THE STRUCTURAL MODEL OF AUTONOMOUS SUSTAINABLE NEIGHBOURHOODS – NEW (SOCIAL) BASIS FOR SUSTAINABLE URBAN PLANNING

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Abstract

Urban planning tools designers have recognized that today’s prevailing sustainable neighbourhood models (urban design tools) do not take sufficiently into account the complexity of various social factors (integration of the community, local economy, identity of the community, etc.) in the implementation of new urban areas. In determining that the best practices of successful sustainable neighbourhoods are too little known and are not taken into account in urban design tools; from the fact that there is no such comparative analysis best practices, which would provide common guidelines for the implementation of new autonomous sustainable neighbourhoods, it follows the central objective of the article – creating an interdisciplinary structure for a holistic model of autonomous sustainable neighbourhoods. The aim of the article is to create a framework of sustainable principles, which derives from “good examples” of sustainable neighbourhoods, and that could represents a new mode of interdisciplinary urban planning, emphasizing the importance of socio-economic factors in neighbourhood modelling. The article will try to identify a concrete scheme of sustainable principles, which could facilitate the creation of new sustainable neighbourhoods in concrete urban environments (with due regard to local specifics). The structural model of autonomous sustainable neighbourhoods could be suitable as a tool for the implementation of sustainable principles and might upgrade existing sustainable urban planning tools. The proposed model, which is based on the comparative analysis of the best practices of sustainable neighbourhoods in Europe, is formed and structured by “the four pillars of urban sustainability” (Energy pillar and natural resources, Sustainable Transport, Socio-economic balance and Sustainable urban design elements). Each of the “pillar” incorporates several “sustainable principles”.

Keywords: autonomous sustainable neighbourhoods, urban design model, socio-economic balance, sustainable urban principles, social ecology

Highlights:
- New basis for interdisciplinary urban planning underlining the importance of socio-economic factors is proposed.
- The proposed innovative model merges theoretical urban fundamentals with concrete sustainable variables, which derive from successfully implemented sustainable neighbourhoods.
- The concept of “social ecology” is introduced in urban planning (in addressing sustainable neighbourhoods).
1. Introduction

Rapid urbanisation is arguably the most complex and important socio-economic phenomenon of the 20th and 21st centuries (Allen, 2009). In year 2008, it was for the first time the majority of the world's population (about 3.3 billion people) lived in urban areas. The United Nations predicts that by 2050 over 70% of the world's population will live in urban areas (United Nations, 2008). Regarding the fact that cities represent the largest source of greenhouse gas emissions, and are at the same time the biggest energy consumers, it is necessary to transform and develop the urban areas in a sustainable way. As agreed by urban researchers, defective and inoperative urban development is the main cause of social and ecological imbalances (Young, 2011). According to Young (2011) sustainable urban planning with the “green infrastructure” represents an important strategic element to reduce carbon footprint and social inequalities in urban areas.

Transition to the sustainable society and culture is not possible without a radical change of our ethics, and therefore, a revision in our values scales (Plut, 2008). A harmonious development of a socially and ecologically oriented society, stand in stark contrast to the current economy, which homogenize, standardize the society, the nature and individuals (Bookchin, 1990). The environmental crisis has to be understood as a crisis of social relations (Chodorkoff, 1995; Gorz, 1994).

Obviously, a global simultaneous operational strategy that could change the world’s direction towards a more sustainable development is not feasible. On the other hand, it is possible to perform and function sustainably at the micro level within low-carbon communities. Eco-villages were the first entities that addressed local rural communities in a sustainable way. In the last decades, several new local projects of sustainable urban transformation have appeared - the so-called sustainable neighbourhoods. Sustainable neighbourhoods could represent a stable durable solution for new sustainable urban balances at the local level (Rudlin and Falk, 2009).

2. Autonomous Sustainable Neighbourhood concept

Sustainable neighbourhood represents an experiment that could provide concrete solutions to the challenges of our currently unsustainable global environment. This relatively modern social formation could grow into a new metropolitan pattern, completely in line with sustainable development principles (Taylor, 2000). Harvey (1990) defines sustainable neighbourhood as an independent city
within the city that preserves the symbolic richness of traditional urban form, and is based on
dialogue and diversity. For Carley and Falk (2012), sustainable neighbourhood is:
• a sustainable living environment that is large enough to offer a wide selection of different residential
areas and services, which could ensure a long-term balance in the local community;
• well-connected and easily accessible with efficient public transport;
• designed to preserve and maintain a sustainable usage of different natural resources;
• based on participation of neighbourhood residents, responsible local organizations, associations,
who all together act in accordance with the principles of sustainable development.

