

Erwin Hepperle, Jenny Paulsson, Vida Maliene, Reinfried Mansberger,
Armands Auzins, Jolanta Valciukiene (eds.)

Methods and Concepts of Land Management

Diversity, Changes and New Approaches

EUROPEAN ACADEMY OF LAND USE AND DEVELOPMENT

EUROPÄISCHE AKADEMIE FÜR BODENORDNUNG

ACADÉMIE EUROPÉENNE DES SCIENCES DU FONCIER

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Introduction

This publication includes papers based on presentations held at two symposia of the European Academy of Land Use and Development (EALD). The symposium of 2018 had the topic “Changes in Land Use Management Practices” and was organised at Riga Technical University. The symposium of 2019 took place at Vytautas Magnus University in Kaunas on the theme “Land Use and Land Development in the field of tensions between environmental, social and economic sustainability”. The peer-reviewed papers inform about investigations on the common subject “land-management” – due to the interdisciplinary nature of the EALD from very different positions. The spectrum of contributions covers regulations, governance and the implementation of land management along with the assessment of relevant data to support these tasks. Various approaches, methods, systems and understanding of the government’s role in the different states of Europe are highlighted. It can be said that Europe provides an experimental field for land management issues, enabling the most important processes when dealing with sustainability: to improve knowledge of new practices, to verify them and to learn from each other.

In the first part of the book, articles compare the diversity of planning systems and approaches in European countries. Two papers examine the significant shifts in territorial government and the planning style in several European countries. The following two inter-related contributions focus on urban redevelopment strategies of shrinking cities in Germany and Estonia. The final paper in this section compares the legal system for property formation of Finland and Sweden concerning the possibilities for digitalisation of land development processes:

- *Auziņš, Jürgenson* and *Burinskienė* give a comparative view of the dynamics of the spatial planning systems and practices in Latvia, Estonia, and Lithuania. The authors have identified significant changes since the 1990s. Using a common methodological framework, they explore policy, planning styles and tools, but also the scope and main objectives of changes in addition to the driving forces indicating main phases and causing turning points. The findings of the research document key trends involve the evolution of spatial planning in the Baltic countries.
- The paper of *Auziņš* presents and discusses the results of case studies, which have been elaborated by empirical research in seven selected countries. The systematic, logical and comparative analysis concerns the implementation of spatial development plans and the institutional performance. Results show transitions between command/control and consensus-oriented governances, shifts from formal institutionalised planning towards complementing informal planning arrangements and movements between supply-led and demand-led planning.
- *Hendricks* and *Tintera* gives an overview of housing redevelopment tools for local governments in the small Estonian city of Valga and compare these with tools applied to the towns with a similar shrinking and vacancy problem in Eastern Germany. Similar

strategies are used in both countries. However, the authors found significant differences in price levels and in the perception of the problem at the national level, indicating their influence on the success of the measures.

- In their second paper, *Hendricks* and *Tintera* draw the focus to the conflict between conservation of architectural heritage and urban redevelopment of a shrinking town according to the expectations of its current population. Based on the cases of Görlitz (Germany) and Valga (Estonia), a summary of frame conditions and strategies to achieve different aims was established, thus identifying several crucial points for a successful management of the problem.
- In an explorative analysis, *Ekbäck* and *Riekkinen* compare the legislation of Finland and Sweden, to evaluate differences as either institutional potentials or impediments for digitalisation and automation in land formation processes. The special interest lies in how far the property formation is coordinated with existing land use legislation, land use planning and requirements for permits to change land use, and with due care recommend legal measures to improve the conditions for digitisation.

These papers are followed by three contributions that tries to answer the question: how to create legal and planning certainty by ensuring a balance of interests. The authors analyse to what extent the characteristics of the planning-framework in their states influence this challenge.

- *Sørensen* and *Christensen* present strategies and other measures to control land consumption in spatial planning. Looking on the Danish planning system, they discuss advantages and disadvantages when implementing quantitative targets and technical provisions on the one hand with qualitative policy strategies on the other. They end up advocating for the approach of “traditional rational planning” to control a balance between limiting land take and creating growth.
- In Norway, private real estate developers initiate and prepare the vast majority of all approved detailed zoning plans. *Holsen* and *Børrud* analyse what they call “the urban planning split”, namely the question: how sustainable development can be achieved at large while securing efficient project implementation for a specific development. The discussion is focused on the crucial initial phase and shows possible new perspectives to understand implementation problems of zoning-plans.
- *Dahlsjö*, *Ekbäck* and *Kalbro* address the fact that the first stages of planning, although they are not legally binding, serve as guidance in the design of the detailed development. These processes can take a long time, while negative economic impact may occur already at an early stage of planning without a compensation-option. The authors discuss different types of actions that could improve the conformity of the Swedish legislation with the European Convention for the Protection of Human Rights.

