). The local support factor includes three attributes (government support, quality of convention personnel, and efficiency of convention personnel). Finally, the extra-conference opportunities factor includes three attributes (climate, entertainment opportunities, and sightseeing and cultural attractions).

Finally, on the bottom of this hierarchy some destinations are offered, and it can be seen in figure 3.

Prioritization procedure

Once the hierarchy structure of the convention site selection has been constructed, the prioritization procedure begins to determine the relative importance of the elements on each level. A questionnaire survey was designed for academic professors and directors of tourist agencies in order to collect the data of pairwise comparisons. The respondents are asked to make judgments about the relative importance of the element with respect to the overall goal of selecting the convention site. For example, when asked, "With respect to meeting and accommodation facilities with costs, which is more important?" the verbal judgment from equal importance to extreme importance was then translated into the corresponding number in the relative importance scale in the table 3.

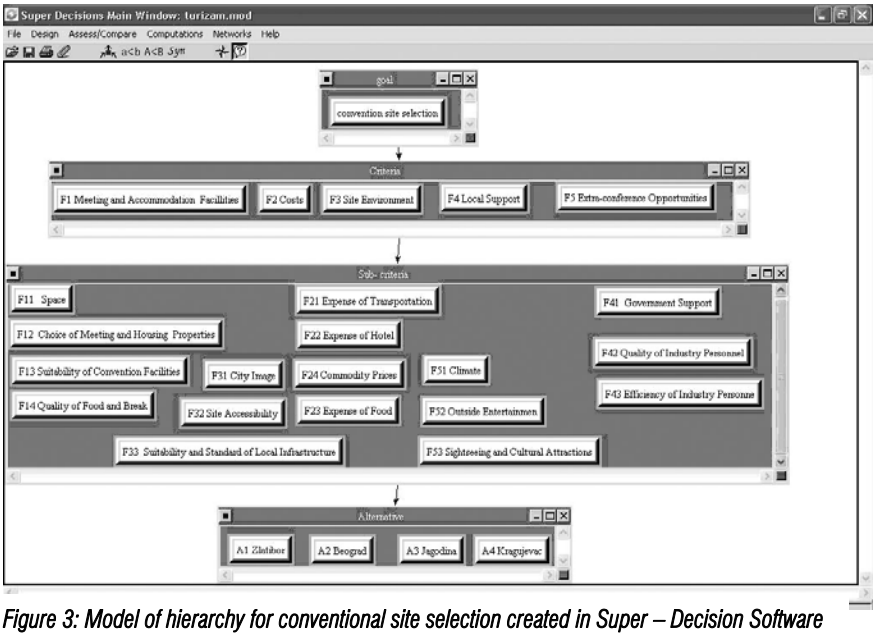


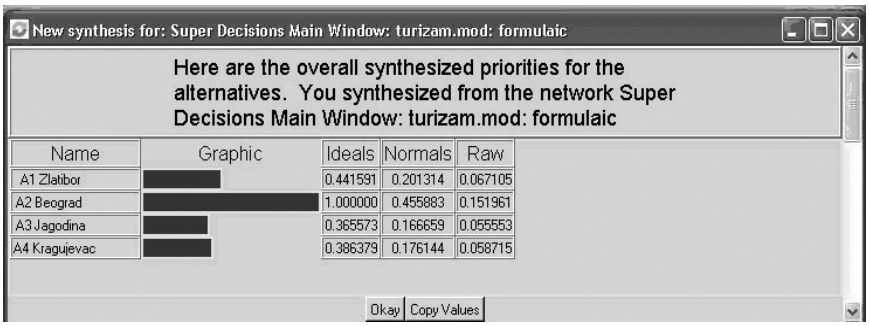
Figure 3: Model of hierarchy for conventional site selection created in Super – Decision Software

Table 3: Nine-point intensity of relative importance scale

Intensity of Relative Importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to objective 1.
3	Moderate importance of one over another	Experience and judgment slightly favor one activity over another.
5	Essential or strong importance	Experience and judgment strongly favor one activity over another.
7	Demonstrated importance	An activity is strongly favored, and its dominance is demonstrated in practice.
9	Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation.
2, 4, 6, 8	Intermediate values between the two adjacent judgments	When a compromise is needed

After doing all pairwise comparisons on the level 2, the pairwise comparison matrix is constructed. Similarly, the pairwise comparison procedure is then applied to all factors with respect to the second level. At the end four destinations are offered: Zlatibor, Beograd, Jagodina and Kragujevac. The dates put in the Super-Decision give the result which is shown in the figure 4.

It is evaluated that the attributes of suitability of convention facilities (0.079616%), commodity prices (0.023021%), suitability and quality of local infrastructure (0.04931%), government support (0.182667%), and sightseeing and cultural attractions (0.313266%) show the highest importance with respect to each factor in the order of meeting and accommodation facilities, costs, site environment, local support, and extra conference opportunities, respectively. The derived weights for every factor in respect to the goal are: meeting and accommodation facilities (0.142%), costs (0.038%), site environment (0.072%), local support (0.267%), and extra conference opportunities (0.481%).



Name	Graphic	Ideals	Normals	Raw
A1 Zlatibor		0.441591	0.201314	0.067105
A2 Beograd		1.000000	0.455883	0.151961
A3 Jagodina		0.365573	0.166659	0.055553
A4 Kragujevac		0.386379	0.176144	0.058715

Figure 4: Priorities of proposed model created in Super – Decision Software

CONCLUSIONS

Selecting a suitable and attractive site destination is essential for creating a successful convention for associated decision makers and meeting planners. Although the literature has contributed to identifying many of the selection factors, little is known about the relative importance of each factor.

Viewing the selection of a convention site as a MCDM problem, the relative importance of each affecting factor can be effectively obtained using the MCDM approaches. This article examines proposal of the AHP model for decision makers to evaluate convention site selection in every particular case.

In addition to an application to destination competitiveness, this article shows the suitability of the AHP model to be applied in the meeting, incentive, convention, and exposition (MICE) industry for site selection by allowing decision makers to structure their unique problems into priority weights, which can reflect their own priority considerations.

The main conclusions of this article are: first, the proposed evaluation model by this study demonstrates the sensitivity and efficiency in evaluating convention site selection, and second, the site factors extra – conference opportunities and local support reveal their dominating importance. Although it contributes to the introduction of a convention site selection model, the result is limited to specific academic related associations.

In spite of the fact that a smaller group of specialists answered the questionnaire, this example should be considered as illustrative one, and that is why the given results can not be quantified in any different way.

It is very important that one or more comparision judgment within considering problem can be changed in the Super-Decision software , and the new ranking immediately can be seen according that. This makes the programm ideale for applaying as a tool in decision making problems

Further studies with respect to regional characteristics and types of conventions would be very interesting to analyze for model generalization purposes.

ACKNOWLEDGEMENT

This research was supported by the Government of Serbia - Science and Environmental Protection, grant number TP-6500A though the Institute of Architecture and Urbanism of Serbia, the Faculty of Architecture and the Faculty of Civil Engineering, University of Belgrade.

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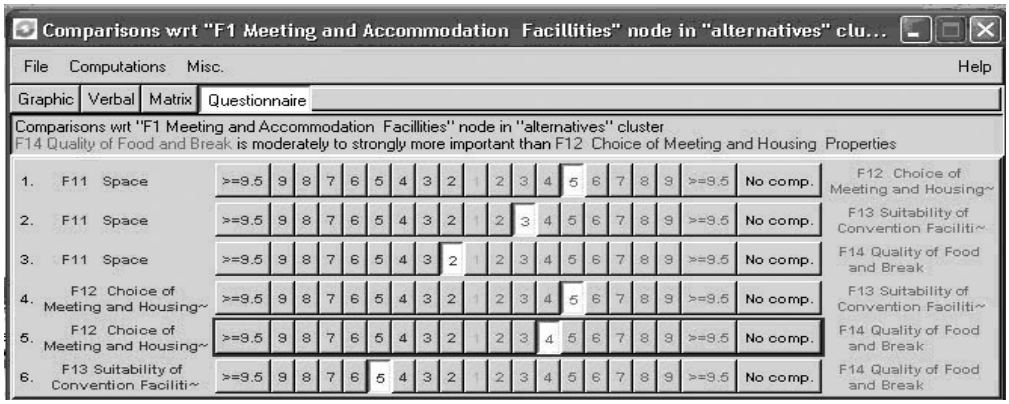
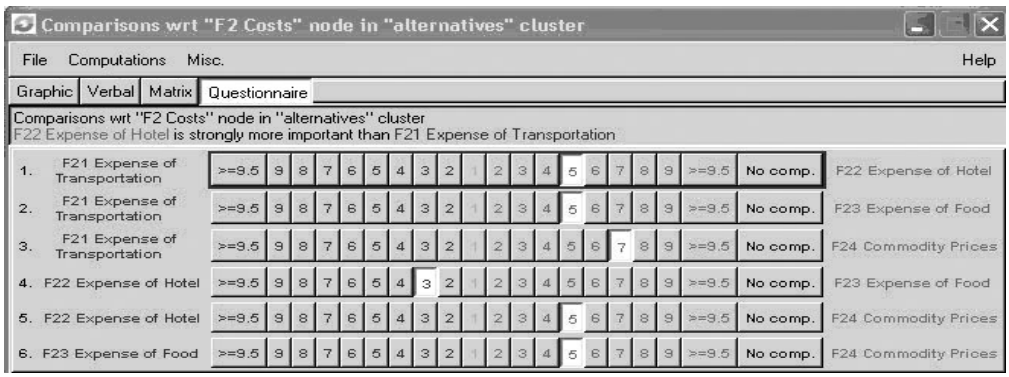
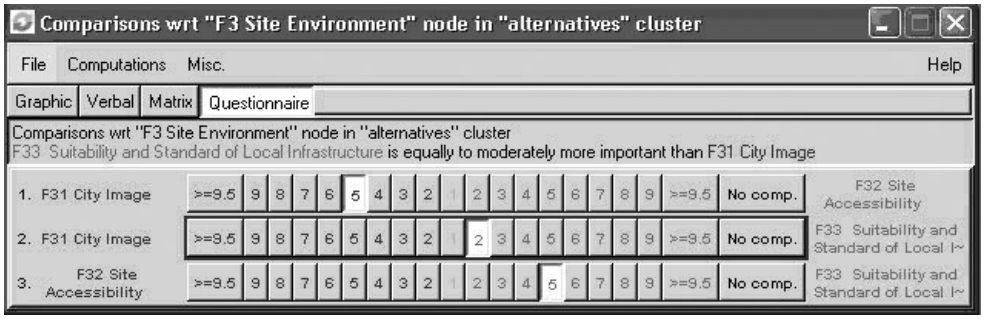
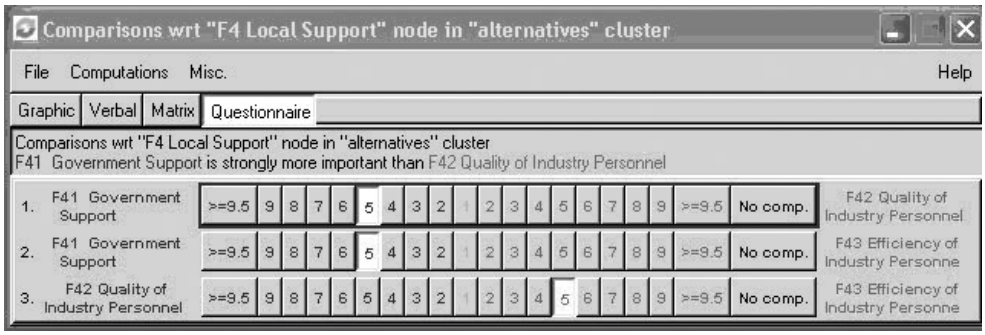
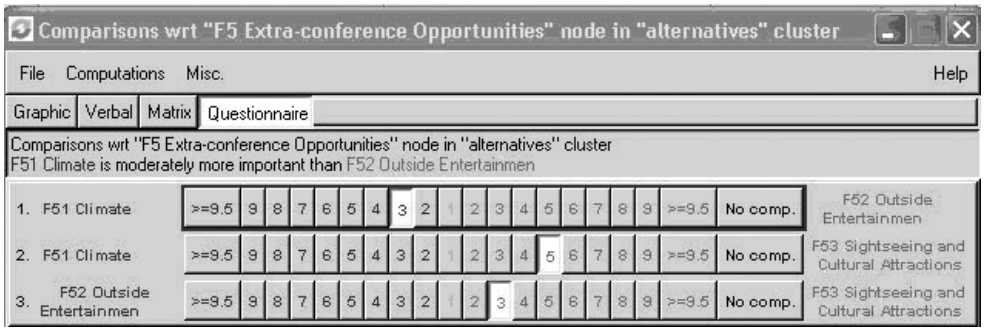
APPENDIX

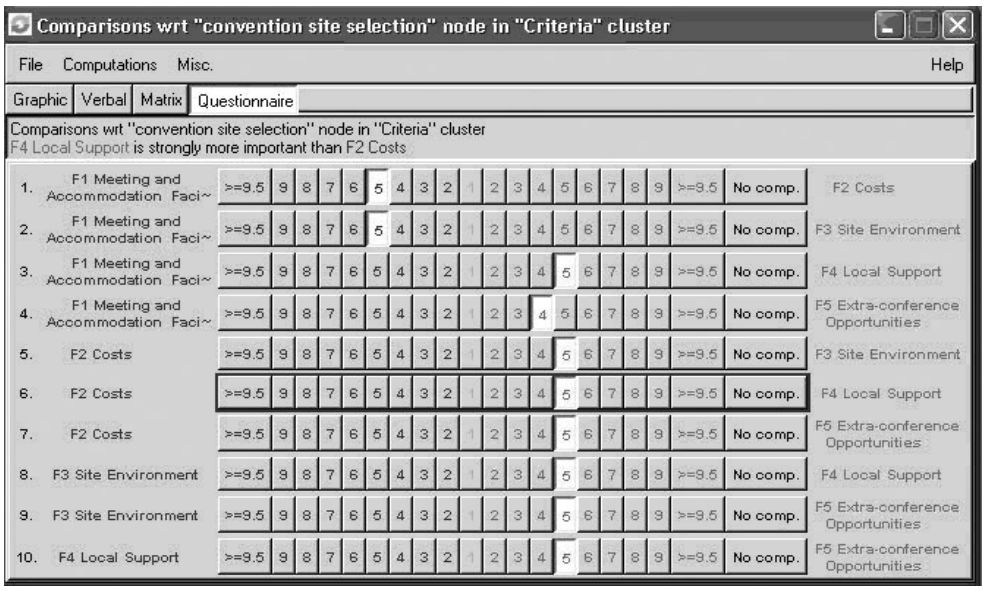


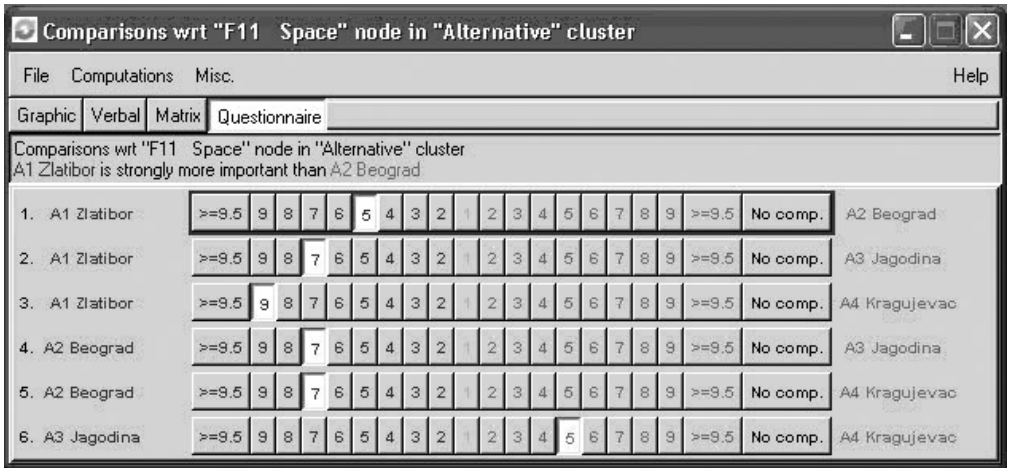


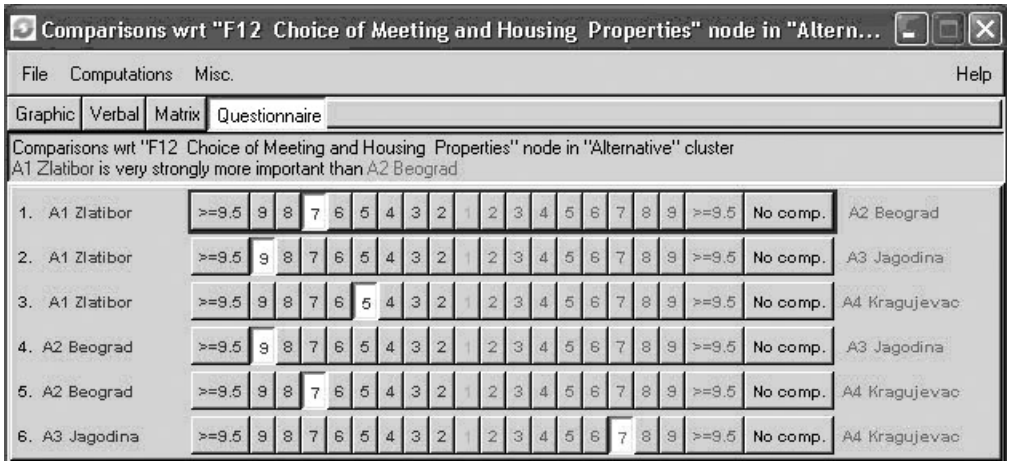

Comparisons wrt "F3 Site Environment" node in "alternatives" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F3 Site Environment" node in "alternatives" cluster
F33 Suitability and Standard of Local Infrastructure is equally to moderately more important than F31 City Image
1. F31 City Image
2. F31 City Image
3. F32 Site Accessibility
>=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp.
F32 Site Accessibility
F33 Suitability and Standard of Local I~
F33 Suitability and Standard of Local I~