The implementation of sustainable neighbourhoods and consequently the development of local
urban communities necessitates setting clear environmental, social and economic goals that are in
constant equilibrium (Churchill and Baetz, 1999). Sustainable neighbourhoods are located in urban
areas, because the dense urban environment allows the “economy of scale” (unlike the eco-villages),
to achieve a minimum level of (economic) self-sufficiency for public transport, recycling and
educational system (Rudlin and Falk, 2009).

In the presented article topic, the concept of sustainable neighbourhood is upgraded with the term
“autonomous” for two reasons. Firstly; self-sufficiency, self-management and independence
represent essential social and political characteristics of particular “green” urban communities.
According to Harvey (1990), sustainable neighbourhood is a basic, autonomous, self-sufficient cell
in urban areas. The autonomy of sustainable neighbourhoods is reflected in decision-making (local
governance) processes, self-management of local resources (energy, water, waste, etc.) and in
organizing local socio-economic entities (initiatives, associations, cooperatives, etc.). The second
reason for emphasizing the designator “autonomy” is its symbolic connotation. Autonomous
sustainable neighbourhood reflects, indicates also an “autonomous zone” in the city, a “parallel urban
space”¹ (Kos, 1993; Williams, 1990), a “heterotopia”² (Foucault, 1997) or a certain “counter-position”
to the dominant unsustainable system (Foucault, 1997).

¹ Physical parallel worlds, spatial niches “allow a unique asylum, a retreat from a hyper complex, often too
formal, repressive social control” (Kos, 1993:165). Parallel urban spaces are enclaves within the existing formal
urban policy. They are in constant conflict with the system, but in certain circumstances can lead to a productive
coexistence.

² Heterotopias are “real and effective spaces which are outlined in the very institution of society, but which
constitute a sort of counter arrangement, of effectively realized utopia, in which all the real arrangements, all
the other real arrangements that can be found within society, are at one and the same time represented,
challenged, and overturned: a sort of place that lies outside all places and yet is actually localizable.” (Foucault,
1997: 352)
According to the mentioned definition(s) of autonomous sustainable neighbourhood, it is obvious that the concept of autonomous sustainable neighbourhoods does not cover just the environmental protection issues, but assumes new, active, participatory, egalitarian socio-existential impetuses.

2.1 The best examples of Autonomous Sustainable Neighbourhoods

Autonomous sustainable neighbourhoods are extremely vivid, organic formations, and the theoretical concept is not enough to explain this relatively new urban phenomenon. For further analysis it is necessary to highlight or (at this stage) at least mention the best practices that have been successfully implemented in different cities. As it will be shown in chapter 3, the model for future sustainable neighbourhoods has to derive from the specific solutions of already implemented “good examples”, and not just from theoretical analysis. For this reason, the presented urban model framework is based on “real experience” of best practices (more in chapter 5). In this sub-chapter I am going to locate, identify and name various autonomous sustainable neighbourhoods.

To list the best sustainable neighbourhood examples, I have done a scientific literature review in order to identify which sustainable neighbourhoods are the most quoted, mentioned, analysed. From a detailed research and analysis of recent scientific articles, books, and sustainable neighbourhoods guides (handbooks, case studies), it is possible to conclude that most of successful sustainable neighbourhoods are implemented in North and West Europe. Consequently, some researchers define sustainable neighbourhood concept as a North European sustainable model (Kyvelou et al., 2012). From the literature review is possible to determine that the most often cited “best examples” of sustainable neighbourhood implementation are located in Sweden (Western Harbour and Augustenborg in Malmö, Hammarby Sjöstad in Stockholm), Germany (Vauban, Rieselfeld and Weingarten in Freiburg, Kronsberg in Hannover, Scharnhauser Park in Ostfildern, Französisches Viertel – Südstadt in Tübingen), Holland (EVA-Lanxmeer in Culemborg; Leidsche Rijn in Utrecht, GWL Terrein in Amsterdam), Finland (Viikki in Helsinki), Denmark (Vasterbo in

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3 Schröpfer and Hee, 2008; Kasioumi, 2011; Marique and Reiter, 2011; Verdaguer Viana-Cárdenas, 2012; Williams, 2012; Anastasiadis and Metaxas, 2013.

4 OECD, 2010; Campagna et al, 2012; Bächtold, 2013; Fraker, 2013.

Copenhagen), England (BedZed in Sutton, Greenwich Millenium Village in London), and Austria (Solar city in Linz – Pichling).

To balance the Northern European model it was also initiated a “South-European Eco-Quarter Design and Assessment” (Kyvelou et al., 2012) which highlights other urban sustainable criteria – the so called “determinants of the territorial capital”. San Rocco in Faenza (Italy), Villaggio olimpico in Turin (Italy), Sarriguren in Pamplona (Spain), Trinitat Nova in Barcelona (Spain), Solar Village 3 - Pefki in Athens (Greece), Boavista in Lisbon (Portugal), are just some urban plans, sustainable urban initiative (projects) and good practices that come from South Europe. South European sustainable neighbourhoods have great potential, but are rarely quoted or mentioned as “best examples” and are not often analysed in the scientific article, books and other sustainable neighbourhood guides.