Successful land management depends on a proper legal system, but also on social trends along with regional and local conditions. Adequate and sufficient information on these

topics is required. The next section of papers summarises methods of how to acquire relevant information for the implementation of land use management. They may serve as a source of inspiration since they underline the multitude of possible applications.

- The article of *Mansberger, Bauer, Malinnikov* and *Protnov* enlightens the capabilities offered by remote sensing techniques to assess and provide data for land management applications. The methods are characterised by a high degree of automation, leading to almost real-time, homogenous and reliable results. The authors substantiate the usefulness of remote sensing applications in urban environment by two case studies from Vienna (Austria) and Hanoi (Vietnam).
- *Schaffert, Becker, Steensen* and *Wenger* are interested in the use of geodata to build a regional landscape-oriented brand. They combine supra-regional with region-specific spatial and temporal patterns to find peculiarities of land cover development in Northern Germany. The authors applied a mixed methods and transdisciplinary approach, bringing together scientists from archaeology, geodesy and landscape planning with local stakeholders from administration, politics, associations, the private sector and the local public.
- *Ekbäck* reviews and evaluates the suitability of some existing models that give information on the concrete rights of use associated with ownership of a parcel in Sweden. These analytical tools visualise the legal relation between the owner of land use rights, the content of these rights and the concrete parcel(s). However, they should not only represent the status quo, but also the change of land use rights. Therefore, the author suggests an extension of static models with dynamic components.

Housing shortage and accommodation costs are a major problem in urban land management. The following papers focus on factors which influence housing provision and pricing.

- *Ortner, Jaimes Parra* and *Weitkamp* compare strengths and weaknesses of two methods to assess residential locations: the well-established approach of qualitative utility analysis and the new quantitative structural equation modelling, which is not yet applied in practice for this purpose. The authors highlight the suitability for use in terms of the criteria complexity of the method, choice of (spatial) indicators, objectivity, explanation of latent variables, and presentation of results to the interested persons.
- Until now, the attempts to realise affordable housing have been hesitant in Sweden. *Granath Hansson* presents a comparative case study on three recent municipal initiatives using different set-ups to incentivise private housing developers to construct apartments with lower rents. Drivers in the housing and planning systems in Sweden have been analysed. Extensive land ownership would give Swedish municipalities a unique possibility. However, the author found several political and institutional reasons for difficulties in implementing affordable housing land models.
- *Süring* and *Weitkamp* present a systematic worldwide literature review on the topic of residential real estate transactions and value-influencing parameters. They found that

two main fields of research dominate the scene: behavioural factors influencing decision making on the one hand and factors that influence the price (environment, location, effect of supply and demand etc.) on the other. The authors identify limitations and gaps in research, also highlight the absence of a discussion relating to the general validity of the used parameters.

Combining local particularities and local situation with multiple overriding interests and adequate knowledge of the correlations creates a real challenge for implementation strategies. The different aspects discussed in the following papers give evidence about existing deficiencies in communication and knowledge. Local actors are sometimes poorly or insufficiently informed about the requirements and flexibility of the overcrossing framework. Moreover, the support from diverse disciplines is essential. The papers present possible ways how to proceed with selected intents and purposes.