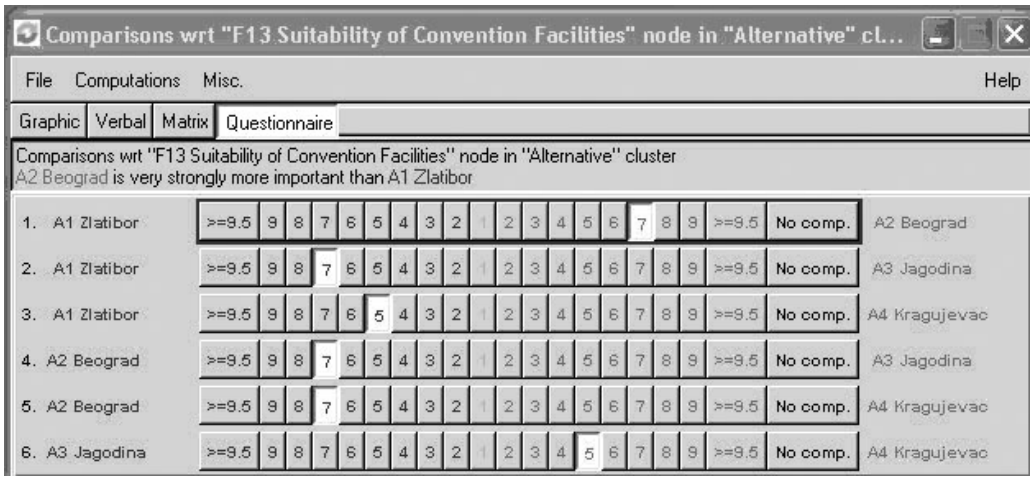

Comparisons wrt "F4 Local Support" node in "alternatives" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F4 Local Support" node in "alternatives" cluster
F41 Government Support is strongly more important than F42 Quality of Industry Personnel
1. F41 Government Support
2. F41 Government Support
3. F42 Quality of Industry Personnel
>=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp.
F42 Quality of Industry Personnel
F43 Efficiency of Industry Personne
F43 Efficiency of Industry Personne

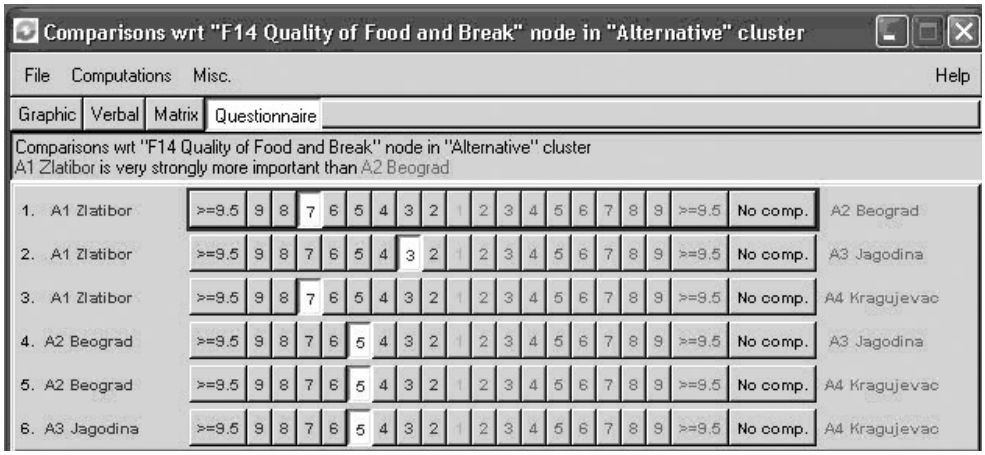

Comparisons wrt "F5 Extra-conference Opportunities" node in "alternatives" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F5 Extra-conference Opportunities" node in "alternatives" cluster
F51 Climate is moderately more important than F52 Outside Entertainmen
1. F51 Climate
2. F51 Climate
3. F52 Outside Entertainmen
>=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp.
F52 Outside Entertainmen
F53 Sightseeing and Cultural Attractions
F53 Sightseeing and Cultural Attractions

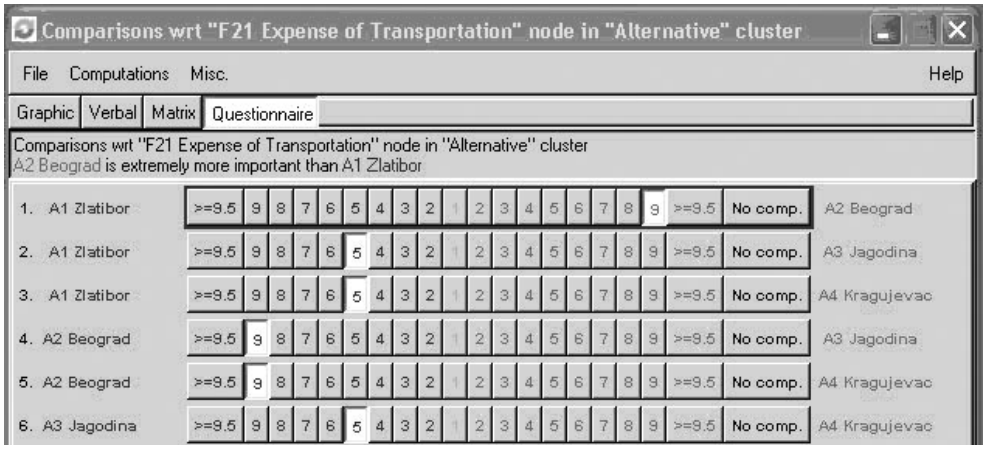

Comparisons wrt "convention site selection" node in "Criteria" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "convention site selection" node in "Criteria" cluster
F4 Local Support is strongly more important than F2 Costs
1. F1 Meeting and Accommodation Faci~
2. F1 Meeting and Accommodation Faci~
3. F1 Meeting and Accommodation Faci~
4. F1 Meeting and Accommodation Faci~
5. F2 Costs
6. F2 Costs
7. F2 Costs
8. F3 Site Environment
9. F3 Site Environment
10. F4 Local Support
>=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp.
F2 Costs
F3 Site Environment
F4 Local Support
F5 Extra-conference Opportunities
F3 Site Environment
F4 Local Support
F5 Extra-conference Opportunities
F4 Local Support
F5 Extra-conference Opportunities
F5 Extra-conference Opportunities

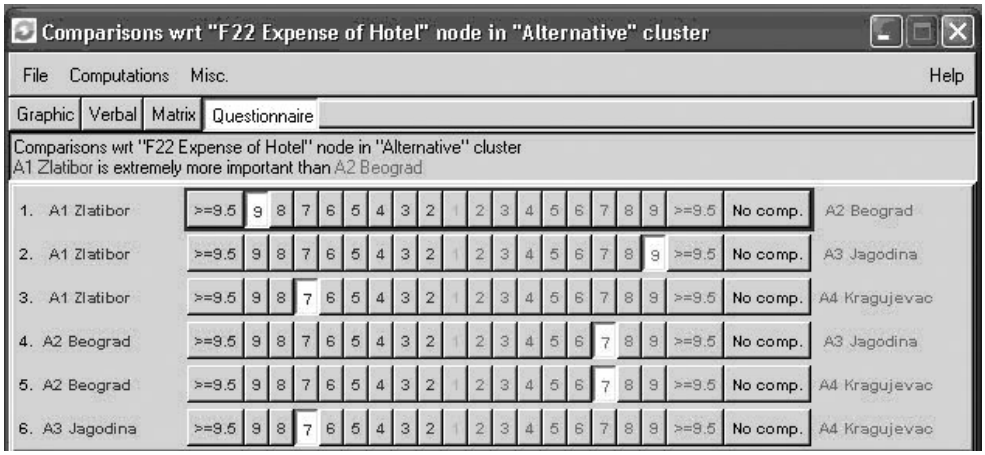

Comparisons wrt "F11 Space" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F11 Space" node in "Alternative" cluster
A1 Zlatibor is strongly more important than A2 Beograd
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac

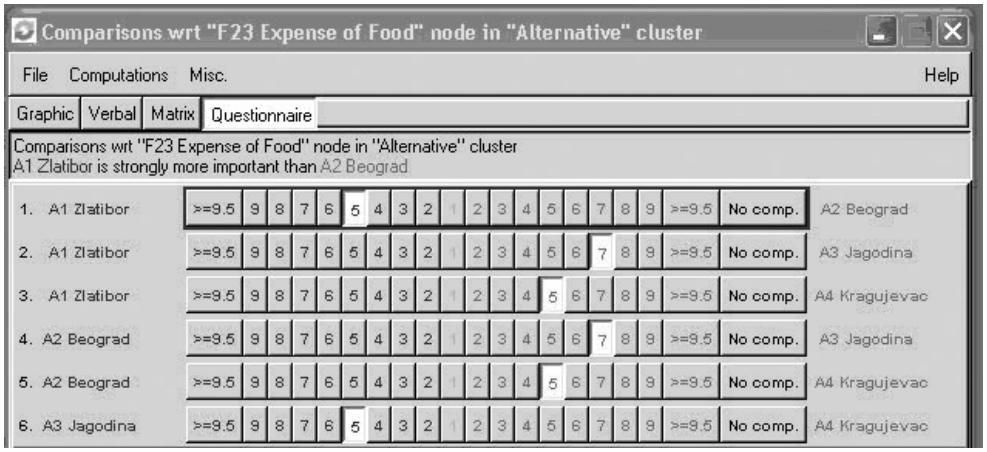

Comparisons wrt "F12 Choice of Meeting and Housing Properties" node in "Altern...
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F12 Choice of Meeting and Housing Properties" node in "Alternative" cluster
A1 Zlatibor is very strongly more important than A2 Beograd
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac

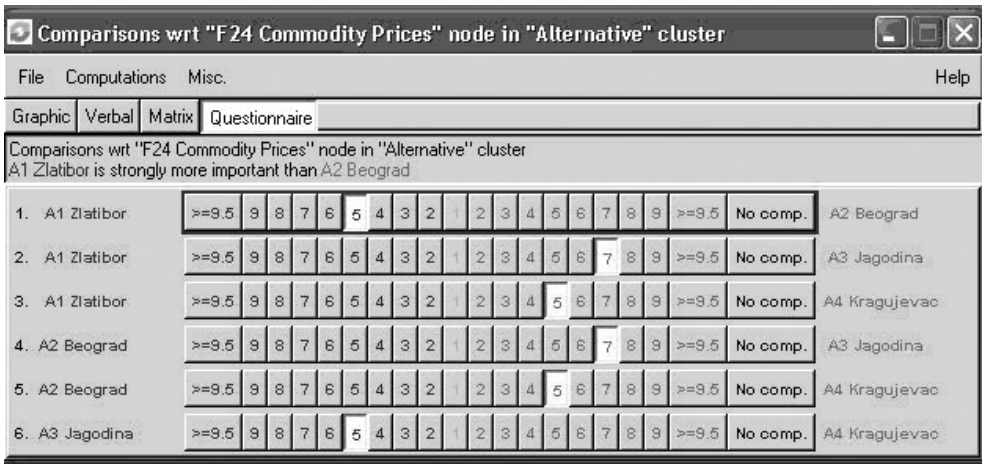

Comparisons wrt "F13 Suitability of Convention Facilities" node in "Alternative" cl...
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F13 Suitability of Convention Facilities" node in "Alternative" cluster
A2 Beograd is very strongly more important than A1 Zlatibor
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac

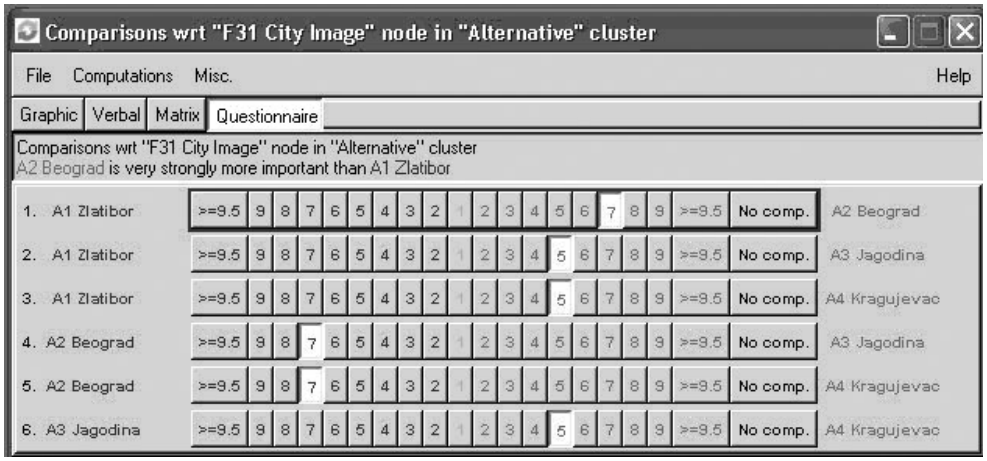

Comparisons wrt "F14 Quality of Food and Break" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F14 Quality of Food and Break" node in "Alternative" cluster
A1 Zlatibor is very strongly more important than A2 Beograd
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac

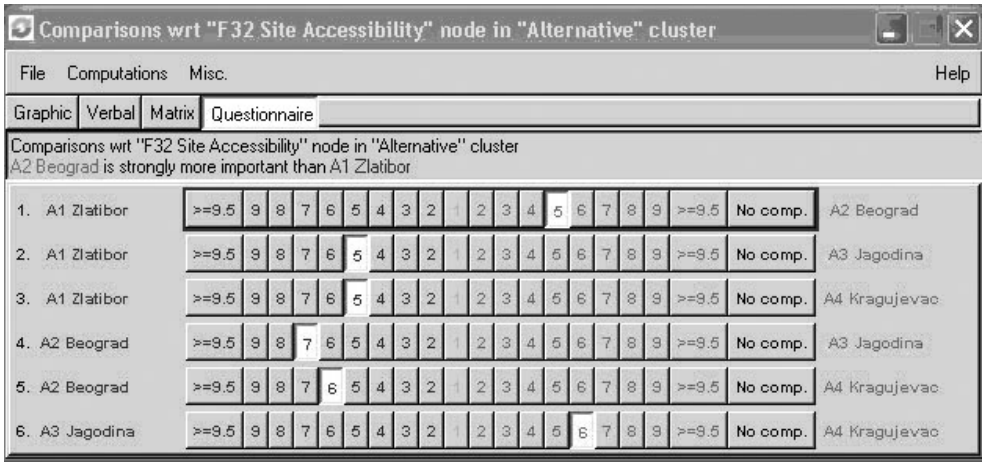

Comparisons wrt "F21 Expense of Transportation" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F21 Expense of Transportation" node in "Alternative" cluster
A2 Beograd is extremely more important than A1 Zlatibor
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac

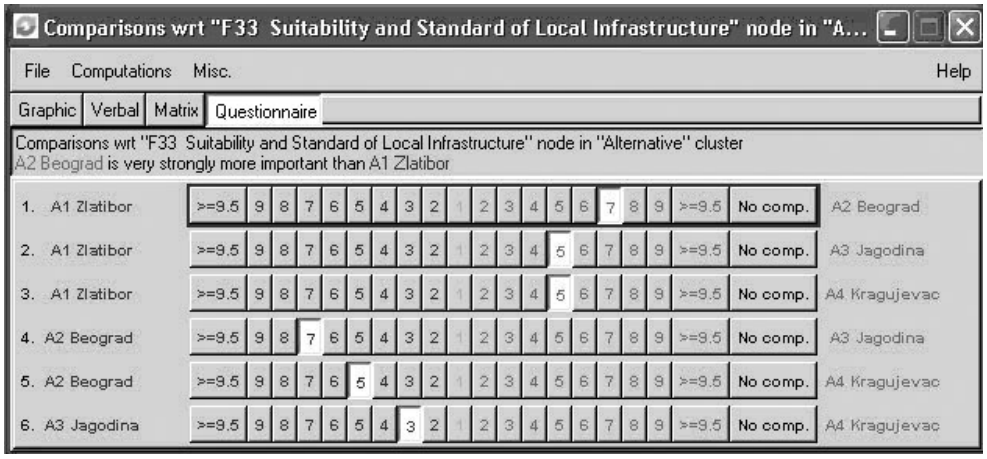

Comparisons wrt "F22 Expense of Hotel" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F22 Expense of Hotel" node in "Alternative" cluster
A1 Zlatibor is extremely more important than A2 Beograd
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac

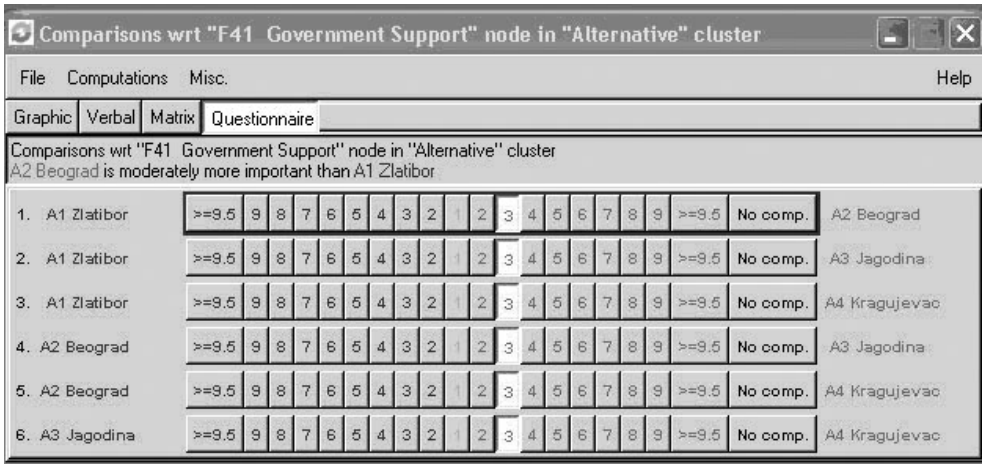

Comparisons wrt "F23 Expense of Food" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F23 Expense of Food" node in "Alternative" cluster
A1 Zlatibor is strongly more important than A2 Beograd
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac

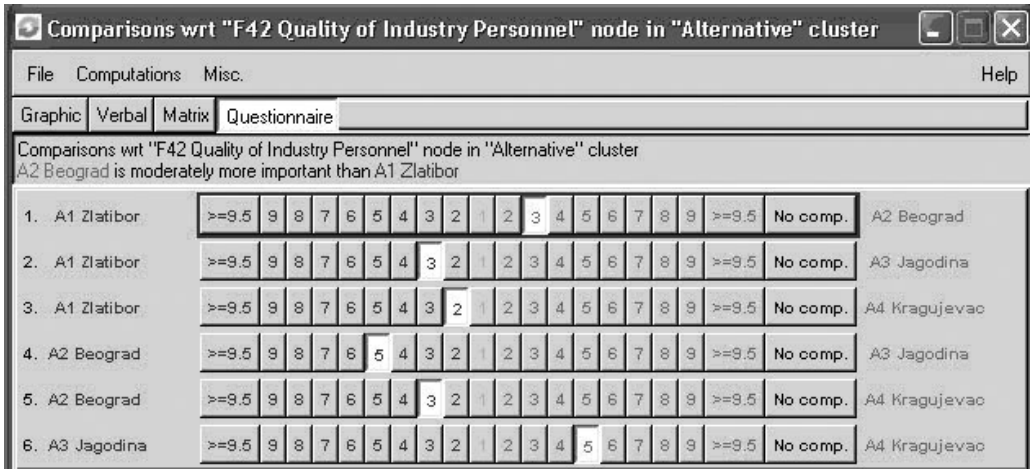

Comparisons wrt "F24 Commodity Prices" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F24 Commodity Prices" node in "Alternative" cluster
A1 Zlatibor is strongly more important than A2 Beograd
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac

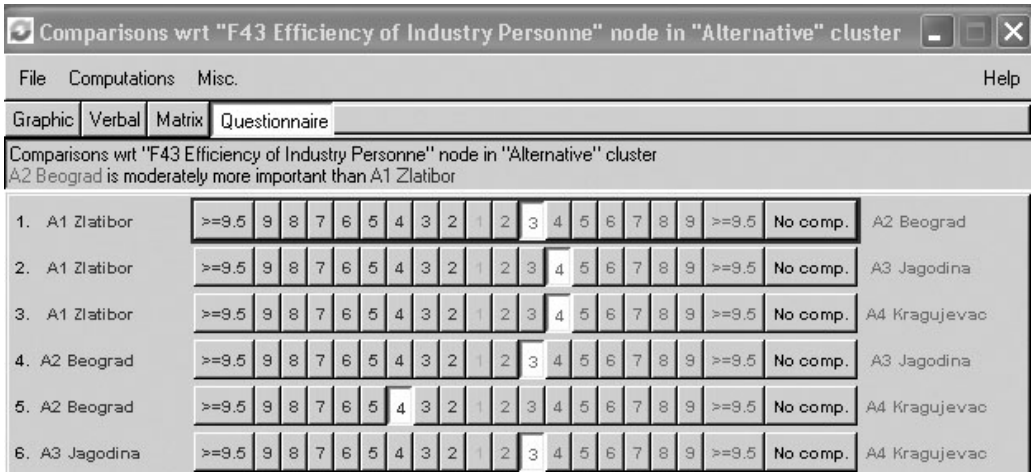

Comparisons wrt "F31 City Image" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F31 City Image" node in "Alternative" cluster
A2 Beograd is very strongly more important than A1 Zlatibor
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac

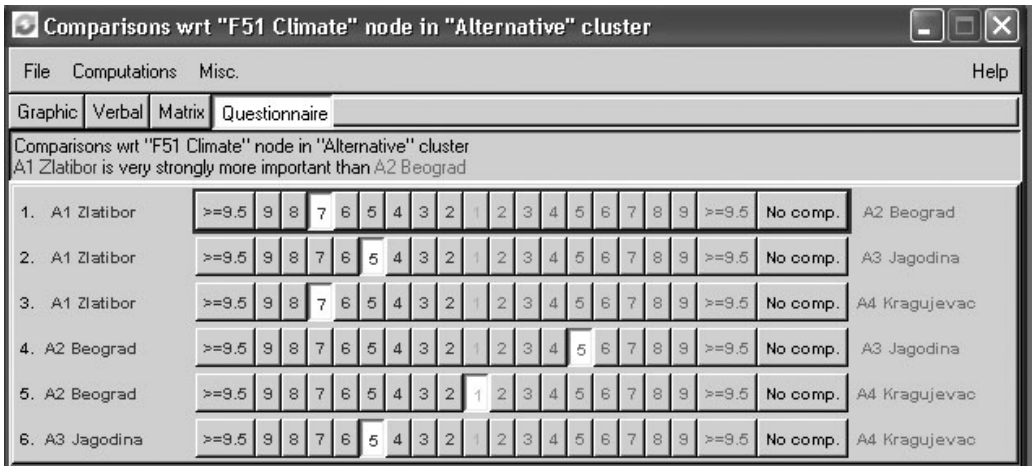

Comparisons wrt "F32 Site Accessibility" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F32 Site Accessibility" node in "Alternative" cluster
A2 Beograd is strongly more important than A1 Zlatibor
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac

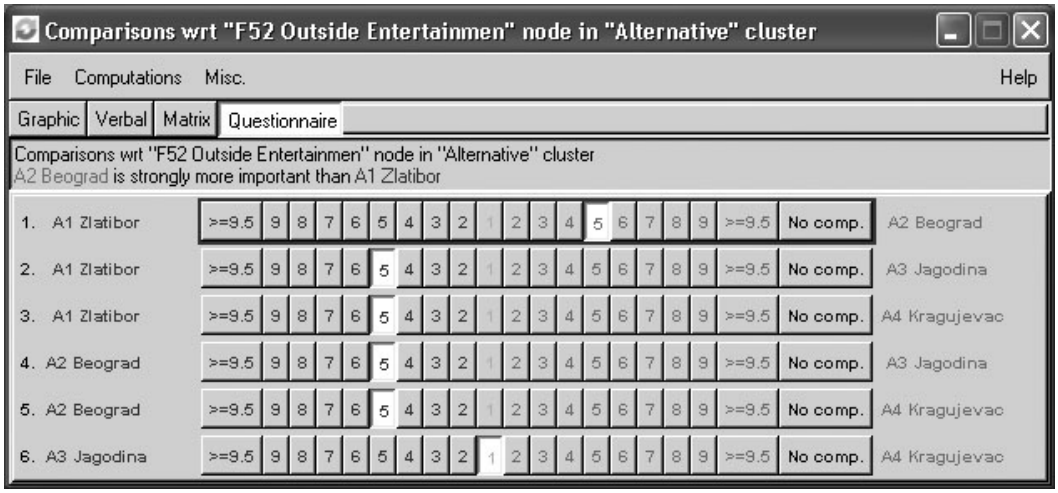

Comparisons wrt "F33 Suitability and Standard of Local Infrastructure" node in "A...
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F33 Suitability and Standard of Local Infrastructure" node in "Alternative" cluster
A2 Beograd is very strongly more important than A1 Zlatibor
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac

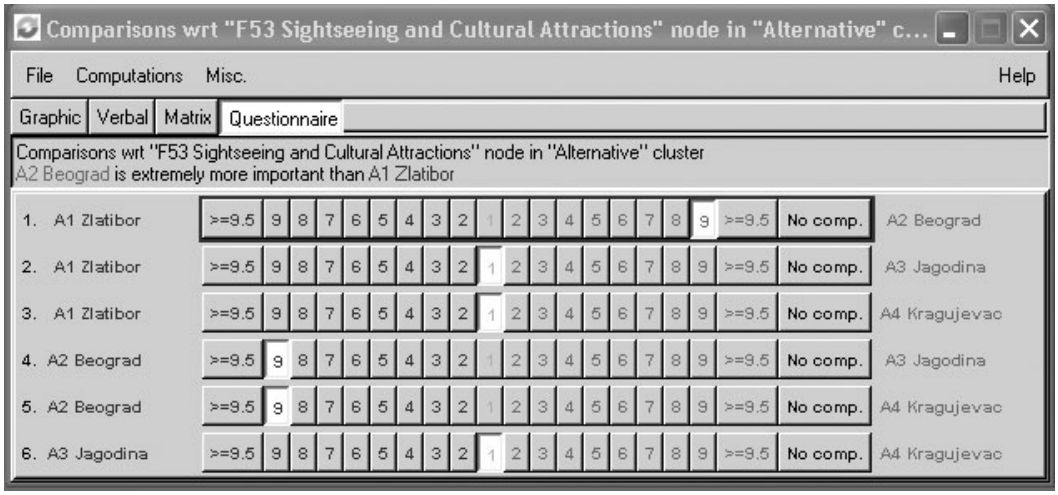

Comparisons wrt "F41 Government Support" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F41 Government Support" node in "Alternative" cluster
A2 Beograd is moderately more important than A1 Zlatibor
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac


Comparisons wrt "F42 Quality of Industry Personnel" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F42 Quality of Industry Personnel" node in "Alternative" cluster
A2 Beograd is moderately more important than A1 Zlatibor
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac


Comparisons wrt "F43 Efficiency of Industry Personne" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F43 Efficiency of Industry Personne" node in "Alternative" cluster
A2 Beograd is moderately more important than A1 Zlatibor
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac


Comparisons wrt "F51 Climate" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F51 Climate" node in "Alternative" cluster
A1 Zlatibor is very strongly more important than A2 Beograd
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac


Comparisons wrt "F52 Outside Entertainmen" node in "Alternative" cluster
File Computations Misc. Help
Graphic Verbal Matrix Questionnaire
Comparisons wrt "F52 Outside Entertainmen" node in "Alternative" cluster
A2 Beograd is strongly more important than A1 Zlatibor
1. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A2 Beograd
2. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
3. A1 Zlatibor >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
4. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A3 Jagodina
5. A2 Beograd >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac
6. A3 Jagodina >=9.5 9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9 >=9.5 No comp. A4 Kragujevac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REHABILITATION PROJECT OF AN APARTMENT BUILDING IN BELGRADE, SERBIA

Milica Jovanović-Popović, Dušan Ignjatović, Nataša Ćuković-Ignjatović, Ana Radivojević

As a part of a scientific project conducted at the Faculty of Architecture University of Belgrade a detailed survey of building fund has been made and a typical 1950's building was chosen as a demonstration project for the energy conscious renovation and retrofit procedure.

Rehabilitation has been done in three main phases:

- ***Detailed analysis and inspection of present state based on available project documentation, on site inspection, thermography, as well as interviews with tenants. In this phase strategies for reconstructions were analyzed and evaluated***
- ***First phase of rehabilitation mainly concerned improvement of performance of envelope (façade, windows) with addition of an attic level.***
- ***Second phase maximizes performance of building using various architectural and technical methods.***

Addition of new volumes (glazed loggias, and partly double skin façades), heat recuperating units, and hot water collectors with redefinition of heating system was the main objectives.

For both phases techno-economical analyses were made optimizing possible thermal performance gains and used technology in accordance with economic potential and pay-back period. Also a detailed procedure algorithm was developed in order to give guidelines for future projects of this type.

Keywords: ***rehabilitation, energy optimisation***

INTRODUCTION

Extensions, refurbishments and conversions of unused parts of apartment buildings became very popular way of gaining new apartment units during the 1990's. The investors were individuals already living in the existing building, or private entrepreneurs who would (in return for allowance to intervene on the dwelling) compensate the owners by performing major works on their building, such as repairs and refurbishments on the façade, halls and staircases, installing elevators etc. The extent of these interventions and the quality of works varied a lot, since it was up to the two parties involved (owners and investors) to make an agreement and neither party was professional on the subject. Regulations were inconsistent and unclear, leaving plenty of opportunities for manipulations and malpractice. The need arose for some sort of guidelines that would make better use of these interventions, and encourage search for modernized and environmentally friendlier design and research works began in many disciplines related to architecture and urban planning.

The project of energy based rehabilitation of an apartment building in Belgrade has been organized by Velux (Denmark) and Faculty of Architecture University of Belgrade and sponsored by BIF (Building Improvement Foundation - Denmark). Ministry of Education and Sports as well as Ministry of Science and Capital investments also participated as supporting bodies.

Project was based on the premises of creating an applicable model for further interventions. This model had to be based on real economic grounds and incorporate direct participation of both tenants and experts. For this reason an extension of existing structure was chosen as a generator of the rehabilitation project providing sufficient value for the whole process.

In the preliminary period it was decided that the gained space is to be donated to the University of Belgrade to accommodate young specializing professionals for a limited time period.

CHOOSING THE MODEL BUILDING

The first phase of the research that preceded the pilot project was focused on detailed analysis of Belgrade's building stock in order to identify building types and single out the one that would be the most suitable for energy rehabilitation. The major building types seemed to have corresponded to the certain phases of housing development in Belgrade –

the construction prior to the World War II (buildings dated before 1941), the post-war construction (1946-1970), the directed housing strategy (1966-1980), etc [1].

Some 15% of present building stock was constructed before World War II and it could not be considered as representative mainly because of rather modest number of apartments and great variety of building types. Also, many of these buildings are important part of architectural and cultural heritage and their refurbishment demands specific and more complex approach.

On the other hand, by the late 1960's, first building regulations regarding thermal insulation were introduced, and most buildings constructed during the period of directed housing strategy were designed according to these regulations; by the late 1980's Yugoslav standards in the area of building physics were based on German DIN standards at the time and were compulsory part of building design.

The buildings constructed during the 1950's and 1960 have presented the most interesting material for this research due to the particular set of characteristics:

They have no thermal insulation, so even modest interventions could result in noticeable improvement

During this period some 30% of Belgrade's building fund was constructed, mainly repeating the same model with minor variations. This means that the same guidelines could be applied on a large number of buildings, and a good model could provoke and initiate numerous interventions

Long life span of primary construction (although built with rather limited resources, they are made of solid, traditional materials, mainly brickwork and concrete) supports the idea of rehabilitation instead of demolition

The apartments are equipped with chimney installation, heated individually, using electricity mainly, with no gas or district heating connection, so tenants could feel benefits from rehabilitation instantly, both financially and in terms of thermal comfort

Their very limited architectural value provides space for architectural research for improvements in building appearance and identity

The model building was chosen as typical representative of this particular building type. In order to meet the needs of all the participants in the project, we looked for a building in a traditional city block, located in the greater central area of Belgrade, preferably with the disposition that would enable introducing some passive and/or active solar systems and optimal use of solar gains.

Finally, the building in 112-120 Cvijiceva street built in 1957. was chosen to be the subject of the pilot project (Figures 1 and 2). It was built within a traditional city block, it has all the characteristics of designated building type, with street façade facing north and court façade facing south with courtyard wide enough to provide good solar exposure. The building was in rather poor condition, and needed some refurbishment and repairs that the owners could not carry out themselves.