3. Background – preconditions for a new sustainable urban model

Urban planning tools designers have recognized that today’s prevailing sustainable neighbourhood models (urban design models) do not take sufficiently into account the complexity of various social factors (integration of the community, local economy, identity of the community, etc.) in the implementation of new urban areas (Haapio, 2012: 168; Kyvelou et al., 2012: 570). The predominant models are focused mainly on the technical sphere and ecological parameters of the neighbourhoods (Georgiadou and Hacking, 2011: 186). This shortfall is also present in the most known neighbourhood sustainability assessment tool - “LEED for Neighbourhood development”, which ignores the influence of the local community in the process of designing sustainable neighbourhoods (Sharifi and Murayama, 2013: 78). Some other distinctive models of sustainable neighbourhoods (BREEAM, CASBEE, One Planet Living, etc.) include certain “social parameters” in the implementation process of sustainable neighbourhoods, but these factors represent only a marginal part of the models and are rarely applied in practice (Haapio, 2012; Sharifi and Murayama, 2013).

The other main shortcoming of prevailing sustainable neighbourhood assessment tools is that current models do not reproduce sustainable principles from existing “good practices”. Models do not relate to concrete, already implemented sustainable neighbourhoods (Engel - Yan et al., 2005; Marique and Reiter, 2011). Modern urban planning should be developed from the perspective of sustainable communities and at the same time should constantly refer to the best examples of sustainable neighbourhoods (Engel - Yan et al., 2005).
The aim of the article is to open a discussion about a more holistic perspective in sustainable urban design, with the development of the overlooked aspect in neighbourhood design—*the socio-economic balance*. The desired outcome of this paper is building up an interdisciplinary draft, "a skeleton", a structure of a possible future autonomous sustainable neighbourhood model, which could overcome the two main shortcomings of current sustainable urban design tools.

4. Methodology and approach

Article research methodology is defined with a multitude of different methodological approaches. The complete research methodology composition includes scientific literature review with analysis of case studies, analysis of primary sources, analysis with personal participation, personal interviews and an international comparative analysis of the best practices of sustainable neighbourhoods in Europe. In 2013 and 2014, I visited and lived in five of most successful and advanced neighbourhoods where I had the opportunity to interview the main actors, who have created and significantly contributed to the development of green urban experiments.

The article’s methodological approach in constructing innovative urban model is divided in two stages. In the first phase, I created the theoretical framework of sustainable determinants for the model; also with the examination of the most known sustainable urban tools. From the initial theoretical analysis of books and scientific articles about sustainable neighbourhood, I could determine a basic network of interconnected sustainable principles, which was fundamental for the

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7 In Freiburg (Vauban and Rieselfeld) I had the opportunity to interview Andreas Delleske (the urban planner of the Freiburg municipality, who had planned Freiburg’s sustainable neighbourhoods), Wulf Daseking (the leader of the former community initiative Forum Vauban) and Sigrid Gombert (past editor of the local newspaper Vauban Actuel). In Tübingen I interviewed Marc Mausch (the editor of the local Südstadt community internet platform) and Hopfner Karin (Tübingen urban planner). In Western Harbour (Malmö) I interviewed Eva Dalman (former project manager of the district Bo01 - Western Harbour), Marial Loof and Roland Zinkernagel (both: Environmental department of the Malmö municipality) and Jan Johansson (Real estate department of the Malmö municipality). In Hammarby Sjöstad (Stockholm) I interviewed Helene Wintzel (co-planer of the community “Hammarby Sjöstad 2020”), Bjorn Cederquist (Urban planning sector of Stockholm municipality), Alan Larsson (ex European Commissioner and urban developer of the local platform “Hammarby Sjöstad 2020”).
later upgrade with factual, real-life implementation aspects from concrete sustainable urban development.

In the second phase I visited and analysed best practices of sustainable neighbourhoods (in Sweden and Germany), where I interviewed the main neighbourhood developers, urban planners and neighbourhoods’ citizens. With personal involvement, scientific observations, interviews and collection of specific empirical data in each sustainable neighbourhood I was able: to identify the key urban “sustainable elements” in each district; to study the formal legal basis of the neighbourhoods; to understand unique historical conditions allowing the first implementation of sustainable neighbourhood in each city; to understand the differences between the selected neighbourhoods, etc. I could compare all common and unique sustainable factors, “sustainable principles” of the best green districts in order to create a basic structure for an interdisciplinary model of autonomous sustainable neighbourhoods.