- *Brokking, Liedholm Johnson and Paulsson* investigate where sustainable development is addressed in Swedish municipal planning and land development processes. Starting with the question: why finished building-projects do not fulfil all ambitions that were defined at the beginning, authors explore the opportunities and obstacles from detailed planning to building permits. Case studies look at the spectrum of the approach and the continuity between the different stages of the process. Finally, the paper gives answers to the question: how sustainability aspects can be strengthened in the planning process.
- Usually, regulations in Austria define the minimum number of parking spaces that have to be built when constructing new buildings, where the minimum number is dependent on the intended usage of the building. Currently, modern mobility research recommends the definition of a maximum number of parking spaces by considering regionally spatial structures. *Weninger* reports a study, which investigated potential parking space regulations in Lower Austria depending on the quality of existing public transport.
- *Seher* explores options and limitations of spatial planning in mitigating pluvial flood risks. An interdisciplinary Austrian case study has been performed containing pluvial flood hazard modelling, technical flood mitigation literature study and workshops with relevant stakeholders. Local land use planning was found as a suitable approach at local level to mitigate pluvial flood risks, but has to be combined with emergency measures, structural flood protection, green infrastructure and implementation of runoff-reducing cultivation techniques in agriculture and forestry.
- From an architectural point of view, *Yılmaz and Tüfekçiöğlu* investigate the role of urban agriculture for ecological urban restructuring, a topic that until now has been rarely considered in housing and urban design at a fine grain level. The authors evaluate the role of urban agriculture and analyse the possibilities along with limitations regarding ecological urban restructuring. Using two examples of campus agriculture: at McGill University in Montreal and at Hacettepe University in Ankara, the students are shown

multidisciplinary learning processes used to plan the vacant areas for agricultural activities.

The final group of papers is focused on the financial aspects of state and municipal tasks in land management.

- A primary objective of Ukraine's strategy for sustainable development is to create a safe and efficient Ukrainian transport system in order to introduce European standards of living in Ukraine. *Lizunova* describes the international and the specific Ukrainian background of the problem involving the legal framework. The author emphasises the importance of land acquisition and in particular, compulsory purchase of land for public needs from the perspective of sustainability by considering economic, social and environmental factors.
- Recognising the urgent need to fill Ukrainian's local budgets, *Petrakovska* and *Mykhalova* investigates the various strategic methods that are used to tackle urban development and land management. Findings indicate an absence of a coherent set of respective documents. The authors examine the strengths, weaknesses and efficiency of the different sources for financing urban development in Ukraine, also taking into account the role of the various interested actors.
- *Šubic Kovač* investigates the financing of land development through municipal charges in Slovenia. The focus is on whether the expert bases consider the fundamental principles of municipal contribution: the principle of equivalence, the principle of equality before the law, the principle of counter-payment and the principle of cost coverage. The development over various periods shows a shift away from these principles.

Erwin Hepperle
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Comparative Analysis of Spatial Planning Systems and Practices: Changes and Continuity in Baltic Countries

A comparative study of Latvia, Estonia, and Lithuania

Abstract

Evidence-based studies show meaningful changes in spatial planning if observing the evolution of planning systems and practices in Europe. Three Baltic countries over the last decades have witnessed considerable changes in institutional settings in this respect. The research emphasises on comparative analysis of Latvian, Estonian, and Lithuanian experiences through the evolution of spatial development planning in the light of dynamic changes in Europe since the 1990s. The purpose of the article is to give an overview and discuss significant changes and turning points in spatial planning systems and practices in Baltic countries, as well as to assess key trends of relevant related processes. Inspired by a profoundly conducted comparative European study, the common methodological framework has been used to gain evidence-based knowledge. Thus, (1) the scope and main objectives of changes, (2) driving forces causing changes by indicating main phases and turning points as well as (3) policy, planning styles, and tools are explored and presented through a comparative perspective in the article. The review of institutional settings, dynamic and comparative analysis and synthesis techniques as well as the logical-constructive and graphical methods are mainly employed for the study. The outcome of the research shows key trends in the evolution of spatial planning in Baltic countries. These trends represent a dynamic continuity of planning cultures and emphasise its significant impact on decision-making in land management practices.

1. Introduction

Spatial planning systems have been recognised as dynamic institutional technologies, which define corridors of action for planning practice (Reimer and Blotevogel 2012). Planning cultures reflect on the values, attitudes, mindsets, and routines shared by those who take part in planning activities (Fürst 2009). Recent comparative research emphasises dynamic changes due to the discourse of evolution of spatial planning across Europe. It underlines the specific and content-dependent variety and disparateness of planning transformation in selected countries (Reimer et al. 2014). The Baltic region is often understood as a single

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** Estonian University of Life Sciences, Department of Geomatics/Estonia.