Figure 1: Building in Cvijiceva 112-120: street (North) façade – existing state

Figure 2: Building in Cvijiceva 112-120: court (South) façade - existing state

MODEL BUILDING – PRELIMINARY INVESTIGATION

The first project activities were dedicated to the detailed examination of the existing state of the building in order to investigate possible limitations for planned activities. At this stage, preliminary investigations were carried out regarding:

- technical data, involving technical investigation, measurements and a questionnaire for each individual flat
- legal issues, and
- feasibility study

The collected data were structured into the Technical report that covered all engineering aspects:

- General description that presented the designed and the existing state of the building in general, characteristics of its envelope, materials and equipment that were used
- Geotechnical conditions that covered geologic and hydrogeologic soil features, as well as seismic characteristics of the ground
- Structure condition where the designed and the existing state of building's structure were presented, and possible restrictions regarding the reconstruction were explored
- Waterworks and sewage installation networks
- Electrical installations
- Mechanical installations in the sense of the option for possible district heating connection and new heating installations for all apartments was elaborated
- Survey which covered all apartment owners, identifying the changes made by tenants during the exploitation and their approval or disapproval regarding each particular potential intervention proposed as part of the pilot-project
- Appendix which included complete set of technical drawings, schemes, illustrations and photos that accompanied sections 1-7

Later during the research, when thermal camera was acquired, thermal images showed the patterns of heat losses and identified the most critical parts of the building regarding its energy performance. Figures 3 and 4 show that the most evident losses occur in the areas

where concrete slabs intersect with the façade and on the windows. Some variations are visible on the South façade (Figure 4) where tenants have used their loggias as extension of living space, having them enclosed in their own way.

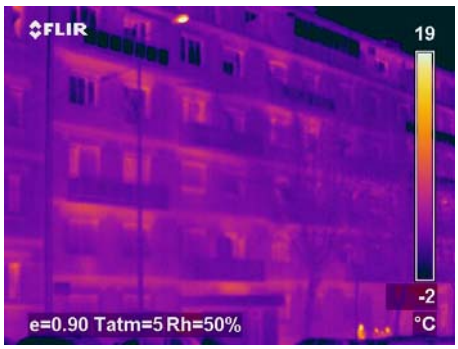

Figure 3: North façade – thermographic image

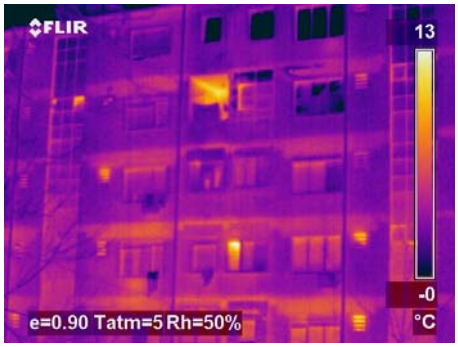

Figure 4: South façade – thermographic image

REHABILITATION

First Phase

Based on the detailed technical report first phase concentrated on vertical extension and envelope improvement [3]. Interventions were planned in three major fields:

- construction of new attic.
- reconstruction of the envelope (changing or servicing the windows, adding thermal insulation on the façade and along the staircases)
- connecting the building on distant heating system network

Figures 5 and 6 present the perspective views of the North and South facades as designed for the first phase. The design was approved by all participating parties.

Figure 5: North façade – the first phase of reconstruction

Figure 6: South façade – first phase of reconstruction

New attic was designed to have minimal impact on existing structure combined with simple construction method. Several architectural and technological solutions were considered and evaluated [2]. All new structures and installations systems were designed to be an extension of existing ones. Roof structure was designed as ventilated construction with 25cm thermal insulation. Shaped in the form of Mansard roof, it provided adequate use of roof windows insuring sufficient light and ventilation.

Façade of the building was to be fully renovated and insulated using Rockwool façade system (with additional 10cm insulation). Depending on their state, windows and balcony doors were either renovated or changed using PVC windows (5 chambers PVC profiles, low emission glass) equipped with external blinds. Internal staircases were insulated with 5cm insulation.

An approval from the city authorities for connection to the district heating system was obtained and new substation planned (within the building). Main distributing pipes were planned in staircases and tenants were obliged to provide radiators and local branching. An automated valves and individual measuring system for each flat were also planned. The effects of individual measuring system do not show on direct calculations but it can be expected that tenants are encouraged to reduce their consumption if they pay accordingly to the energy used, and not per m2 of their flat as it the case in Belgrade district heating system.

First phase of rehabilitation was mainly focused towards reaching the desired energy standard and level of comfort as well as improving the overall state of building. For the Base case and for the Reconstructed case the dynamic building model (DOE 2.2) has been established. The theoretical estimations of energy consumption showed that the annual amount of energy used for heating could be reduced up to 63% (Figure 7).

Second Phase

The second phase concentrated on additional methods for energy optimization and improvement of total building performance.

In this phase new structure was added on the south façade (Figure 8). This structure serves both as a thermal buffer zone and an extension of existing flats. Constructed from steel frames and glass covering it is connected directly onto the primary structure of the building serving as a sunspace to which every flat can be extended. Sufficient internal shading in the form of Venetian blinds and lateral openings were designed to prevent overheating in summer period.

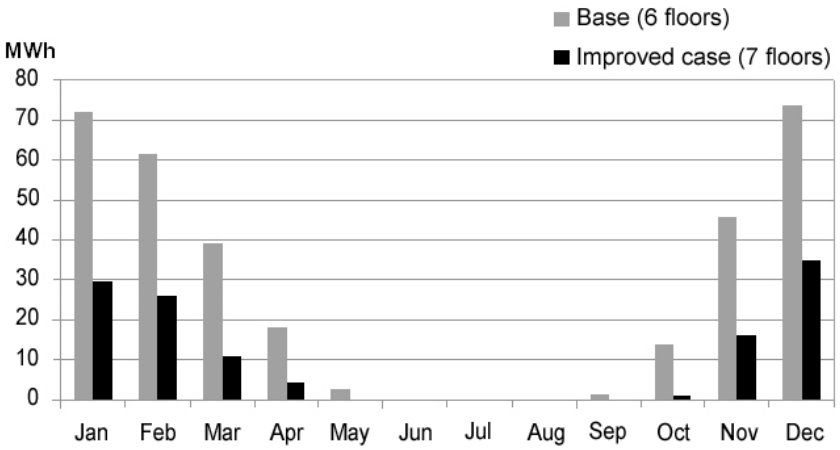

Figure 7: Annual energy load for heating

Figure 8: Reconstructed court façade – phase 2.

A system of hot water collectors was also planned, but serving only to newly constructed flats as an individual system. Since more complex system providing hot water for the whole building required extensive works and lack of legislation it was not concerned in the project.

A ventilation system with heat exchange units located in each flat was also designed using abandoned chimney pipes (no longer in operation due to the central heating system installation) as installation ducts.

In addition to this phase introducing active solar systems such as photovoltaic cells and various measures for reducing complete environmental footprint of the building were taken into consideration.

ECONOMIC ANALYSIS

For both phases of rehabilitation project, a preliminary cost calculation was created, providing sufficient data for decision-making process.

It was estimated that the first phase would cost €762.550, out of which some 40% is designated for the reconstruction of existing building without an extension.

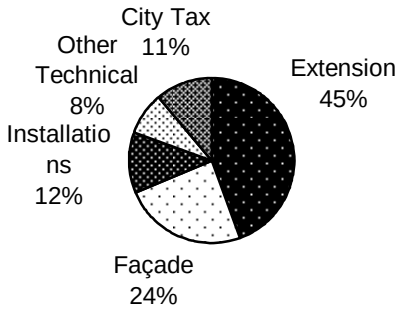

Figure 9: Structure of the costs for the first phase

Pie-chart shown on Figure 9 presents the structure of the costs for the first phase of reconstruction. Total costs for the extension are estimated on €334.791, façade works together with necessary repairs and replacements of windows €183.260, installations (with the substation and all necessary equipment for district heating) €98.485, other technical costs (surveillance, design and insurance) for €63.014 and City tax would be €83.000. City authorities were not willing to wave this tax, although it could reduce the total costs for 13%. Also, general VAT (18%) is included in this cost calculation. With some support from fiscal authorities such as wavers or reductions in taxing thermal insulation, automated valves etc., and the overall costs could be significantly reduced.

Pie-chart on Figure 10 presents the structure of the costs for more elaborated refurbishment, as designed for the phase 2. With total costs of €1.003.450 it is by 31.6% more expensive than the proposal for phase 1, with glazed addition costing more than the primary façade refurbishment. Since the habitable surface of the existing flats is increased, the costs for the City tax increase (the tax is paid per m2 of new habitable surface achieved).

This structure of costs implies that for improvements designed in phase 2, more participation from the owners is needed and it could be expected only if such intervention would immediately reflect on the increase of market value of their apartments that would cover the initial investment. At the moment, it is not the case and interventions on this scale could not be expected to occur in near future unless strongly supported by local authorities or donations.

IMPLEMENTATION

The primary goal of the pilot-project was to optimize the energy performance of the selected building, using the methods and resources that could serve as a model scheme for future interventions, preferably carried out by the tenants/owners with some encouragement and support from the municipality level. Figure 11 shows the algorithm with phases and corresponding actions that should enable the complete realization with monitoring and evaluation providing data on real benefits of intervention. This algorithm was elaborated having in mind not only the participants in the particular pilot-project, but the real actors that would be involved in a similar process elsewhere in Belgrade metropolitan area [4].

The absolute preconditions for the interventions are solid legal grounds, where complete accordance with planning limitations is required in order to make any intervention legally possible. Preparations phase covers analysis of limitations deriving from local characteristics of particular site, building type and ownership status. In search for modalities of intervention, alternative models can be proposed with energy simulations and techno-economical analysis that could help clarify the most suitable intervention type. For the chosen intervention, financing scheme is elaborated and at that point contracting can begin. Realization covers all standard phases, from preliminary design up to the construction and should be followed by adequate maintenance and involve monitoring and evaluation that would provide feedback data if possible.

Theoretical research and surveys described in previous chapters covered the phases prior to the actual realization – contracting and construction. Since the results of the survey showed that the apartment owners were willing to support the intervention, and BIF and VELUX were willing to cover the costs presented in techno-economic analysis, the design was further elaborated up to the stage of main design documentation.

Major set-back for the pilot-project came when several apartment owners asked for extension of the original contract, implying that the participants should cover all potential repairs

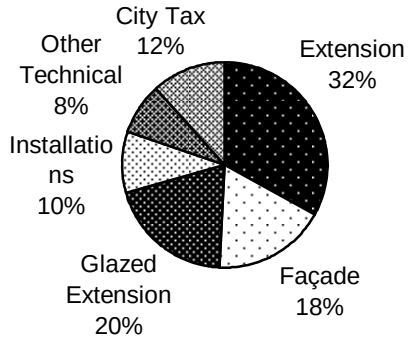

Figure 10: Structure of the costs with the second phase included

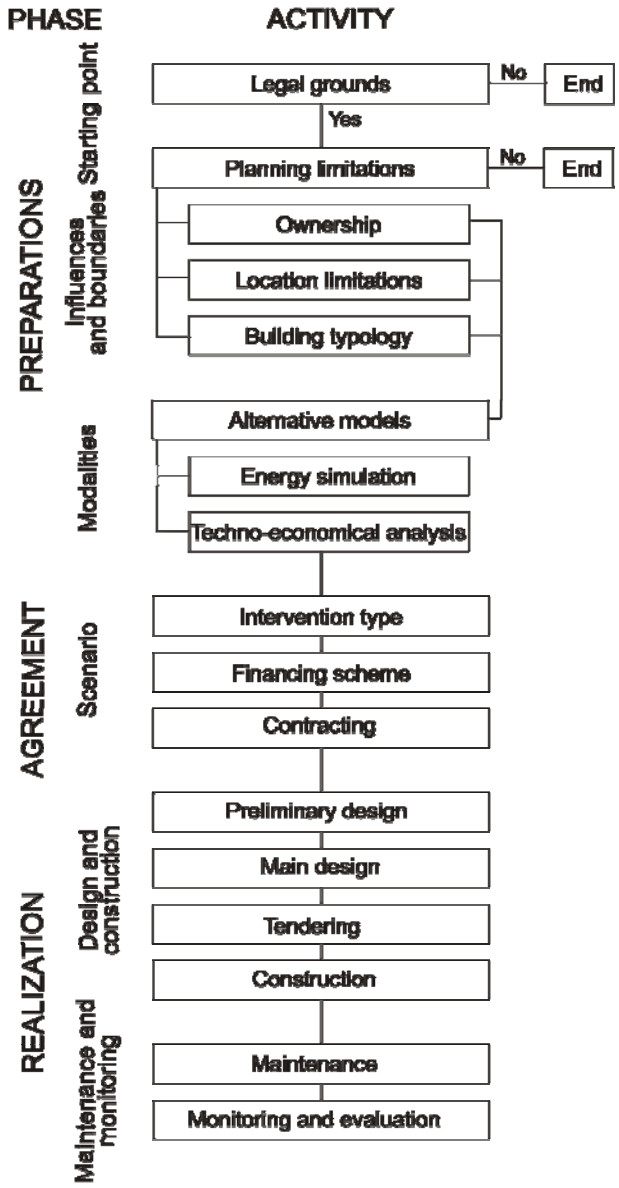

Figure 11: Algorithm for energy optimisation

for any damages occurring after the intervention, regardless of their cause. The donators were not able to take that kind of liability, the beneficiaries redrew their accordance, and the final contract was never signed. Although the relevant legislation did not demand 100% accordance for such intervention, the donators required the complete accordance throughout the whole process and the construction was never carried out.

CONCLUSION

Sustainable use of building fund is very important issue urban areas. Energy efficient and environmentally friendly refurbishments offer opportunities for optimized use of the existing building stock. This research has elaborated the topic, analysing the structure of Belgrade's existing building stock, choosing a model-building to conduct a pilot-project of energy optimization.

The research and theoretical findings have proved that an ordinary multi-storey apartment building can be refurbished to reduce the energy consumption using the same building techniques as in common construction practice in Belgrade. Even so, some support and encouragement from local authorities is still necessary, either in financial (through programs like "Let's Fix it Together", or tax reductions, donation programs etc) or in administrative area (to facilitate the procedures that sometimes last longer than the actual construction, enable individual measuring for district heating etc.). For more complex interventions, higher degree of investment and active participation of all actors is needed, and that is very hard to carry out during the transition years with very limited financial resources.

Although the pilot-project lacked the final execution, the findings of the research are very useful regarding the great number of buildings very similar to the actual subject of this particular project. The prices for all energy consumed in housing rise constantly, and the energy performance of apartments starts to reflect on their market prices. Individual owners now tend to improve their thermal insulation and use windows with lower U-values when refurbishing their apartments. These interventions are at the moment random and partial but with more coordination on the municipality level, the whole city blocks could be upgraded to meet the contemporary standards both in comfort and in environmental performance.

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LEGISLATIVE AND POLICY IN ENERGY EFFICIENT DESIGNING AND RENEWABLE ENERGY SOURCES – APPLICATION IN SERBIA

Mila Pucar, Marina Nenković-Riznić

This paper analyses political and legislative frames in the field of energy efficient building and renewable energy sources in planning and implementation in Serbia. „Development strategy until 2015." is reviewed in concise portrait. This strategy maps a way for the application of energy services of much higher quality than ones offered at a present day. It reviews relevant laws concerning the subject, as well as institutions, programs and their implementation. Basic principles of energy policy in Serbia and their achievement are also given by that strategy. Serbia's energy policies are designed to allow new legislative, structural, organizational, institutional, and economic frames and visions of unification of Serbian energetics into regional and Pan-European integrations.

One of the key factors is the inclusion of sustainable development and energy efficient design concerned policies. Application of these, almost completely neglected, energy sources, for which there is high potential in Serbia, would allow preservation of primary energy sources and local environment. This potential hasn't seen significant research, and therefore, neither the technical improvement. Apart from that, one of the goals of wider application of renewable energy sources is lowering the poverty level. This helps avoiding the already used "dirty development" method.

Keywords: ***energy policy, legislative, renewable energy sources, energy efficient planning, Serbia.***

INTRODUCTION

Energy crisis that was prominent during the 1970's was an after-effect of disturbances on the oil market. Fossil fuel reserves (the one that are in current and presumed future, usage) are limited, and according to different predictions, most of them will be depleted by the middle of this century, when the next energy crisis might occur.

Energy crisis, followed by an ecological crisis, both on local and global levels, were primary factors in the formation of the general attitude that the current methods and levels of both energy exploitation and means of its consumption are unsustainable. This attitude clearly comes from the range of data considering the water and air pollution, chemical changes in the atmosphere, ozone holes, soil degradation, extinction of many plant and animal species, declination of the forest regions, etc. (Kaya, 2006.).

Energy, ecologic and economical crises led to the definition and wider acceptance of the unsustainability of traditional resources and the environment's limited capacity on local and global scale. Sustainable development concept could be transposed into all human activities (Baumgartner, Zielowski, 2006.).