5. The Structural model of Autonomous Sustainable Neighbourhoods

The proposed structural model is determined and formed by the “4 pillars of urban sustainability” (Energy pillar and natural resources, Sustainable Transport, Socio-economic balance and Sustainable urban design elements). Each of the “pillar” incorporates several “sustainable (urban) principles” (more in Table 1; p.9). Sustainable (urban) principles are sustainable function, green policies, sustainable features, neighbourhood’s characteristics, “elementary elements” of sustainable neighbourhood design. Sustainable principles represent propositions, alternatives, solutions to current unsustainable practices in cities. They embody sustainable guidelines that are adaptable, with consideration of local spatial and social specifics, and realizable for the transformation of (currently) unsustainable urban environments.
Table 1: Configuration of the “Structural model of Autonomous Sustainable neighbourhoods”

<table>
<thead>
<tr>
<th>SUSTAINABLE PRINCIPLES OF AUTONOMOUS SUSTAINABLE NEIGHBOURHOODS</th>
<th>ENERGY PILLAR (AND NATURAL RESOURCES)</th>
<th>SOCIO-ECONOMIC BALANCE</th>
<th>SUSTAINABLE TRANSPORT</th>
<th>SUSTAINABLE URBAN DESIGN ELEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewable Energy Co-operative</td>
<td>Local (organic) food Co-operative</td>
<td>Efficient public transport</td>
<td>(heterogeneous multi-purpose community space; convergent central market, green spaces, public spaces, road closures, bike trails, clearly defined neighbourhoods' boundaries, etc.)</td>
<td></td>
</tr>
<tr>
<td>Energy-saving (passive) multi-dwelling buildings</td>
<td>“Social ecology” as a policy framework of the neighbourhood</td>
<td>The ban of cars</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovative solutions to stimulate recycling and to reduce natural resources (water and waste management)</td>
<td>Local exchange trading system (LETS)</td>
<td>Promoting cycling and walking</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Local economy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identity of the local community and culture</td>
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</tr>
</tbody>
</table>

3 sub-groups:

- “Quality of life with sustainable urban planning”
- “Protection of nature and urbanism”
- “Compactness of the buildings and the proximity of services”

Source: Primož Medved, 2015

Each sustainable principle (presented in Table 1) encompasses several sustainable variables. For the purpose of further analysis, sustainable principles are divided into qualitative and quantitative variables (see Appendix A: Sustainable variables scheme). In that way, it is possible with qualitative variables (of sustainable principles) to focus on “unmeasurable”, descriptive aspects and “soft policies” of neighbourhoods. On the other hand, quantitative variables allow empirical comparisons of different neighbourhoods. The presented variables (Appendix A) represent the “real core” of the article, and show some very concrete focus points, that could stimulate new approaches in urban planning.

As could be seen from the Table 1 and from the model’s extended version in Appendix A, the proposed structure of sustainable principles tries to overcome the identified shortcomings (defined in chapter 3) in sustainable urbanism with emphasizing and suggesting new (social) aspects, new

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8 The structural model of autonomous sustainable neighbourhoods is based on results and interpretations of analyses from: the scientific literature review, international comparative analysis and case studies of autonomous sustainable neighborhoods, evaluation of the existing models of urban design tools (LEED, BREEAM, CASBEE, One Planet living, etc...), interviews with planners and representatives of civil initiatives of some of the most known sustainable neighborhoods in Europe (Vauban, Riesefeld, Französisches Viertel, Western Harbour, Hammarby Sjöstad).
points of references in the development of urban areas (with the innovative sustainable pillar: *Socio economic balance*; with the sustainable principle *Renewable energy co-operatives, etc.*). At the same time, the proposed framework preserves some “habitual”, standard sustainable principles that are typically used in common urban models (*Ban of cars, Public Transport, Public green spaces, Sustainable water management, etc.*) and puts it on an “equal level” of importance with the social variables.

The article’s model (in the “Energy pillar”) gives slightly more attention to the neighbourhood’s “energy aspects” compared with other natural resources. This controversial (symbolical) choice derives from the fact that “energy issues” in the urban context (in)directly condition most of the neighbourhood’s everyday activities. Neighbourhood’s energy needs include energy demand from edifices and other urban features; such are local waste and water systems, parks, public lighting as well as the energy demand from the public transport.

*Sustainable Transport* pillar is fundamental for the existence of a sustainable life style within the neighbourhood. An exemplary sustainable neighbourhood should have a functional, integrated public transport system. Urban green districts usually try to avoid alienated, typical suburban single-family houses, which necessitate, because of the dispersal construction ideology, more than two cars per family.

The creation of a forth individual pillar of *Sustainable urban design elements* is also not common for traditional neighbourhoods tools, but it is essential, because represents a “physical environment” for sustainable principles’ essence and its manifestation. It symbolically embodies an “adhesive” which connects, integrates all the sustainable principles of different sustainable pillars.