*** Vilnius Gediminas Technical University, Department of Urban Engineering/Lithuania.

territorial unit, although it is made up of three independent states: Latvia, Estonia, and Lithuania. An examination of post-soviet countries in the Eastern part of Europe shows a societal transformation in which the social value of planning is recognised as a fundamental issue for debates (Nedovic-Budic 2001). Developing national spatial planning agendas after the collapse of the Soviet Union and restoring independence, the Baltic countries opened their planning debates to the European planning discourse and associated spatial planning principles, especially after their accession to the EU in 2004. Since then, also European knowledge, expertise, and structural funds were available to support the development of national spatial planning systems. The support involved several spatially relevant European spatial planning policies (e.g., ESDP, Territorial Agendas) and instruments (e.g., ERDF, ESF, Cohesion Fund). Under the ESPON projects, the integrated tools for European spatial development have been intended to apply (Faludi 2008). The paradigm of “Europeanization of spatial planning” may be seen as a consequence of the introduction of Territorial Agenda 2007 and European influence on planning systems. The Territorial Agenda 2020 under the specific objective of the ESPON EGTC 2020 and cooperation program focussed on gathering and analysis of European territorial evidence through an applied research project (ESPON 2018). Previously done research focussed on key trends and aspects, which influenced changes into spatial planning systems and practices in Europe (Auziņš 2018). Exploring the Baltic perspective and the engagement with European policies, some arguments have been provided that Baltic countries reflect a ‘culture of pragmatism’ in spatial development planning (Adams et al. 2014).

If considering similar historical evolution of three Baltic countries – Estonia, Latvia, and Lithuania, it should be necessary to develop a model of transformation design and to explain main phases and turning points when setting a time perspective by years since the restoration of independence in the 1990s. Therefore, a further complete study outcome due to ‘path-dependent evolutions’ could be designed and discussed. If considering above described topicality and the influence of European policies on Baltic spatial planning agendas, the authors of the research propose a *hypothesis* – there exist several other driving forces besides ‘Europeanization’ causing changes into spatial planning practices and discourses, which essentially do not differ among three Baltic countries. The *aim* of the study resulting from the drawn hypothesis is to explore the key trends and aspects which have influenced the changes in spatial planning systems and practices in Baltic countries. The *objectives* of the study to meet the aim are: (1) to identify the key trends and aspects influencing changes into spatial planning systems and practices based on profound literature review; (2) to analyse the outcome of comparative studies by using previously developed methodological framework and established criteria; and (3) to explore the evolution of Latvian, Estonian and Lithuanian spatial planning experience and to discuss it in the light of previously made comparative studies, which presents a novelty of the research. The review of scientific literature and legal instruments; the expert interview method; the dynamic and comparative analysis, and synthesis techniques have been employed as *research methods* for the study.

2. The scope and main objectives of changes

The transition from a planned economy to the incremental development of the market economy started simultaneously with the restoration of independence in 1990 in all Baltic countries. Also, the land reforms were a political priority. In particular, the land-use restrictions caused the formation of abandoned territories and fragmented holdings in many areas of Baltic countries. The implementation of land reform, to a great extent, delayed the establishment of first spatial planning legislation in all three countries (1994–1995). Changing regulations of land reforms also influenced changes in spatial planning systems. The implementation of land reform has been complicated. The restitution of land has made planning difficult. The land has been allocated between previous owners (before 1940) and their heirs through restitution and new owners through privatisation. The regulations of land reform have led the process in the way the planning aspect frequently disregarded (Jürgenson 2016:35). The neoliberal economic approach was promoted to enable plan demand-driven territories for new development. The attitude that “everything will be solved by the market” was often encouraged. Progressively reformed territorial governance influenced the locus of power and caused subsequent legal amendments and changes in planning systems. Economic crisis (2008–2009) and urban sprawl caused restrictions on incremental urban development and limitations of urban containment. The uncontrolled development of suburbs, e.g., over-planning of residential areas, lack of investments, and missing infrastructure, required essential changes to legal and regulatory planning documents (Palevičius et al 2019).