Out of the overall energy produced, around 50% is used on communal buildings, which makes measures that could potentially lead to the reduction of these figures very important in the process (Walker, Devine-Wright, 2007). The reduction of energy consumption in communal buildings (in heating, cooling, illumination, etc.) is possible through the utilization of the energy efficient urban planning and building design methods and with the application of the bio-climatic planning and design principles with an emphasis on renewable energy sources (further R.E.S.).

There is a need for strategic, politically-legislative frames, institutions, programs and instruments for the realization and implementation of the sustainable development concepts.

ENERGY EFICIENCY AND RENEWABLE ENERGY SOURCES (R.E.S.)

Energy efficient buildings

The European directive (Directive 2002/91/ 1 from 4.1.2003) on energy consumption in communal buildings, which is an obligation for the member countries to implement in their

national legislatives since January 2006. ensured that building standards for the whole European Union are unified. This, while not demanding additional financial burden, allowed a more efficient usage of energy in European communal buildings. At the same time, this directive ensured an increase in the quality of life for the population. This, and similar measures, which are targeted at a broader public of energy consumers, represent basic component of the European Union's strategy towards the facilitation of responsibilities undertaken by the ratification of the Kyoto protocol (Jager-Waldau, 2007).

But, it is not always applied in European Union, mainly because all the countries still are in a kind of unsustainable condition, using traditional energy resources, instead of renewable one.

Entire European Union will implement the common methodology for calculation of the communal energy consumption, which will consider climate differences as variables. Member countries will define minimum in standards for consumption which will be applied both, in the design of new buildings, and in the significant reconstructions of old ones. For the most part, these standards will be based on contemporary or planned European norms. Energy certification system will allow owners, tenants and users to be better informed on the consumption of the energy in the building they buy or rent.

Establishing the energy efficiency will encompass several different elements, like thermal isolation, heating system, cooling, natural ventilation as well as passive lighting and heating using solar energy. Positive factors could include heating using solar energy, electric energy production, distant heating and co-generation of electric energy and heat. Local climate limitations, because of its high diversification on the territory of Europe, play an important role in the facilitation of the energy efficiency in communal buildings.

On the other hand, communal energy consumption in buildings in Serbia is near 40% of the overall consumption. Lighting, heating, cooling and hot water in Serbian homes, offices and recreational buildings consume more energy than it is used in transport or industry. This trend is growing with the amount of consumed energy, because the growth in life standard leads to a broader application of the air conditioning and heating systems. It means that present conditions in Serbia are not so promising, especially because of the fact that Serbia has a large potential in renewable energy sources, and not using almost any of it for her basic needs in energy.

Thinking about the future energy consumption, we must not forget the fact that renewable energy sources such as geothermal energy, solar energy, and energy of hydro power plants could substitute a large amount of traditional energy sources (oil, coal, wood, etc.) which are causing an green house effect. Domestic strategies should not base themselves exclusively on the European directives, but they should seek instead a model appropriate to the local environment, political and financial conditions and also local legislative. Serbia must adjust European traditional values to our local contextual conditions.

Renewable energy sources (RES)

Renewable energy sources (RES), apart from other energy sources like fossil fuels or nuclear fuel, are being naturally renewed. Renewable energy sources are apparently inexhaustible, but only if the current natural conditions are not disrupted. However, RES are limited in intensity (Hein, 2005).

All of the aforementioned renewable energy sources are of interest for Serbia, except the ones related to the energy from the sea.

Renewable energy sources are clean energy sources, and they remarkably contribute to the decrease of air, water and soil pollution. In the last decade, great importance has been given to the problem of global warming and the greenhouse effect, which is the consequence of an increased content of carbon-dioxide in the upper layers of atmosphere, preventing reflection of solar radiation from the surface of the Earth through the atmosphere.

The increased use of RES will contribute to increasing reliability of energy supply, will help in sustainable development of the energy sector and will increase the standard of living, particularly in rural areas. The reduction of harmful gases emission will improve quality of the environment.

Serbia is relatively poor in fossil fuels. It is expected that in the near future the share of RES will be significantly increased in the energy balance of Serbia.

Serbia with its territory of 88.361 km^2 has a natural suitability for use of renewable energy sources. It is estimated that the biomass has the greatest energy potential in Serbia. Biomass energy sources are distributed at an area of 24 000 km^2 covered with forests and at an area of 48.000 km^2 used for agriculture. Some 900 locations are identified as appropriate for small hydro power plants. At more than hundred locations there are geothermal wells with water temperature ranging between 20 and 100°C.

It is a large amount of renewable energy sources which could be used instead of traditional once, not only in their original locations, but also they could be installed on a long distance through appropriate infrastructural equipment. So the large number of cities and villages could be heated from geothermal resources, or bio gas (originally received form bio mass or bio waste).

It is possible to expect that in next several years private investors and stake holders will invest in hydro power plants, investigative works for geothermal resources etc. which could provide more clean energy to the whole country.

STRATEGY, LAWS, IMPLEMENTATION

Serbian energetics development strategy till 2015

On May 25th 2005. the National assembly of the Republic of Serbia ratified the „Energetics development strategy until 2015", developed by the Ministry of mining and energy. By appointing the council members of the Serbian energy efficiency agency, the regulatory agency has been established. „Energetics development strategy until 2015" represents a vision of local energetics development. It predicts that in the next ten or more years the

aspect of energetics activities will have improved quality, with simultaneous development of subjects included in energetics industry.

It proposes new legislative, institutional, structural, organizational and economical frames and visions on integration of local energetics into regional and pan European integrations.

The elementary premises of mentioned Strategy are based on the assumed trend of socio-economic growth of Serbia until year 2015 with respect to its current economic abilities.

A new category, Renewable energy sources, which includes biomass energy, hydropotential of small flows (with objects up to 10MW), geothermal energy and wind and solar energy, is planned for development and application because of Serbia's natural capabilities for their exploitation in the processes of decentralized production of heat and electric energy. Through these means it is believed that local users needs could be facilitated in a more qualitative and cost-efficient manner.

Energy potential of mentioned energy sources is considerable in Serbia and is over 3 M t.en per year. Around 80% of the potential comes from the biomass exploitation.

Although for the most part of Serbia's territory, there is a considerably higher number of sunny days (over 2000 hours), because of the high costs of solar receivers and auxiliary equipment, intensive usage of these technologies depends mostly on social and economic incentives for facilitation, implementation and exploitation of the National program for the renewable energy sources.

Serbian energy policy

Energy Law ("Official gazette of the RS", N0. 84/2004) in Energy policy section includes measures and activities taken for achieving long-term objectives in the energy sector, and particularly: creating conditions for stimulating the use of renewable energy sources and combined heat and electrical power generation, and providing conditions for promoting energy efficiency in carrying out energy activities and energy consumption

Energy sector Development strategy in Energy law is defining long term development objectives of specific energy activities, development priorities, sources and methods of providing the required energy quantities and incentives for increasing energy efficiency

Instruments for implementation of energy policy goals in Serbia

Energy policy realization tools are:

- Legislative instruments – are concerned with the Energetics law, and other, following packages of law instruments concerning the regulations of new functioning methodologies.
- Institutional instruments - which define the role and mission of the Energetics agency, which includes innovations into technical work practices, business of energetics subjects and development of the energy sector, and defines a methodology for definition of the justified costs of production, transport and distribution of the electrical and heat energy and natural gas.
- Structural and organizational instruments - are concerned with methods of reorganization of current vertically integrated EPS and NIS, into divided, productive and profit units, economically motivated for rational functioning and financially capable to invest into their own development.
- Economic and financial instruments - are concerned with the rates and price policies of the energy sector.
- System instruments - are concerned with facilitation of the Energetics statistics system and founding of the National fund for energy efficiency.

It is important to know that all of these instruments must be included in global strategy of the RES and energy efficiency implementation in Serbia. Without any of these instruments, the whole strategy could not be implemented in Serbian laws and instructions for usage.

Expected results of these instruments are overall usage of renewable energy sources in Serbia and mutual cooperation of all interest group in process (investors, stake holders, population, politicians, local government etc.)

Laws

Promotion of energy efficiency and usage of renewable energy sources can be exhilarate through enactment of new laws in the field of energy, environmental protection etc. In Serbia, these are:

- Energy Law ("Official gazette of the RS ", N0. 84/2004) determines long term goals for development and stimulating measures for increasing energy efficiency
- Law on Planning and Construction ("Official gazette of the RS ", N0. 47/2003): this law is not mentioning energy efficient buildings
- Law on environmental protection ("Official gazette of the RS ", N0. 135/2004)
- Law on integrated environmental pollution prevention and control ("Official gazette of the RS ", N0. 135/2004)
- Law on environmental impact assessment ("Official gazette of the RS ", N0. 135/2004)
- Law on strategic environmental impact assessment ("Official gazette of the RS ", N0. 135/2004).
- Laws on international investments, concessions etc.

All of these legislative documents are functioning on internal level, without corresponding to each other. One of the main objectives in Serbian legislative is the harmonization of laws and politics in order to make an implementation of RES and energy efficiency in Serbia easier and more operative.

Institutions

There are several competent institutions in Serbia in the area of energy efficiency and renewable energy sources: Ministry of Mining and Energy of the Republic of Serbia; Energy Efficiency Agency of the Republic of Serbia (SEEA); Ministry of science, Ministry of environmental protection – Directorate for the environmental protection; Ministry of Energy and Mining, Ministry of Finance; Ministry of Infrastructures; Ministry of Economy and Regional development; Republic Development Bureau; Republic Statistical Office; National Information Technology and Internet Agency; Recycling agency; Energetics agency; Republic agency for spatial planning; Serbian land

development agency; Belgrade land development public agency; The European Agency for Reconstruction, EPS, NIS etc, innovation centers, technological parks, etc, research institutions qualified for development of energy efficient buildings and settlements, public agencies, public utility companies; local governments and communities, city managers and city architects.

Main goal is to harmonize working, objectives and strategies of these institutions, because it is the only way to implement „Energetics development strategy until 2015“. These are the basic interest groups in process of implementation of renewable energy sources in Serbia.

Energy Efficiency Agency of the Republic of Serbia (SEEA)

Taking into consideration the current state within energy efficiency issue and renewable energy sources, energy policy objectives, as well as the contemporary practice in European countries, Ministry of Energy and Mining of the Republic of Serbia recognized the need for national agency. Therefore, according to Energy Law, adopted on August 1, 2004 and with the financial support of the European Agency for Reconstruction, it has been re-established and thus operating for the period of two years as a separate republic organization.

Energy Efficiency Agency of the Republic of Serbia (SEEA) was formed by new Energy Law. Energy Efficiency Agency is formed as a special republic organization meaning separate legal entity. Serbian Energy Efficiency Agency executes the tasks envisaged by the Energy Law, as an integral part of the overall energy policy, led by the Ministry of Energy and Mining of the Republic of Serbia.

The managing of the agency is carried out by director who is appointed by the Government of the Republic of Serbia. Internal organization and job description in the Agency is approved by the Government.

Agency's mission is to improve the usage of renewable energy sources. Agency implements its mission through sector, multi year programs for energy efficiency improvements and promotion of renewable energy sources. All programs are funded by European Union's donation, through European Agency for Reconstruction.

Agency also organized a number of educational programs for local self governments, professional experts from industry, then energy engineers, energy management and business plans, thus aiding institutional capacity building in Serbia.

Agency for energetics

Energetics agency is the most important newly formed institution in the field of energetics. It is planned to maintain licenses issuing for the facilitation of energy subjects, define the methodology for the calculation of cost justification, define rate systems for the regulation of energy systems, and approve price policies of energy subjects whose functioning it regulates.

By ratifying the „Energetics development strategy until 2015“ and foundation of the Energetics agency, the Ministry of Energy and mining rounded the legislative activities in the application of energy sector reforms.

Energy communities of South-East Europe, Athens

Signing the Athens memo in 2002. and 2003., Serbia integrated into the regional energy market of the South East Europe. The meeting of the European Union ministers was held on the December 2004. and the basic principles of the Energy community contract were established on that occasion.

PROGRAMS AND IMPLEMENTATION IN SERBIA

Programs

„Energetics development strategy until 2015.“ proposes several specific programs: energy efficiency, new and renewable energy sources, environment protection, scientific, research and technological progress, aimed education and expert education in new and existing activities in the sector, including the implementation of contemporary statistics system, and additional energy regulations for the energy activities in new conditions, both locally and in the region.

If this Strategy would be properly carried into effect, the results in Serbia will be notable in every household, residential and business building.

Strategic programs of the Agency for energy efficiency

- Coordination of national policies with trends of energy efficiency
- Energy efficiency in building design
- Energy efficiency in communal energy
- Energy efficiency in industrial environments
- Energy efficiency in transport
- Renewable energy sources (R.E.S.)
- Co-generation of heat and electricity

Program realization of program (A) is, through “Energy efficiency in Serbia” project, helped by the “World bank”, with $21 million. This project consists of three components:

(a) Clinical center of Serbia - reconstruction,

(b) School, hospital and other buildings of public interest - reconstruction for the improvement of the energy efficiency, and

(c) Technical help offered to the Agency concerning the realization of this project.

National energy efficiency program (NEEP)

Ministry of environmental protection – Directorate for the environmental protection of the Republic of Serbia unified the research, development and engineering activities and potentials of Serbia under the “National energy efficiency program” (NEEP). The goal of this action was to raise the efficiency of the production, distribution and usage of all means of energy and energy sources.

Some building energy efficiency projects and programs

It is important to mention when the development of energy efficiency is concerned the “Energy revitalization and comfort optimization” for 22 schools and kindergartens in Belgrade, the project invested by the Education secretary of the Belgrade city Assembly.

For a number of years, Serbia’s standard U.J5.600 had been neglected. Higher project

temperatures are recommended, which would lead to significant increase in efficiency with long distance heating. Summer temperatures and humidity are established as parameters relevant to summer climate. Data, acquired by the Republic hydro-meteorological institution, are based on daily averages. Research should be continued, based on the hourly values.

CONCLUSION

With the application of principles of energy efficiency in planning and design, need for conventional energy sources, which are not renewable, and represent high pollution potential, is lowered. Sustainable urban planning, from the aspect of rational energy consumption, is an important task of planers, engineers in energetics and architects. This is why the concept of energy distribution should be based on the integration of urban planning and energy consumption planning.

One of the key points is the connection between policies concerning sustainable development and the ones concerning the exploitation of renewable energy sources. Application of mainly neglected, renewable energy sources, for which there is a high potential in Serbia, but are not researched and technologically improved, is one of the solutions which strives towards the preservation of remaining resources and the environment. Apart from that, one of the broader goals of the renewable energy sources is the poverty minimization. The value of R.E.S. lies in its ability to adequately respond to all challenges of the energy sector: energy distribution safety, economic growth, sustainable development and ecological plausibility.

Insistence on energy as public good with long term effects on the environment must have an appropriate legislative base, as well as actualization instruments, with adequate stimulations through tax and other incentives. All this is to build awareness for the need for rationalization and usage of the renewable energy sources. This is why an additional attention should be paid to education, legislative and regulation systems.

These systems should constantly adapt to the technological progress of the public. In order to meet these goals, a joint action of energy suppliers, republic and local government and end users should be developed and maintained.

Republic of Serbia has not yet taken any serious actions in the path of preserving its resources. This is the reason for the Assembly through it's ministries to research the options and set the policies concerning the subject in that direction.

Knowledge on possible effects of climate changes on the application of long term development goals and poverty limitation, as well as the strategic goal of Serbia to participate in European integration processes as an active member in solving the problems of mentioned climate changes, were reasons for the creation of the adequate strategy with it's measures action plan. This facilitates the support on the creation and realization of the national policy and measures concerning climate changes, and compliance to obligations from the UN convention on the climate changes and Kyoto protocol.

Based on all that is said, it is safe to assume that cities of Serbia are ready for the application of program and implementation of principles of sustainable planning and rational energy consumption. With this, it is possible to significantly lower the amount of traditional energy sources, and their impact on the environment. Concerning the fact that the large part of energy and ecology problems represents an issue with global character, overcoming this problem is of great importance for the further integration of Serbia into international community.

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UDC 711.2:314.8

502.131.1:711.2

STRATEGIC ENVIRONMENTAL ASSESSMENT AS AN INSTRUMENT FOR ENHACEMENT OF PUBLIC PARTICIPATION IN PLANNING

Tijana Crnčević

The paper presents an overview of experiences of public participation within planning, summarized in the "ladder of citizen participation". Further, considering that Strategic Environmental Assessment (SEA) is seen as an instrument for operationalizing the sustainable development strategy, the stress is on the place, role and scope of public participation in SEA within planning.

Special attention is given to the status of SEA regarding public participation in planning in Serbia. One of the conclusions of the paper is that by introduction of the "Plan for public participation" as a legal obligation, it could be the way for operationalizing pubic participation and further, enhancement of participation in planning.