For example; in the *heterogeneous multi-purpose community space* (Sustainable urban design element), which is in an energy passive building (Energy pillar), local citizens meet and discuss about local issues, about their common companies (Local economy; Socio-economic balance), like solar panels cooperatives (Energy pillar), or cooperatives of organic food (Socio-economic balance). Such community spaces, neighbourhoods’ collective buildings are important, because they enforce the local community identity (Socio-economic balance).

This is just one general example where it is possible to identify the inter-connectivity of very different sustainable variables, which forms a structure of inter-dependency between variables of autonomous sustainable neighbourhood.

The most innovative and ambiguous part of the presented structural model, represents the inclusion of the sustainable pillar “*Socio-economic balance*”. For this reason, the sub-chapter 5.1 will focus in detail on different characteristics of this innovative pillar, which proposes a new perspective in perceiving sustainable communities.
5.1 Socio-economic balance – the new key pillar for interpreting sustainable neighbourhood’s context

As presented in the chapter 3, addressing autonomous sustainable neighbourhoods social issues have been mostly overlooked in urban planning tools. For this reason this article and the proposed model try to overcome this shortcoming with encouraging new planning approaches, which are concentrated in the pillar “socio-economic balance” (see also Appendix A). To understand better the essence of the new proposed pillar, it is primarily necessary to understand the holistic perspective of sustainable governance and social cooperation in the local urban space. The explication of the complex social interaction in a specific (sustainable) urban context lies in the fundamentals of the “social ecology” concept.9

Social Ecology, as a political framework, represents a radical critique of contemporary social political and environmental trends. It embodies a reconstitution of sustainable, communitarian (collective) and ethical approach to the society. The concept of social ecology is correlated with the “libertarian municipalism,”10 which commits to the decentralization of power and its organization at the local level (Chodorkoff, 1995). Social ecology emphasizes the importance of the "moral economy" (Bookchin, 1990, 1986). The moral economy, at the level of autonomous sustainable neighbourhoods, is also enacted through egalitarian non-monetary exchange, "time bank" or local exchange trade system (LETS) scheme. LETS scheme represents a counterweight to money exchange, to monetised evaluation of work.11 Moral, sustainable, local economy represents an alternative to destructive dynamics of today's predominant neoliberal individualistic economic activities.

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9 Social Ecology is a philosophical branch firstly initiated by the French anarchist and geographer Elisée Reclus, but it was Murray Bookchin, who in the sixties revitalized the concept of social ecology in theoretical and in practical terms. Social ecology epitomize a critique of current social, political, and anti-ecological global trends; it express a reconstructive, ecological, communitarian, and ethical approach to society.

10 Libertarian municipalism is a political project to give to the politics a more ethical character with the bottom up ("grassroots") organization. It supports local urban neighborhood assemblies, and promotes a coordinated bottom-up strategy development (Chodorkoff, 1995). Libertarian municipalism strives to regain the public sphere; the public space for genuine, egalitarian, communitarian action. Libertarian municipalism is not only a political strategy, but also tries to develop democratic possibilities that are latent or in embryonic state, to form a new radical configuration of the society. The aim is a communitarian society that combines human needs with ecological necessities and develops a new ethic based on reciprocity (Bookchin, 1991).

11 However, in practice, not many sustainable neighbourhoods have adopted the LETS scheme; some of them introduced it just partially (f.e. Vauban).
Local urban development should be focused on conserving and strengthening the local community and on an active role of its members. Local (urban) community represents the primary, central sustainable principle of any sustainable neighbourhoods. Local community with a strong identity to the local space stimulates the development of vibrant local culture activities and defines the sustainable neighbourhood’s quotidian dynamism.

As already indicated, it is impossible to persist on theoretical ideals when speaking about creating vivid districts. Sustainable models, urban tools should be based on “real”, already implemented good practices. Although it was inspired and formed from “real” good practices, the pillar “socio-economic balance” still represents a “desirable formula” of different sustainable social factors in an urban space. Apart from theoretical ideals, it is very interesting to understand how (to what extent) this “desirable formula” is applied in practice. If we look to some of the most successful neighbourhoods, it could be seen that socio-economic sustainable principles are interpreted, manifested, concretized in very different ways. In some sustainable neighbourhoods, like in Vauban (Freiburg), it is possible to identify the manifestation of all mentioned sustainable principles of the pillar “socio-economic balance”.