3. Driving forces causing changes by indicating main phases and turning points

Gradual development towards a market economy 1994–2004 was supported by increasing foreign investments in all Baltic countries. After joining EU in 2004, in line with the “Europeanization” of spatial planning, consequently, the introduction of ESDP and Territorial Agenda as well as the implementation of regional policy instruments, i.e., ERDF, ESF, Cohesion Fund, have seen as drivers that influenced changes into spatial planning agendas in Baltics significantly. As a consequence of administrative-territorial reforms: the number of local municipalities was increased from 40 to 60 already in 2000, but 10 counties were abolished later in 2010 in Lithuania; the number of local municipalities was diminished from 546 to 119 and the regional planning level represented only by 5 planning regions since 2009 in Latvia; the number of local municipalities was diminished from 213 to 79 only in 2017 but rapidly, at the same time abolishing the counties, in Estonia. The economic crisis 2008–2009 and incremental urban development caused essential amendments in planning legislation. New Spatial Development Planning Law was adopted to improve planning practice in 2011 in Latvia. Uncontrolled suburban development and the planning of overflows promoted the study for better planning practice in 2010 in Estonia. It brought together necessary amendments in planning regulations as well as boosted the adoption of the renewed Planning Act in 2015. Similarly, the economic crisis and uncontrolled suburban development, as well as the planning of overflows, led to the adoption of the new Law

on Territorial Planning in 2014 in Lithuania. Following, new institutional settings, e.g., in the form of regulations, were introduced to promote qualitative changes and improvement of spatial planning practices in Baltic countries.

3.1 Evolution of spatial planning in Latvia

Initially (since 1990), priority was given to the implementation of land reform, which delayed the establishment of first institutional settings (in 1994) for spatial planning. The spatial planning system and practice developed gradually with significant changes in institutional settings in 2004 and 2011. Spatial Development Planning Law (2011) determined new institutional settings for spatial planning agenda and aimed qualitative changes into spatial planning practice. Since then, the shift towards a strategic spatial planning approach can be argued, as all three planning levels (national, regional, and local) have strategies. Since the administrative-territorial reform (2009), physical planning with legally binding parts of the local government plan has been practiced. The planning style can be characterised as decentralized, integrated, and comprehensive spatial planning with a tendency of centralization for recognising the priorities of national and regional scales. Weak cooperation among stakeholders, public activity, and participation increases slowly.

Meanwhile, the qualitative improvement of planning practice can be seen since 2013. Thus differences in the design of local development plans among municipalities are limited, and application of GIS solutions for planning are promoted. Statutory planning exists only at the local/municipal level. Thus local government spatial plans (comprehensive plans), local plans (cover the part of the area of a municipality), and detailed plans (include the area of the development site) are elaborated. Additionally, the planning documents at the local level are concerned with a sustainable development strategy and development program. National and regional levels have guiding development strategies. Figure 1 shows the evolution of the spatial planning system, including the main phases and turning points since 1990 in Latvia (Auziņš 2018).

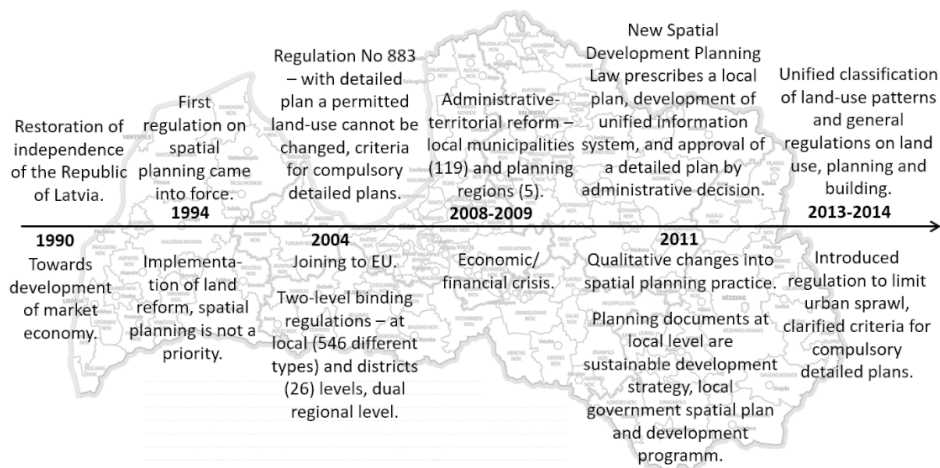


Figure 1: The evolution of spatial planning in Latvia.