Keywords: ***strategic environmental assessment, public participation, planning***

INTRODUCTION

Strategic Environmental Assessment (SEA) represents multy-disciplinary, systematic and cyclic process which comprehends knowledge not only of the process in nature but also in the society. One of the simplest definitions defines SEA as "an instrument for evaluating the impacts on the environment of the plans, programmes and policies" (Glasson et al., 1994). During the development of the instrument, the definitions have being adjusting and developing. Reviewing the literature, SEA is also defined as "... systematic process for evaluating the impacts.." (Sadler & Verheem, 1996) through to the newest one which supports SEA as an "...instrument adaptable to the current process of decision - making and which is more policy oriented and related to the concepts..." (Partidario, 2000). It could be said that this represents, the development of the theoretical base in the world and the EU, which was primarily directed towards taking into consideration the need for this instrument up to the contemporary theoretical papers that consider the effectiveness of the application of the SEA.

Referring to the sustainable development strategy, the application of SEA is supported as an integral part of the planning process. The results of the implementation show that SEA is effective in the countries where a developed policy for environmental protection and sustainable development already exists. Taking into consideration that SEA is seen as a planning instrument for operationalization of the sustainable development strategy, the public participation represents an essential element of the process.

The main supporting framework for SEA in respect to public participation is contained in the Agenda 21 (A21) and Convention on access to information, public participation in decision - making and access to justice in environmental matters done at Aarhus, Denmark on 25th of June 1998 - known as Aarhus convention - whose regulations aim to establish an effective system for spreading the information as well as for the promotion of transparency within the procedure of decision-making.

The 10th principle of the Rio Declaration states that "the best way for resolving the questions of the environment is within the participation of all interested parties...", while the Aarhus Convention, article 7, among other things, specially points out the public participation in the process of plan and program making within the subject of environment, after which "Every party will during the preparation of plans and programs which refer to the environment do all necessary preparation for the public participation in the transparent and objective circumstances, providing information for the public...".

Taking into account the contemporary inclinations, the Republic of Serbia, according to the Law on Strategic Environmental Assessment (Official gazette – Republic of Serbia n.135/04) introduced and defined SEA as "making the report about the environmental condition, conducting act of consultation, taking into consideration the report and the result of consultation in the action of making decisions and adoption of certain plans and programs, as well as providing the information and data about the brought decision."

PUBLIC PARTICIPATION AND PLANNING

Considering public participation in the planning process it is possible to separate two main approaches. After the first one, the question is will the professionals represent the citizens or, after the second one, will the activities be conducted steering for "strengthen" citizens, what is comprehended from running out different educational programmes (Arnstein, 1969). As an illustration of the results and experience from practice, referring to the level of public participation in planning, in "the ladder of citizen participation" could be distinguished: from nonparticipation through the tokenism to the citizen power (Figure 1).

At the bottom of the ladder within the level of nonparticipation are (Arnstein, 1969) , distinguished further forms: manipulation, where citizens have place in certain city councils but without concrete participation and with the aim to emphasize purpose of education and therapy, with main intention to educate and "transform" citizens.

First step within the level of tokenism for the legitimate public participation, is informing what is understood by the process of providing the information from competent authority towards citizens, without possibilities for any response and negotiation. The tools which are often used are different media, leaflets, posters and survey techniques. Then consultations follow comprehending calls from responsible organizations to the hearings, usually using techniques such as attitude surveys, neighborhood meetings and public opinions. Placation, as a form of tokenism, represents the level of public participation when citizens start to realize certain impact, which depends on the quality of technical support used in formulating the priorities to the extent where the society is organized to stand for it.

Next on the ladder, within the citizen power level is partnership, where citizens can enter into such partnership giving them the opportunity to negotiate and to exchange opinions with the ones who traditionally have the power because they have resources - professional and material. Then delegated

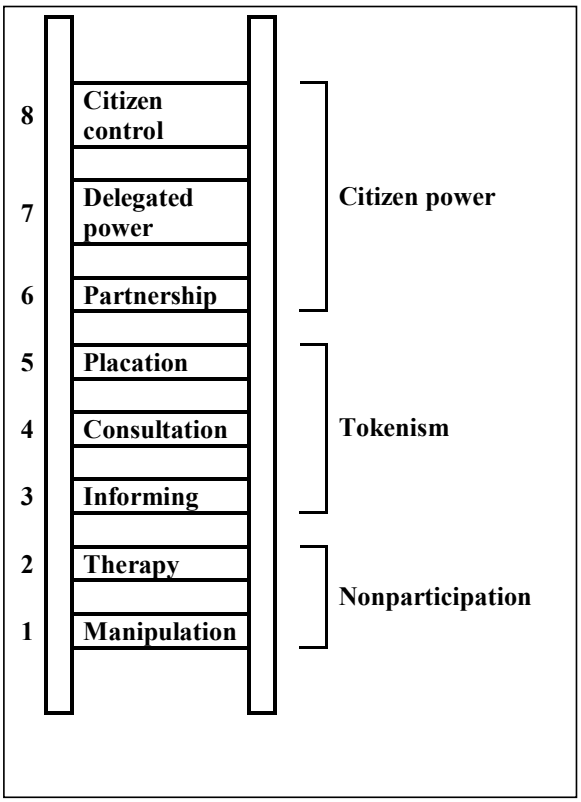

Fig. 1 Ladder of citizen participation (Arnstein, 1969)

power and citizen control, as a form of progressive and active public participation where citizens have the control over the programs or the citizens could be specially delegated to conduct the programs, which actually depends from the resources - professional and as well as the material.

After an insight at the ladder, it is possible to point out that presented forms are reflection of experiences of the different systems of planning. Introducing new interests in the planning process, meaning environmental protection and sustainable development – which support active public participation - strengthen the conflict. As new conditions and standards are established in the process of planning and carrying out control, the imperative of the effective implementation is to obtain active public participation with the aim to take part of the responsibility during the plan implementation.

So, it could be said that the implementation of sustainable development strategy depends also on the way local population is mobilized. The main function of SEA understands active public participation support and achievement of communications between all actors of the process. The role of SEA regarding the process of planning is to strengthen the public, in the sense to educate, to timely inform and also to provide conditions for active participations. Regarding the conditions, i.e. the system of environmental management and planning, SEA "moves" the level in the ladder of citizen participation, providing the conditions for active participation.

Regarding the presented ladder, SEA supports separated forms but, at different stages of the process, actually, taking into account the stage of the process, SEA represents the combination of more than one. That means that, deepening of the phase, the public role will be less or more participative, from tokenism in the SEA formulation phase (such as the identification of main problems), to the citizen's power in the later phases of the process such as monitoring, which, taking into account the sustainable development and the plan implementation,has an interest to strengthen the public to be able to take control.

SEA AS A TOOL FOR ENHANCEMENT PUBLIC PARTICIPATION IN PLANNING

The SEA and public participation experience in practice shows that it is possible and that it has to be active. Specially public participation is supportive at different strategic levels, where reactions of the public have to be stimulating and encouraging, particularly emphasizing the longing for development of specific methods and techniques for advancing participation at the higher levels (EC,1997).On the other side, the concern regarding the possibilities for public participation in the SEA is stated as well as the assumption that depending on the subject and the number of population that are potentially under impact, this actually would not be possible, as it is timely demanding and

also requires additional material support (EC, 2000). As a result of these opposite experiences, the main message in the process of formulating the Directive 2001/42/EC of the European Parliament and the Council of 27 June 2001 on the assessment of the effects of certain plans and programs on the environment (SEA Directive) referring to the public participation is that the document has to be "just good frame for public participation", so that every country member is left with the opportunity to define the scope of public inclusion (Strategic Environmental Assessment Workshop report, Semmering, Austria, 1998).

Also, regarding the enchacment of public participation within SEA it should be stressed The Protocol on Strategic Environmental Assessment adopted at Kiev in 2003. represent the document which also provides extensive public participation in the proces of decision-making within numerous development sectors.

However, it has to be stated that special impact to the further development of SEA was accomplished by adopting SEA Directive, setting up the methodological and procedural framework for SEA within the European Union (EU). Regarding the public participation, article 6 of the SEA Directive states the public obligation to give an opinion of the plan proposal and the SEA report which represents, after article 2 of the SEA Directive "the part of the documentation which is part of plan or program and contain regulated information". All other and further involvement of the public is left to the country member.

The results of the research conducted in Flanders among actors of planning process - the representatives of administration, target groups, local government and the experts for environmental assessment - show presence of certain consciousness for the need as well as the support of all participants for public participation. Most of the stated actors expressed positive, standing at the position that it is important that public enters at the beginning as well as at the end of the process, while the lowest support was given to the option to include the public during preparations of the SEA report (Devuyst et al., 2000).

The public participation in SEA gives an opportunity to get an insight into the citizens' reflections regarding environmental problems and the plan and it has the possibility to influence the rationality of the whole process and likewise the effectiveness. For active and successful public participation the methods and techniques which are standing within the SEA application are also important. The overview of possible methods and techniques is given in the Table 1. They are set apart according to the level of public participation as well as the level of participation, and the choice, beside other, directly depends on the scope of SEA phase.

Table 1.Overview of the methods and techniques regarding the levels of public participation (Sadler, 2001)

LEVEL 1 Education and information provision	LEVEL 2 Information feedback	LEVEL 3 Involvement and consultation	LEVEL 4 Extended involvement
Leaflets / brochures	Staffed exhibits / displays	Workshops	Community advisory groups / liaison groups
Newsletters	Staffed telephone lines	Focus groups / forums	Planning for real
Unstaffed exhibits / displays	Internet	Open house	Citizen juries
Advertising	Public meetings		Consensus conference
Local newspapers	Survey, interviews and questionnaires		Visioning
National newspapers			
Television and radio			
Video			
Site visits			

As it is presented in the Table 1, the level of public participation depends on the level of necessary technical, material and experts support. The application of SEA supports public participation, taking into consideration the distinguish levels, where tendencies regarding the planning process are toward supporting the public participation within the level involvement and consultation and extended involvement so that the possibilities to obtain the impact to the planning solutions could be given to the public through SEA.

Beside that, it is necessary to state that successfulness of the process of public participation also depends on how the environmental justice is considered, what means the support of applying innovative approaches so that the language, institutional, cultural, economic and historical barriers could be exceeded for the effective participation. That means, beside other, direct coordination with the individuals and organizations which are under impact, translation of important documents, personal interviews and audio recordings so that maintenance of all comments and held meetings could be possible which in turn will promote participation as well as obtain help for the citizens with special need (CEQ, 1996).

SEA AND PUBLIC PARTICIPATION IN SERBIA

In Serbia, the current planning regulations - Law on planning and construction, Official gazette Republic of Serbia 47/2003 and supported regulations - are standing for public participation within public meetings, actually referring to the ladder of citizen participation - public participation is within the level of tokenism.

Introducing SEA in Serbia established certain potentials, but at the same time also created

limitations. Actually, the main potential is legal framework for SEA which, by the way it was introduced created following limitations: not coordinated legal frame referring to the planning regulations, the time limit for adjusting was not included and necessary guidelines and expertise were not procure (Crncevic, 2005).

The legal framework for SEA gives certain support to public participation, since it supports the existing frame within the planning process. The Law on SEA defines public as "one or more physical or legal persons, their associations, organizations or groups" (article 4). According to the article 19 of the Law on SEA, public participation is obligatory before submitting the SEA Report for the agreement. Organization in charge of public participation is a body which brings the plan, that after this article is defined to "consider SEA report within the placing of plan to the public opinion and public meetings, if this is not regulated by special law". This regulation is in accordance within the one in the Law of planning and construction and supported regulations. However, taking into account main principles of SEA as a planning instrument, public in the SEA process has much more breaded role, actually public participation is an integral part of the process, included from the beginning of plan making, which current Law on SEA does not provide. However, Law on SEA gives an opportunity to involve public in the way regulated by "special law", taking into account this case, the Law of planning and construction and supported regulations or the separate law, or the act which will regulate public participation.

However, these regulations are to the certain point within the main conditions established in the SEA Directive, considering the paragraph stated during the process of formulating SEA Directive that it is better that any frame existsthan not to have one.

Last years presented distant activity of steering towards mobilization of public within different programs and activities, as well the actions with the aim for environmental protection and implementation of sustainable development strategy such as formulation of Local Environmental Action Plans and Local Agendas 21. For these activities, the support of local governmental bodies individual citizens and certain support of foreign donators is stated. Giving the support to these programs, strengthens the local community in environmental protection and sustainable development. It can be assumed that these activities could also have an important contribution in the implementation of the SEA in respect to the public participation, as well as regarding the development of the information base for the subject environment.

However, the current practice regarding the public participation in SEA shows that, the scope of public involvement is not considered and the support for broaden public participation is not given enough in implementation of SEA, but only as stated by the law within the planning regulation (Crncevic, 2007).

The solution for the current problems and one of the ways for activating public participation could be by introducing "Plan for public participation" within the legal requirements for SEA. The Plan could be the way for operationalizing public participation in the process of SEA in planning. The content of the Plan comprehends, first defining the public under impact of the plan and referring to the SEA phases, defining the role, the scope and the methods and techniques for obtaining desired aims.

Taking into account that the application of SEA in Serbia is at the beginning and that public participation in planning till now has not had an active part in the process of formulating the scope, it is important to state that possible directions are contended by the foreign experiences and guidelines. In this respect, Aarhus Convention can specially be distinguished, where article 6 states more specifically the regulations for public participation in the process of decision making.

Further, to obtain the conditions for active public participation - taking into account that legal framework does not specially consider and stimulate public participation, one of the ways could also be to procure the conditions that existing public meetings within the process of plan making obtain other form and content, aiming to strengthen public participation.

CONCLUSIONS

However, it still can be said that the main question is whether the public participates? If public is to be mobilized, it has to have the motive and "to believe" in the project in which they are called to take part. So, it could be said that including the public in SEA, they will have the possibility to be educated within the strategy of sustainable development, then they will have the opportunity to develop and stand for certain attitudes and in that way they will contribute in achieving support to global efforts regarding the implementation of sustainable development strategy.

Above all, within the SEA in planning an active public participation is understood. The level of public participation is different, from education and obtaining the information over to the consultation and participation, and that is in direct condition with the scope of the SEA phase and subject plan as well as the material and professional conditions.

Introducing SEA in Serbia is a good starting point for obtaining the conditions for enhancement of public participation in planning and the “Plan for public participation” could be a way of operationalizing and "moving" the public towards more active participation.

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UDC 711.435 (497.113)

SUBOTICA MUNICIPALITY AS A LEARNING REGION

Marijana Pantić

Some differences in territorial organization between Serbian and EU countries are obvious. The level of centralization and tradition in systems for implementation of ideas are differently back- grounded. However, these are the most important facts for the opportunity to realize Learning Region as a concept of the European future.

There is no part of space that should be considered as unchangeable and the way to a better position and Learning Region concept implementation of each region in Serbia in practice should lead towards few necessary steps and further. The starting point is awareness of the facts on the creation of Subotica region as it is at present. The healthy future of each region is provided by looking back in the past and learning from the history. The other important thing is bench marking- learning on the positive and successful experiences of other regions, and finally, making its own concept of Learning Region adapted to local surrounding and true need of local people.

Some experiences, suggestions and comparisons will be made in this case study, in relation to one of the Serbian municipalities nearest t to EU neighboring countries in a territorial way.

Keywords: ***learning region, soil, life long learing***

COMPARISONS BETWEEN SUBOTICA MUNICIPALITY AND EU MUNICIPALITIES

When speaking about Learning Region there is a need to define a term "Region". The historical background, all political differences and Iron Curtain distances between Balkan countries and Central Europe made distinctions in territorial organizations as well. For example: Only one Austrian state Burgenland (area of about 4 km^2) has 171 municipality within itself which is almost the same number of municipalities as the whole Serbia with 189 (area of about 88.000 km^2). While the Austrian smallest administrative unit is a municipality which consists of one city, town or village and territory that belongs to it, the Serbian municipality gathers 15, 20 or even 100 settlements. In the case of Subotica Municipality number of settlements is 19: one town and 18 villages. Difference is obvious and relevant to an issue of Learning Region organization.

The area of a territorial unit as the basic one is important because the level for implementation of Learning Region tools is different. That means that approach has to vary if expected results should become visible at the level of different number of villages. Of course, the results will be more obvious and all actions will have better support if governance has a task to implement ideas at the level of one village, for a smaller number of people and a smaller area. This is not only a question of spatial efficiency but it is also a question of administrative and political organization of municipalities. In other words it is a question of responsibilities local governance can get and realize in a proper way within municipality.

The other difference between Subotica and EU municipalities is the financial standing point for all actions. While in the EU municipalities this local administrative unit has its own budget and the right to decide how to use the budget for implementation of the projects, at the other side, Subotica Municipality is part of the centralized state system where each project has to be justified by the state headquarter. It is hard to get financial support from someone who has to split it between so many demanding actors.

Going back to the beginning, historical situation, different cultures, tradition and mentality of the people make another distinction between Serbia and EU countries. Looking back into the recent history, for the most of EU countries last 15 years were period of stable development, cooperation and inclusion of new members at the unique European market. At the other side those 15 years in Serbia were a period of slow decadency of belief in a better future where people lost the wish to follow neither ethical nor legal standards.

Conclusion is that most of the differences between Subotica Municipality and EU Municipalities are cases in which Subotica and Serbia in a whole should follow the best practices; change its own structure and approaches but taking necessary care about the ethical situation, specifics of mentality and true needs of local people. Decentralization and establishment of new levels for governing is a future space that leads towards ethical changes.