Vauban has a very strong local community, which has grown gradually and has constantly consolidated the particular local identity. Over the years, with the expansion of the neighbourhood, local residents established a local grassroots community association, called “Forum Vauban”, which represents a reference point and a link between all neighbourhood’s associations, the municipality and local residents. Vauban’s local community has created a balanced and vivid network of different social groups, local entities and associations such as (Gombert, 2013; Bächtold, 2013; Daseking, 2013; Gombert, 2013): housing co-operatives, groups of co-builders (“Baugruppen”), co-operative of organic food “Quartiersladen”, associations for children, association for dementia illness, association for pedestrians, associations for the elderly, the autonomous newspaper “Vauban Actuel", Genova cooperative, self-organised association S.U.S.I. and Forum Vauban (now called “Stadtteilverein Vauban”). Vauban’s community was very active in creating local economic entities with locally concentrated ownership. Local residents’ ownership over local resources (particularly renewables and food distribution system) allows them to achieve a greater autonomy in decision-making and a notable degree of self-sufficiency. Some elements of Vauban’s LETS scheme are manifested in the monthly “exchange market”, which takes place at the neighbourhood’s main plaza Alfred-Döblin-Platz (Delleske, 2013).

However, not all successful sustainable neighbourhoods have implemented such strong and equilibrated socio-economic elements. Vauban is a typical grass-root project, where involvement of
citizens through various association (S.U.Z.I., Forum Vauban) was very intense. On the other hand, some top-down driven successful sustainable neighbourhoods (like the Swedish green districts Western Harbour in Malmö, and Hammarby Sjöstad in Stockholm) had different implementation processes. The community identity and the cooperation of neighbourhoods’ residents in Sweden are not comparable with Vauban’s (Dalman, 2014). For example, in Western Harbour the population structure is very homogenised. The district is also called “upper-middle class ghetto” (Holgersen, 2014). There is no community centre for the local population and the cooperation, connection of the local community is weak. This could derived also from the fact that the whole area was designed with the top-down approach from the municipality, without the citizens involvement (Loof, 2014). From a typical top-down development of urban areas, it is more difficult to expect a strong identity or vivid citizens’ initiatives in the local environment.

6. Conclusion, discussion and reflection

The proposed structural model of autonomous sustainable neighbourhoods could stimulate a new perspective, a new mode in urban planning. The presented urban tool framework could serve as a pre-structure of an interdisciplinary model for sustainable urbanism of the 21 century, which addresses sustainable neighbourhoods in a holistic way. The future model, with an adequate adaptation to local specifics of each micro urban cosmos, could transfer the main sustainable principles of the best sustainable neighbourhoods to particular urban environments in different cities.

However, despite the ambitious intent to create a framework of an experimental sustainable urban model, article opens up many unanswered questions and new subjects of discussion. Firstly, the model is very ethnocentrical, it focus on the European perspective and is based just on North-European examples. It is impossible to aggregate all the different global cultural dimensions of each city, and it is probably impossible to create a true global universal model. From that point of view, it maybe be more suitable for the model to be called (North) European model of autonomous sustainable neighbourhood. Secondly, despite the fact that the article tries to join theoretical and practical aspects (determinant) from different methodological approaches, the model (in Appendix A) will always be somehow unfinished. There would always be one factor, one variable that is fundamental, and is not mentioned in the model. Creating a sustainable urban model is a constant work in progress, and the proposed model is just a starting point, an upgradable scheme. Thirdly, at

12 In the interview Eva Dalman, the initial developer of Bo01 (in Western Harbour, Malmö), mentioned that the community centre was not introduced also because the resident were not interested in that kind of common areas (Dalman, 2014).
this point in 2014, is maybe still too soon, too utopian, to introduce the concept of social ecology into the model, because is not entirely implemented, expressed even in the most advanced sustainable neighbourhoods (f.e. in the mentioned Swedish sustainable neighbourhoods). Realistically, from a detailed analysis of all successful neighbourhoods in chapter 2.1, just a few neighbourhoods could entirely cover all sustainable factors, mentioned in the model.

Despite some obvious deficits of the model, the suggested framework of the proposed model, could still implicate an another dimension, an alternative perspective in urban planning, which is in contrast with the well-established methods. The principal aim of this article is to open up a discussion for a new vision in sustainable urban planning and to suggest some new, concrete sustainable variables for (sustainable) urban planning tools. The pillar “Socio-economic balance” introduces a new paradigm of egalitarianism based on direct democracy in urban communities. Autonomous sustainable neighbourhoods (in theory; not always in practice) could act as a social, economic cultural contra-position against the dominant (neoliberal) order. Autonomous sustainable neighbourhood is not a utopian vision but a real transition to a new, unnamed social order that fragmentally already exists.
# APPENDIXES; Appendix A: Sustainable variables scheme – The structural model of Autonomous Sustainable Neighbourhoods