3.2 Evolution of spatial planning in Estonia

After the restoration of independence in 1990, there has been established a two-level self-government system in Estonia: (1) parishes, small towns, and towns were on the lower level of self-government; (2) fifteen counties and six republican towns were on the higher level of self-government. Priority was the implementation of land reform but not spatial planning. In 1994, it went over the one level self-government system: parishes, small towns, and towns. The county-level moved under state responsibility. In 1995 the Planning and Building Act was adopted. Afterwards the discussions ended with separate Law on Territorial Planning. Since that time, there are four levels of plans in Estonia: national spatial plan, county-wide spatial plan, comprehensive plan, detailed spatial plan (two last are on the local government level). At the same time, the work on the general plan of the territory of the Republic of Estonia was started. In 1996 was the beginning of the voluntary administrative reform at the local government level. The Estonian government has encouraged and promoted the voluntary process of merging local governments throughout recent decades to establish local governments with the enormous territory and number of inhabitants. Nevertheless, it has not had a significant influence on the local government system as a whole. The central government supported (monetary support) the voluntary joining since 2004. However, the result was not as good as it was expected. Only 71 local governments joined and formed 30 new local governments in the period 1996–2014. Local governments' number decreased to 213 (it was 254).¹

In 2000 the general plan of the territory of the Republic of Estonia with the perspective until 2010 and its action plan was approved. In 2002 separate laws: The Planning Act and Building Act were adopted. Estonia acceded to the EU in 2004 and adapted to EU standards. In 2008–2009 economic/financial crisis brought out many problems that occurred concerning the development areas. The development stopped in many areas. Some of them were partly developed as there were few houses already constructed but without the necessary infrastructure. Many developers have bankrupted. It has understood that the Planning Act needs to be renewed (needs the introduction of qualitative changes). In 2010 the study (led by the Ministry of Justice) for the preparation of planning and building law and its explanatory letter were carried out. The survey covered the overview of planning law and practice in different countries (Germany, Italy, Slovenia, Ireland, Finland, and Denmark). In 2012, the general plan of the territory of the Republic of Estonia 2030+ and its action plan was approved. In 2015 renewed (separate), both laws Planning Act and Building Act were adopted. In 2017 rapid administrative-territorial reform was performed. It consisted of voluntary and compulsory parts. Because of this reform, the number of local governments has decreased to 79 (there were 213), and the county-level abolished. Nowadays, local governments consist of urban and rural areas. Figure 2 shows the evolution of the spatial planning system, including main phases and turning points since 1990 in Estonia.

¹ Administrative-Territorial reform. Ministry of Finance;
<https://www.rahandusministeerium.ee/et/kov/haldusreform>;
<https://www.rahandusministeerium.ee/en/objectivesactivities/local-governments-and-administrative-territorial-reform/administrative>

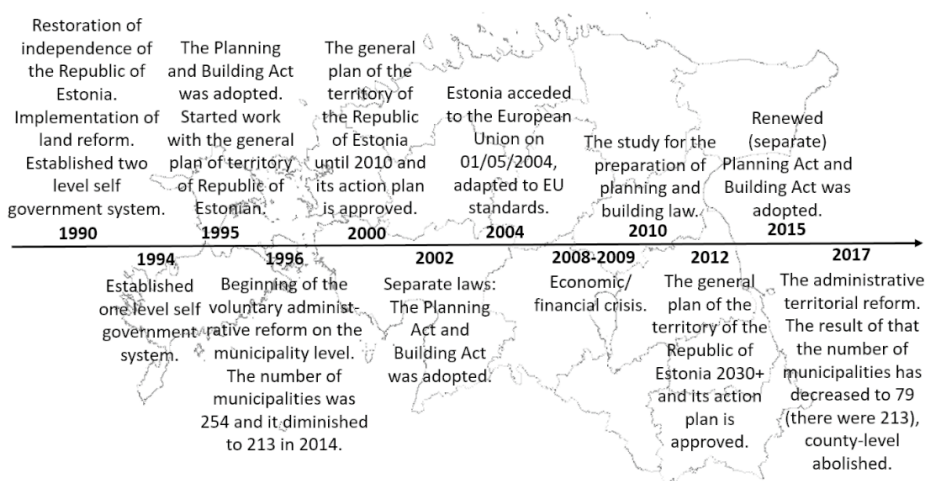


Figure 2: The evolution of spatial planning in Estonia.