THE STATE OF SOIL

Subotica Municipality is located on the very North of Serbia, at the border with Hungary, in a middle of the Panonian lowlands. These

kinds of terrains are extremely convenient for agricultural activities especially because the natural geomorphology of the place is enriched by highly fertile soils.

One of the soil types in Subotica Municipality is among the most fertile in Europe and it has crucial role in wheat, maize, sunflower and other plants production. These soils are recognized by very dark brown color, almost black. The reason for this is richness of humus in the soil.

The other kind of soil widely spread in this area is salty soil. This is the soil with higher percentage of sand than usual. Origin of the sand in the soil is Southeastern part of Vojvodina from where winds brought it during a long geological period. Sandy soil is convenient for grape and fruit growing and some parts of Municipality are also well known as vine and fruit producers, not only as part of tradition, but for industrial need too.

Fig. 1: Agricultural Landscape

Although Subotica Municipality is one of the most developed regions in Serbia, this area is primarily agricultural. Agricultural production is main activity for the most of people that live there and from the close correlation between soil and agriculture; the conclusion is that contribution of the Learning Region concept has to improve awareness on treatment of the agricultural land and soil. Natural potentials of highly fertile soils and tradition in agricultural production breaded for centuries has to find the way for realization and Learning Region is one project that can lead activities in a right course.

Besides awareness of good things and potentials, local people have to be aware of influences and ways to manage them. In Subotica Municipality these problems are high level of ground water and wind erosion. Lowland is good for agriculture but at the other side, especially in combination with big European streams Tisa and Danube, it could bring a trouble with ground water, just as it is the case in this region. Besides jeopardizing agricultural activities, it is also a big problem for water supply of people in the villages. In combination with industrial production and production on the agricultural land where fertilizers are used more and more, water is contaminated. Knowing that ground water is consistent part of the soil it means that soil is contaminated in the same way.

Wind erosion is a process that was more intensive in the previous periods. Now, there is a set of measures that could be used in the course of preventing new consequences on a soil. Again, flat terrains are good for the majority of activities; other kinds of erosion are the ones that influence hilly and mountainous terrains are almost impossible to control such as the strength of wind which leaves repercussions on the soil quality. Buffer zones, plant and trees zones or other kinds of walls are some of the ways to deal with wind erosion. The Learning Region has a task to learn, show and educate locals how to make, use and maintain it.

EXISTING LIFELONG LEARNING TOOLS IN SUBOTICA MUNICIPALITY

Tools that can be used in Learning Region concept is a possible division to the existing and non existing, but to be developed and finally put in implementation. Tools that already exist can be distinguished between those already in use and others that are not in service for soil and Learning Region concept.

Different varieties of plans and planning: belong to the first group of existing tools from urban planning to spatial planning, from the plans made for the certain parts of space (naturally protected conservation area or so) to the spatial plans of municipality. Subotica Municipality has 4 Naturally Protected Conservation Areas (12% of the territory) under three levels of protection. One of them is Palić Natural Park which needs planning, mostly because of its closeness to the town of Subotica and its tourist role. The existing activities of the lake Palić and whole Park cause a lot influences on the soil, water and environment and a special care within the future Learning Region concept in this Municipality is needed.

Some mistakes were made in the planning procedure: instead of making the plan for the whole Municipality first, the work on Master Plan of Subotica started before. Likewise, the same year the Spatial Plan started and the Master Plan was officially accepted by Municipality Parliament. With the wrong steps taken this existing tool was used in an inappropriate way with possible consequences. Instead of global planning and the one with more detailed parts of the space it was done opposite. Spatial Plan is still in a process of finalization and if there are going to be some discrepancies with a Master Plan it will be recognized in the future or during the pubic review of the plan.

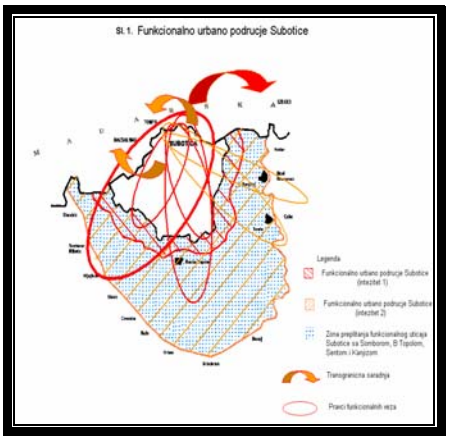

Fig. 2: Functional Area of Subotica Region

The other existing tool for implementing Learning Region and making it possible are NGOs. Non Governmental Organizations are established in these area and some of them are consequently devoted to the nature protection. In close cooperation with the governance responsible for control and plan realization of the Learning Region, NGOs could bring a relevant contribution.

All together, the existing and future tools are the most certain way in bringing up the concept of the Learning Region and making results in raising awareness of soil quality, state, importance and expected treatment. The

desired results could be realized only if the strength of synergy comes to the top: urban planning, spatial planning, NGOs, awareness on soil among local people, politicians and stakeholders.

INTRODUCTION WITH NON-EXISTING INSTRUMENTS

Non-existing instruments are the ones very useful in establishing concept of Learning Region but still not realized or used in Subotica Municipality.

School education is not typical in this group because it would be wrong to say that there is no education, or education where soil and environment in a whole are not implemented or mentioned in some way. The thing is that it should be done in a different way, with new approach and more accents on this kind of topics. Separate subjects that concern only soil sustainability, endangered water cycles etc. could bring more serious echo within students and for the coming generations.

Further there is a possibility for studying these subjects at the higher level, not only at the specific faculties but at the faculties of social sciences too. If sociology and philosophy can be studied within the geographical sciences than, there is no reason why the environmental sciences cannot be studied at the Faculties of Economics or Law.

The second tool within this group is marketing. People usually need a lot of repetitions and visualizations to become aware of something. That is the reason for establishing separate marketing champagnes on soil, water, air protection and expected behavior of the citizens concerning those elements of environment. Commercials and billboards sponsored by local governance at all places, from playgrounds to highways.

Publicity of each action that is in relation with the environmental protection is a tool for the future as well. Public has its place in a process of planning but announcement of the dates when citizens have a chance to participate has to be more aggressive. A small part at the bottom of the page in local newspapers usually is not enough. Other medias have to be included in the process as well because somebody who works in the field doesn't have a time to read newspapers every day or to do it in details. Radio, local televisions should be a part and co-operant in the process of implementing an idea of Learning Region.

Fig. 3: School in the Nature- Ludaš Lake

Another necessity is more responsibility and awareness in using the already existing tools. It is not enough to know how, but to really act, if we expect to prevent consequences of the eight main soil degradation processes. Planning hierarchy and NGOs are very important but if they have all the qualities that could enforce, not using just a half of their strength. Some processes repeated for years become a habit and that is a moment where sharpness and overview of new relevant details and surrounding changes disappear. So, if awareness has ever existed it should be refreshed.

CONCLUSION

For the start, the future steps are exploring varieties that could be useful in a process of Learning Region implementation.

First there is the collection of best experiences and practices. There is no need to go from the very beginning. Developed countries have that opportunity to learn from mistakes and experiences of the others, not passing trough the same situations. The way to improve could be shorter.

After collecting the experiences from the others, Subotica Municipality will get its own experience where process of learning on own mistakes is inevitable but with positive effects that should be used in a future.

Besides searching for the experience in the theory and practice collecting direct suggestions from the partner countries or from the experts or even laic opinions in Serbia takes appropriate place in the future. Each suggestion doesn't have to be implemented and taken without consideration of consequences but can be an inspiration and a push to some new, good ideas which are seriously acceptable.

Fig. 4: Steps in the Future

Comparisons between good and bad examples, EU countries and Serbian Municipalities are also the part of the process.

After these basic and global steps more concrete and detailed steps are coming, that will be developed according to previous list of steps and real needs of local people.

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UDC 502.131.1:556.5

THE NIŠAVA RIVER WATER QUALITY AS THE INDICATOR OF THE SUSTAINABLE DEVELOPMENT OF THE CITY OF NIŠ

Saša Branković, Slaviša Trajković

The Nišava River has a great importance for the sustainable development of the city of Niš. From the Mediana spring, which is on the bank of the Nišava, the city of Niš satisfies around 30% of its water demand. The aim of this paper is to, on the basis of the analysis of several tens of parameters of water quality; determine whether the Nišava River is a limiting factor to the sustainable development of the city of Niš.

For this purpose the data of Public Utility Company Naissus have been used, as it collects daily samples of the Nišava river water. The number of conducted analyses, depending on the water quality parameters, varies from 1 to 1,240. The obtained results, which have been presented in detail in the paper, indicate that a great majority of analyses, of almost all the water quality parameters, is within predicted range. At the end of the paper, certain measures have been proposed, which should contribute to the sustainable development of Niš in this field.

Keywords: ***sustainable development, indicator, Nišava River, City of Niš***

INTRODUCTION

The city of Niš, with a population of 250,000 is by size a third city in Serbia. This city, once a strong regional center, has been sharing the difficulties of the majority of cities in Serbia which have a similar structure of industry and population.

On the other hand, Niš possesses conditions to use the existing resources in the future and to achieve a sustainable development on the new basis and according to the European standards. In order to realize this, it is necessary to create a strategy of sustainable development of the city with and aim of accomplishing a sustainable and environmentally safe development through the long term reliance on own renewable resources. The Nišava River belongs to the most important natural resources of the city of Niš.

The spring of this river is located in Bulgaria, and the length of its course through Serbia is 195 km, and it is oriented SE-NW (Potic and Trajkovic, 2004). It is a tributary of the Southern Morava River and its confluence is at Trupale village. The surface area of the river basin is 3,974 km^2 in total, 3,641 km^2 belonging to Serbia. The river basin of the Nišava River is a sub-basin of the Southern Morava, and by this, of the Danube River. Significant tributaries of the Nišava are: Kutinska, Crvena, Koritnicka, Jerma, Visočica i Temštica rivers. In the Nišava River valley there are the following towns and cities: Dimitrovgrad, Pirot, Bela Palanka and Niš. The water of Nišava river, at the territory of the city of Niš, is used for drinking water supply, local irrigation on a small surface area, and for recreational fishing (Gocic et al. 2007). Water supply of the city of Niš is provided by three territorially separate water supply systems which are very interdependent, and those are:

- Water supply system "Mediana" – spring of ground water repleNišhed with the previously treated Nišava water, with a capacity up to 550 l/s.
- Water supply system "Studena" – karst natural source and the supply pipeline with accompanying structures, with a capacity 220-340 l/s.
- Water supply system "Ljuberađa-Niš" – a series of karst natural springs (Krupac, Mokra, Divljana and Ljuberađa) and the supply pipeline with accompanying structures, with a capacity 800 l/s.

The mentioned systems with their springs, supply pipelines, appropriate distribution network, pump stations and reservoirs represent one water supply system. It supplies water to around 240,000 people and the Niš industry with 37,732,608 m^3/year that is 103,377 m^3 day^{-1}.

The Mediana spring provides stability of the entire system in the periods of reduced yield of karst springs, and that is why the water quality of the Nišava River is of great importance for the development of the city of Niš. The aim of this paper is to, on the basis of the analysis of several tens of parameters of water quality; determine whether the Nišava river is a limiting factor to the sustainable development of the city of Niš.

THE NIŠAVA RIVER WATER QUALITY STATUS

The surface water status is evaluated according to the norms of the Decision of water classification (Official Journal of SR Serbia 5/68) and Code of the hazardous matters in water (Official Journal of SR Serbia 31/82).

The Public Utilities Company Naissus, which is responsible for water supply of the city of Niš, performs the daily water quality status checks at the location where water is taken in, in order to protect the water supply spring and the health of the citizens. The collected water samples are examined on the location or later in a laboratory, to ascertain the presence of several scores of organoleptic, physico-chemical and microbiologic indicators.

The reliability of the Public Utilities Company Naissus was investigated in (Brankovic and Trajkovic, 2007) comparing them to the data of the Institute for Health protection of Niš. The following water quality indicators were compared: minimal, maximal and average values of parameters defining the class of the water course (dissolved oxygen, BPK, HPK, suspended matter, dry residue, pH and the total colliforms (TC)). The obtained results are presented in the Figure 1.

In all the analyzed parameters, the samples of the Public Utilities Company Naissus, have higher maximum values, and lower minimum values, which was expected due to the significantly higher number of samples. The average values of all parameters do not differ significantly irrespective of who processed the samples. This fact confirms that the obtained values are accurate and reliable.

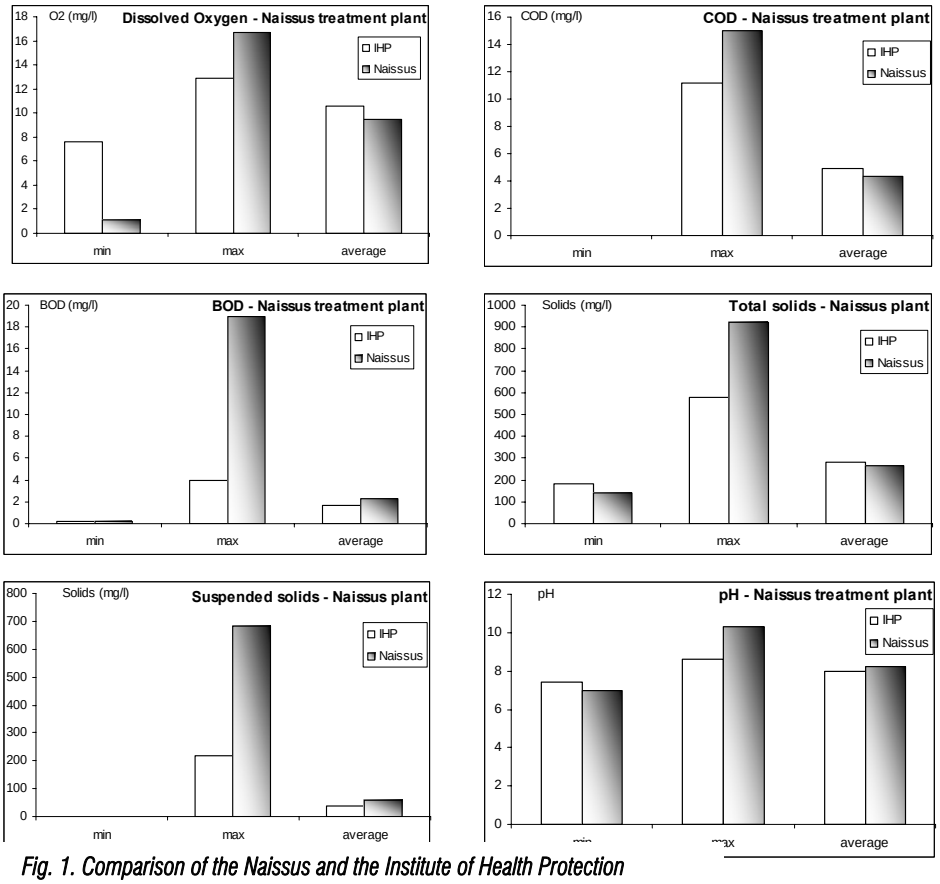

Fig. 1. Comparison of the Naissus and the Institute of Health Protection parameters (IHP)

For the purposes of this paper, the data of the Public Utilities Company Naissus from the period 1st January 2000 to 25th November 2004 were used. The number of analyzed samples in this research ranges between 1 and 1,240 depending on the water quality parameters. Statistic data analysis is given in the table 1 where it can be seen that a large majority of the results of analyses of almost all the water quality parameters is within predicted limits. There are numerous examples corroborating this assertion. Out of 670 analyses of the dissolved oxygen, only the results of one analysis do not comply with regulations. Only 2% of the analyses of Biochemical Oxygen Demand do not comply with the regulations.

Analyses of three parameters significantly do not satisfy the required quality:

- Suspended solids (58% analyses whose result does not comply with regulations)
- Nitrite (23% analyses whose result does not comply with regulations)
- Total Coliforms (78% analyses whose result does not comply with regulations)

Higher concentration of suspended solids can be explained by the fact that Public Utilities Company Naissus takes the water samples from the canal, and not from the river. The higher concentration of nitrites indicates occurrence of organic pollution. Microbiological pollution of the Nišava was not reduced by closing down the industrial facilities, because the main sources are sanitary waste waters. In the Nišava river, there is a high presence of pathogenic bacteria, protozoa, viruses and intestinal parasites. The received microbiological pollution obviously significantly exceeds the capacity of self-recovery of the river.