## 1. “ENERGY PILLAR” (and natural resources)

<table>
<thead>
<tr>
<th><strong>SUSTAINABLE PRINCIPLES</strong></th>
<th><strong>Points of interest - urban modelling focus points (qualitative research variables)</strong></th>
<th><strong>Determinants for the comparative analysis (quantitative research variables)</strong></th>
</tr>
</thead>
</table>
| Renewable Energy Co-operative | - establishment and organizational structure of RES\(^\text{13}\) cooperatives  
- typology of implemented RES  
- co-operation between municipalities and civil initiatives → for the creation of cooperatives | - local population’s ownership share of RES  
- share of local RES in regard with the total energy consumption  
- energy autonomy (%)  
- energy consumption (per capita) regarding: 1.electricity, 2. heating, 3.transportation |
| Energy-saving (passive) multi-dwelling buildings | - method of setting mandatory standards  
- exerting pressure of the civil initiative or the county for the restoration of wasteful buildings  
- usage of ecological materials for the construction of neighbourhoods (wood, glass, wool, etc.)  
- economic aspect of constructions and maintenance; WLC criterion (“whole life costing”)  
- impact of constructions on the environment; CO2 emissions  
- health effects depending on the materials used  
- position of buildings with the consideration of “solar geometry”  
- *Energy efficient buildings*: ventilation; position; insulation; use of water; use of renewable energy for the electricity and heating; recycled materials; concept of smart homes, which adapts to external weather conditions; maximization of the exploitation of energy and water, passive solar energy utilization; acoustic comfort | - proportion of passive or “plus energy” buildings,  
- mandatory energy standards established at the level of municipalities or neighbourhoods  
- energy consumption for heating and electricity (per capita)  
- proportion of neighbourhoods buildings built with “natural materials” |
| Innovative solutions to stimulate recycling and to reduce natural resources (water and waste management) | - introduction of innovative concepts to reduce the consumption of natural resources (bio-gas from compost, vacuum toilets, etc.)  
- particular recycling methods  
- methods of reducing the water consumption  
- re-use of rainwater  
- water-saving modes (three treatment categories: black water, grey water and rainwater)  
- initiatives to reduce the amount of garbage  
- organic garbage for gardens  
- “green roof” | - recycling rate (kg / capita) - general  
- recycling rate (kg / capita) - which is carried out in the neighbourhood  
- usage of recycled material in the neighbourhood  
- water consumption per capita  
- capture rate of rainwater  
- kg of produced trash per capita |

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\(^{13}\) RES: Renewable Energy Sources
### 2. “SUSTAINABLE TRANSPORT”

<table>
<thead>
<tr>
<th>SUSTAINABLE PRINCIPLES</th>
<th>Points of interest - urban modelling focus points (qualitative research variables)</th>
<th>Determinants for the comparative analysis (quantitative research variables)</th>
</tr>
</thead>
</table>
| Efficient public transport | - initial establishment process of the public transport  
- diversity, development and availability of public transport system  
- pollution of public transport  
- actual fluidity-connectedness with the rest of the city  
- “car sharing” initiative  
- initiatives to reduce the need for vehicles  
- public transport-links with the regional hub of public transport / metro to the train station, to the airport  
- reducing the “need” for cars - proximity of essential services / urban density  
- multimodality of the sustainable transportation | - closeness to the railway, bus, metro or tram station (measured from the centre and the extremities of a neighbourhoods)  
- level of development of public transport system (ramifications, the frequency of arrivals)  
- proximity to crucial services (market, school, etc.).  
- time of the construction of public transportation in the neighbourhood: before the buildings in the neighbourhoods / or progressive construction / or the introduction of public transport after the neighbourhood completion  
- time needed (using public transport) to the city centre; the time required to train station; the time required to the first airport (for all, measured at different times) |
| Ban of cars | - methods of reducing car flow or a complete ban of cars in the neighbourhood  
- initiatives from local community or municipality  
- parking lots outside the neighbourhood / in the neighbourhood / restricted parking areas / under the blocks  
- “fee” for driving in the neighbourhood / town? | - no. car ownership per capita  
- no. garage places outside the neighbourhood or within the neighbourhood  
- size (proportion) of roads intended for cars in the neighbourhood |
| Promoting cycling and walking | - cycling and walking routes in the neighbourhood; accessibility to the city centre from the neighbourhood  
- parking spaces for bicycles and other initiatives  
- “walkability”- safety, aesthetic | - no. of bike roads, routes  
- amount of walking paths |
### 3. “SOCI-ECONOMIC BALANCE”

<table>
<thead>
<tr>
<th>SUSTAINABLE PRINCIPLES</th>
<th>Points of interest - urban modelling focus points (qualitative research variables)</th>
<th>Determinants for the comparative analysis (quantitative research variables)</th>
</tr>
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</table>
| Local exchange trading system (LETS) | - methods of organizing LETS schemes  
- typology of organizing time banks (or LETS schemes)  
- “exchange markets”  
- “initial form” of LETS (exchange of goods, vouchers-“goods for goods”) | - number of people involved in LETS  
- growth trend of LETS |
| “Social ecology” as a policy framework of the neighbourhood | - level of direct democracy  
- “bottom up” (or “top down”) approach in creating neighbourhoods  
- degree of self-management and autonomy in decision-making  
- caring for unprivileged groups  
- associations for the elderly, children, handicap people  
- solidarity between people (initiative, laws, etc.)  
- (symbolic) importance of the first sustainable neighbourhoods in the city- implication for vicinity (town, region,..) | - proportion of people involved in decision making processes  
- number and typology of topics discussed through direct democracy  
- number of self-managed initiatives, cooperatives  
- number of initiatives aimed for integrating marginalized groups |
| Local (organic) food Co-operative | - urban gardens  
- synergy with local farmers  
- local (organic) market and the location of marketplaces  
- local food cooperative characteristics  
- regional “food chain” integration | - number of urban gardens  
- proportion of people involved in the local food co-operative  
- frequency, variety and size of the local market |
| Identity of the local community and culture | - participation level in the neighbourhood  
- solidarity within the community  
- diversity of local civil initiatives and associations  
- intergenerational solidarity  
- events to strengthen the identity (f.e. neighbourhood festival etc.).  
- “individuality” (against the standardization) of buildings  
- preservation of local culture, cultural heritage  
- concern for the preservation of local traditions  
- preservation of certain historic buildings  
- development of neighbourhood cultural activity | - existence of the local newspaper and community internet platform  
- number of associations, initiatives  
- level of crime in relation to the other parts (relative / absolute)  
- number and range of networking events for the community |
| Local economy | - organization and promotion of local economic activities  
- balance in “economical exchange” between the neighbourhood and the city and the wider region  
- diversification of services  
- local craft activities  
- initiatives to prevent commercial food (and other) chains in the neighbourhood  
- diversity and variety of economic activities in the neighbourhood | - proportion (number) of people who work in their own neighbourhood  
- number of local businesses (how many of local business are owned locally)  
- proportion of people using local services |
4. **“SUSTAINABLE URBAN DESIGN ELEMENTS”**

<table>
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</tr>
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</table>
| “Quality of life with sustainable urban planning” | - heterogeneous multi-purpose community space (as a central facility of the neighbourhood) for strengthening the local community identity  
- convergent central market (as a community focal point)  
- green areas and public spaces  
- ban of automobiles  
- clear boundaries of the neighbourhood (which strengthen the adherence of the citizens)  
- mixed housing typology (mixed use and also personalized buildings’ “form design”)  
- public street lighting (to revitalize the public space; to prevent micro criminality)  
- designing neighbourhoods to reduce crime rates;  
  CPTED (Crime Prevention Through Environmental Design)  
- concept of “healthy neighbourhoods” with a design that encourage walking / bicycle use (aesthetics, connectivity, permeability, lighting, bike trails, proximity to services) | - proportion, area (ha) and number of public spaces  
- no. of structures / buildings of public institutions (for public interest)  
- no. of community centres (and size)  
- no. of parks, squares, playgrounds  
- average distance to the first the neighbourhood park  
- share of “green roads” with trees  
- diversity of construction, heterogeneous aesthetics |
| “Protection of nature and urbanism” | - determination of green areas  
- biodiversity / diversity of vegetation  
- taking into account the wind flow as a “natural ventilation”  
- integration of the natural landscape in the neighbourhood (strategy at the neighbourhood level, city, region)  
- existence of so-called “natural corridors” - “wildlife corridors”  
- typology of vegetation in the neighbourhood  
- protection of natural habitat and rare species of plants and animals | - proportion, area (ha) and number of parks and green spaces  
- number of norms to protect the local natural environment |
| “Compactness of the buildings and the proximity of services” | - urban design in the direction of compact multi dwelling construction or single sub-urban (suburbia) family houses  
- stimulating the creation of services in the neighbourhood  
- density of buildings, constructions  
- services in the ground floors of the buildings | - no. population per hectare  
- no. service per hectare  
- presence of banks, post offices, shops, markets elementary and secondary schools in the neighbourhood  
- distance to the first ambulance and fire stations  
- number of building and floors/ per hectare |

Source: Primož Medved, 2014
References


Creating sustainable cities. bmz.de. Cities are key players for the implementation of the 2030 Agenda. Cities play a key role for sustainable development. Most of the goals of the 2030 Agenda can only be reached if we manage to mobilize local players and make urban areas sustainable. To that end, a new global agenda for urban development is to be adopted at the Habitat III conference in Quito, Ecuador, in October 2016. Three cities are working to reduce floods on a sustained basis through structural flood control measures and improved urban planning. Indirectly, these activities have reached more than a million people. In particularly vulnerable cities, people received special training to teach them about risks and risk response.