TOWARDS THE SUSTAINABLE MANAGEMENT OF THE NIŠAVA RIVER WATERS

On the basis of the presented result, it is obvious that the Nišava river quality at this moment is not a limiting factor of the sustainable development of the city of Niš. However, in order to provide an appropriate

long-term water quality of the river Nišava, it is necessary to take certain measures which would enable a sustainable water management. The goal to be achieved is establishment of the optimum balance between water resources management and their sustainable usage. Sustainable management of the Nišava river waters should lead to:

Table 1. Maximal, minimal and average values of water quality parameters

No	Parameter	Class II Max Allowed Concent	No. of samples	Min	Max	Average	A	B
1	Air temperature (ºC)	/	167	-3.00	31.00	10.36	-	-
2	Water temperature (ºC)	/	1,212	-2.00	29.00	11.51	-	-
3	Color (Pt-Co scale)	/	1,224	0.00	0.00	0.00	0	0%
4	Odor (-)	/	1,112	0.00	0.00	0.00	0	0%
5	Turbidity (NTU)	/	1,161	0.30	1,000	13.00	-	-
6	Electroconductivity (µS/cm)	/	1,161	3.00	540.00	385.0	-	-
7	pH	6.8-8.5	1,162	7.02	8.90	8.28	5	0.4%
8	Total solids (mg/l)	1,000	430	140.0	920.00	267.1	0	0%
9	Consumption of K-permanganate (mg/l)	/	714	1.10	232.00	3.11	5	0.7%
10	Biochemical Oxygen Demand (mg/l)	4	659	0.16	9.36	2.02	16	2%
11	Chemical oxygen demand (mg/l)	/	4	0.00	15.00	4.36	-	-
12	K-permanganate demand (mg/l)	/	847	0.18	19.10	2.79	-	-
13	Settleable solids (mg/l)	/	3	0.00	2.10	0.77	-	-
14	Suspended solids (mg/l)	30	90	0.05	681.00	60.23	52	58%
15	Dissolved solids (mg/l)	/	164	6.83	428.00	228.5	-	-
16	Dissolved oxygen (mg/l)	>6	670	1.10	13.09	8.50	1	0.1%
17	M-alkalinity (ml 0.1 M HCl/l)	/	1,123	3.30	65.00	40.66	-	-
18	P-alkalinity (mg/l)	/	3	13.10	42.00	32.36	-	-
19	Alkaline hardness (ºdH)	/	61	2.60	15.30	7.53	-	-
20	Non-alkaline hardness (ºdH)	/	61	0.21	10.90	3.79	-	-
21	Total hardness (ºdH)	/	1,110	0.15	18.90	11.96	-	-
22	Aluminum (mg/l)	/	392	0.00	3.10	0.04	5	1%
23	Ammonia (mg/l)	0.1	1,240	0.00	5.70	0.01	1	0.1%
24	Arsenic (mg/l)	0.05	1	0.03	0.03	0.03	0	0%
25	Total Kjeldahl Nitrogen (mg/l)	/	35	0.00	6.80	0.31	-	-
26	Copper (mg/l)	0.1	16	0.00	0.01	0.00	0	0%
27	Cyanide (mg/l)	0.1	41	0.00	0.00	0.00	0	0%
28	Zinc (mg/l)	0.2	10	0.00	0.00	0.00	0	0%
29	Phenol (mg/l)	0.001	764	0.00	0.00	0.00	0	0%
30	Fluoride (mg/l)	1	31	0.00	0.10	0.01	0	0%
31	Iron (mg/l)	0.3	1,125	0.00	0.75	0.05	2	0.2%
32	Chloride (mg/l)	/	1,153	3.20	40.00	6.69	0	0%
33	Chromium III (mg/l)	0.1	1,121	0.00	0.00	0.00	0	0%
34	Chromium VI (mg/l)	0.1	1,121	0.00	0.00	0.00	0	0%
35	Cadmium (mg/l)	0.005	14	0.00	0.00	0.00	0	0%
36	Calcium (mg/l)	/	1,114	2.40	179.00	79.00	0	0%
37	Potassium (mg/l)	/	7	0.93	1.80	1.31	0	0%
38	Magnesium (mg/l)	/	1,112	1.80	86.60	8.81	2	0.2%
39	Manganese (mg/l)	/	1,130	0.00	0.17	0.00	0	0%
40	Sodium (mg/l)	/	8	3.80	7.00	5.30	0	0%

No	Parameter	Class II Max Allowed Concent	No. of samples	Min	Max	Average	A	B
41	Nickel (mg/l)	0.05	1	0.00	0.00	0.00	0	0%
42	Nitrate (mg/l)	10	886	1.20	19.00	6.30	41	5%
43	Nitrite (mg/l)	0.05	1,205	0.00	5.00	0.04	276	23%
44	O-phosphate (mg/l)	/	654	0.00	48.00	0.15	22	3%
45	Lead (mg/l)	0.05	15	0.00	0.01	0.00	0	0%
46	Mercury (mg/l)	0.001	1	0.00	0.00	0.00	0	0%
47	Free chlorine (mg/l)	/	143	0.00	20.00	0.39	-	-
48	Combined chlorine (mg/l)	/	2	0.00	0.00	0.00	0	0%
49	Silicate (mg/l)	/	36	0.00	8.10	4.26	0	0%
50	Free carbon dioxide (mg/l)	/	978	0.00	11.00	1.65	-	-
51	Sulfate (mg/l)	/	812	3.00	90.00	42.50	0	0%
52	Sulfide (mg/l)	/	42	0.00	39.00	0.95	-	-
53	Total phosphates (mg/l)	/	600	0.00	0.71	0.12	0	-
54	Detergent anion (mg/l)	/	751	0.00	0.10	0.00	-	-
55	Oils and fats (mg/l)	0.05	23	0.00	0.50	0.03	0	0%
56	1,2-Dichloroethane (μg/l)	/	268	0.00	0.00	0.00	-	-
57	1,1,1-Trichloroethane (μg/l)	/	268	0.00	0.00	0.00	-	-
58	Bromoform (μg/l)	/	269	0	0	0	-	-
59	Dibromchlormethane (μg/l)	/	269	0	0	0	-	-
60	Dichlorbrommethane (μg/l)	/	269	0	0	0	-	-
61	Chloroform (μg/l)	/	269	0	0.2	0.00	-	-
62	Tetrachloroethylene (μg/l)	/	269	0	0.2	0.00	-	-
63	Trichloroethylene (μg/l)	500	269	0	0.2	0.00	0	0%
64	Carbontetrachlorid (μg/l)	300	266	0	0	0	0	0%
65	Total trihalometani (μg/l)	/	269	0	0.2	0.00	-	-
66	Total Coliforms (No./100(0) ml)	$6*10^4$	1,186	1,500	$24*10^4$	172,212	924	78%
67	Total Viable Count, 22 ºC (No./1ml)	/	1,186	0	$3*10^6$	7932	-	-
68	Total Viable Count, 37 ºC		1,187	0	$92*10^3$	1,494	-	-
69	Fecal Coliforms (No./100(0) ml)	/	1,187	220	$38*10^4$	154,270	-	-
70	Streptococcus Feacalis (No./100(0))	/	1,187	100	$24*10^4$	44,002	-	-
71	Sulfitor.SporogenAnaerob.(No/100(0)	/	1,187	100	$37*10^3$	1,339	-	-
72	Bacteriofag (No./100(0) ml)	/	35	10	$63*10^3$	2,096	-	-
73	Citrobacter. sp.	/	138	0.00	0.00	0.00	-	-
74	Enterobacter. sp	/	282	0.00	0.00	0.00	-	-
75	Eschericia colli	/	1,130	0.00	0.00	0.00	-	-
76	Eschericia sp	/	157	0.00	0.00	0.00	-	-
77	Hafnia	/	8	0.00	0.00	0.00	-	-
78	Klebsillea	/	17	0.00	0.00	0.00	-	-
79	Morganella	/	2	0.00	0.00	0.00	-	-
80	Proteus mirabilis	/	3	0.00	0.00	0.00	-	-
81	Proteus sp. (No./100(0) ml)	/	1,187	200	$38*10^3$	2,169	-	-
82	Proteus vulgaris	/	2	0.00	0.00	0.00	-	-
83	Providencia sp	/	2	0.00	0.00	0.00	-	-
84	PseudomoNiš aeruginosa	/	1,184	200	$24*10^4$	2,585	-	-
85	Serratia sp.	/	14	0.00	0.00	0.00	-	-

A Number of analyses whose result does not comply with regulations
B % of analyses whose result does not comply with regulations

- Improvement of the quality of life of the entire population of the region,
- Protection of health of the population in the entire region,
- Improvement of the environmental conditions in the entire river basin.

The strategy of the sustainable management of the river waters of Nišava should be harmonized with the Water resources plan of the Republic of Serbia. This strategy should be harmonized with the activities in this field within the process of fulfilling the obligations of our country as a member of ICPDR-u (International Commission for Protection of

Danube River) and with the activities of the recently adopted National strategy of sustainable development.

Within the sustainable management of waters, it is necessary to promote institutional strengthening, development and enforcement of the law, establish and develop public awareness, with the active participation of the public in the decision process being a component of this new approach (Libra 2007). The implementation plans should be based on the principles of the sustainable development, proximity and the regional approach, precaution, polluter pays, application of the best available technique and responsibility of all the participants in the process (Davis 2007).

In the framework of the measures leading to the sustainable Nišava water management, a proposition of the solution of the environmental status of the Nišava should be provided, of the cadastre of polluters, give a proposition of monitoring according to the Framework Directive on Waters, propose an early warning system, solution of the treatment of communal and industrial waste waters of the city of Niš. All the solutions should be implemented according to the solutions at the National level, and the existing regional solutions, taking into account the experience from the EU.

In the implementation phase, it is necessary to:

- plan, approve and prepare the design documents,
- implement solutions, monitor realization of projects and monitor environment factors,
- educate population and
- train the participants of the process.

CONCLUSIONS

The Nišava River belongs to the most important natural resources of the city of Niš. The Nišava river water, on the territory of the city of Niš, is used for water supply, and its quality may be a limiting factor for the sustainable development of the city of Niš. On the basis of the analyzed water samples the following conclusions can be drawn:

- The water quality status at the water intake location is satisfactory, excluding the total coliforms (TC). This parameter is a constant problem of the Nišava river quality. Concentration of suspended matter and nitrites can occasionally be over the permissible limits.
- The biggest Nišava river water polluters are waste waters from the sewages of the upstream places and of the city of Niš. Industrial waste waters, for the time being, do not represent a big threat for the river course. However, an increase of the industrial production may cause deterioration of water quality.
- In order to provide an appropriate long-term water quality of the river Nišava, it is necessary to take certain measures which would enable a sustainable water management in the entire Nišava river basin. The sustainable development of the city of Niš in this area is not possible without the wider regional approach.

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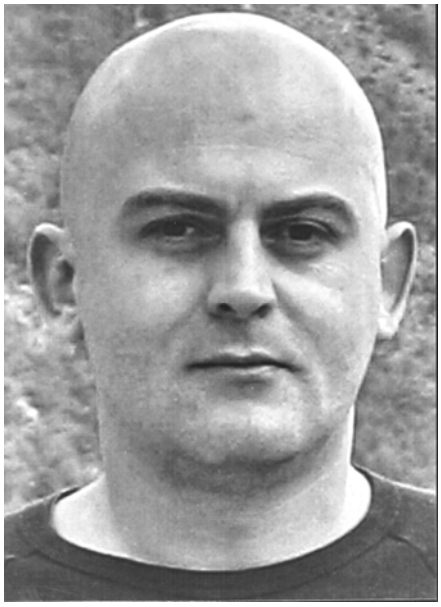
IN MEMORIAM



Professor Vladimir A. Milić, PhD, Arch.

We are sad to report the death of Professor Vladimir A. Milić, a scholar and researcher in the field of spatial and urban planning, and member of the SPATIUM Editorial Board.

Born in Belgrade, May 27, 1965, graduated primary and secondary school in Prijedor (Republika Srpska, Bosnia and Herzegovina). He took all his academic degrees at Faculty of Architecture University of Belgrade: Bachelor of Architecture in 1992, Master of Architecture in 1996 (*Regulation of the Urban Form in Urban Planning*), and PhD in field of Architecture and Urbanism in 2002 (*Research of Principles for Social Housing in the Frame of New Urban Planning Model*).

From 1992-2002 he was employed as a teaching assistant at the Faculty of Architecture University of Belgrade. In 2003, he was elected at the position of assistant professor at the same Faculty. He was teaching urban planning and urban design courses, both theoreticly and practicaly. His innovation was elective course *Urbanism Without Urbanists*, established at the Faculty of Architecture couple years ago, and very popular among the students. As a professor, he supervised a number of Bachelor and Master thesis.

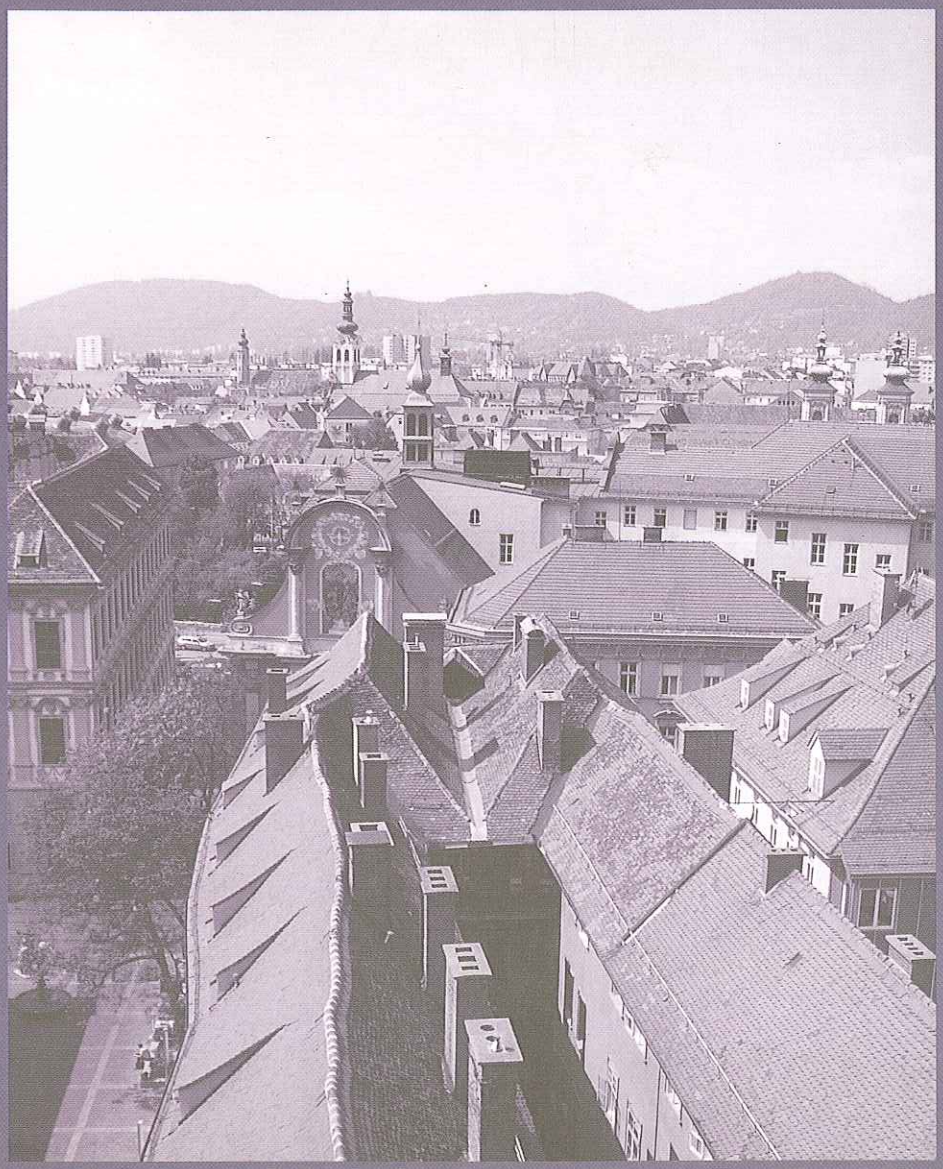
During his professional career, Professor Milić published 5 books, and more than 50 scientific articles, took part in numbered urban studies, urban and spatial plans, urban and architectural projects as well as urban and architectural competitions, where he took several prizes and mentions. He contributed to more than 20 articles and documents in the field of spatial and urban planning at local, regional and national level. During the year of 2004, he was Assistant Minister at the Ministry of Capital Investment, responsible for spatial and urban planning.

Professor Milić had great talent, for drawings as well for writings. His freehand drawings are well known and very reputablle among the architects and artists. As a result of his wish, to represent in public his freehand drawings, the book *Vladimir A. Milić – drawings*, was published late this year.

Professor Milić was a member of a number of national and international professional associations.

By his death Faculty of Architecture University of Belgrade, and the planning profession in Serbia lost one of its most prominent member.

Vladan Đokic, Faculty of Architecture University of Belgrade

CIP-Katalogizacija u publikaciji
Narodna biblioteka Srbije, Beograd
71/72
Spatium: urban and regional planning,
Architecture, housing, building, geodesia,
Environment/ editor in chief Nada Milašin.
- 1997, no 1(sept.)-.-Belgrade:
Institute of Architecture and Urban &Spatial
Planning of Serbia, 1997-.-29 cm
ISSN 1450-569X =Spatium (Belgrade)
COBISS.SR-ID 150289159

ISSN 1450-569X * spatium 15-16/2007 * International Review