3.3 Evolution of spatial planning in Lithuania

Likewise, in both other Baltic countries, also in Lithuania after the restoration of independence, spatial planning was not the priority because of urgent implementation of the land reform. In 1995, the first version of The Law on Territorial Planning was issued. In 2000, the administrative-territorial reform was started in Lithuania: the number of municipalities increased to 60 (before there had been 40) and ten counties were established. In 2002, the general plan of the territory of the Republic of Lithuania with the perspective until 2020 was approved. Lithuania entered to the EU in 2004 and adapted EU standards. In the period from 2007 until 2009, the planned county plans and tourism projects at the national level, as well as the municipal comprehensive plans, were carried out with the EU support massively. In 2010, the next administrative-territorial reform eliminated counties. During 2011–2012, the national spatial plan (BP) and the municipal comprehensive spatial plans of the territory of the Republic of Lithuania as well as the border project were mass-produced. In 2014, the new version of The Law on Territorial Planning came into force, and the planning in both urban and rural areas was separated. Accordingly, since then, the architects were responsible for urban planning (in towns) but land managers for planning in rural areas (in villages). The regulations regarding mandatory quarterly detailed planning and limitation of planning procedures (in the direction of its reduction) were enforced. The monitoring of the implementation of the different plans have been provided and advanced information systems for planning documents developed (e.g., TPDRIS – territory planning documents registration information system, TPSIS – territory planning monitoring information system, TPDR – territory planning documents register). After 2014, the planning legislation was gradually modified when taking into account the spatial planning practice. The provisions of the new spatial planning system have been introduced. Since 2018 till now a new national spatial plan (LRBP) is being prepared, thus reflecting on the next version

of spatial planning system and planning instruments (e.g., general plan (GP) and strategic planning) in Lithuania.

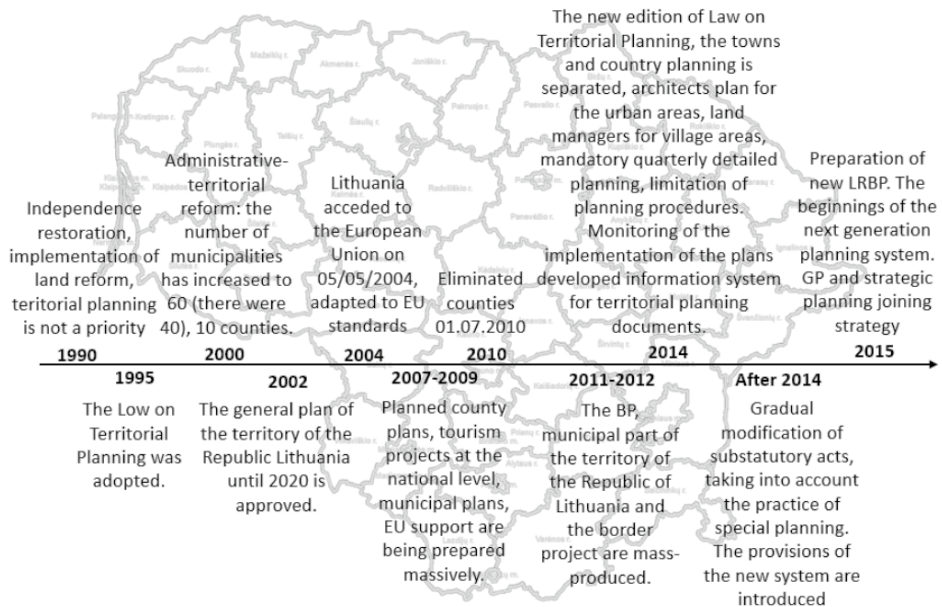


Figure 3: The evolution of spatial planning in Lithuania.

4. Policy, planning styles and tools

In Latvia, all three planning levels have strategies. Since the administrative-territorial reform (2009), physical planning with legally binding parts of the local government plan has been practiced. Statutory planning exists only at the local governmental (municipal) level. Thus, local government spatial plan (comprehensive plan), local plan, and detailed plan are elaborated. Additionally, the planning documents at the local level are concerned with the sustainable development strategy and development program. National and regional levels have guiding development strategies. The changes in institutional settings and planning instruments step-by-step ensured qualitative improvement of spatial planning practice since 2013, thus limiting differences in the design of local development plans among municipalities and promoting the application of GIS solutions for planning.

In Estonia, since adopting the Planning and Building Act (1995), there are four levels of spatial plans: national spatial plan, county-wide spatial plan, comprehensive plan, detailed spatial plan. Two last is at the local government level, and in addition to these plans, there has been the strategic plan (development plan) introduced for providing planned measures and financial resources at the municipal level. The national spatial plan has been more of a strategy. The county plan has been between the strategy and land use planning; it is still the central governmental level. Two lower levels that are under the responsibility of local government define mostly the planned land use. The planning logic is that the plan of the higher

level gives the directions, and lower levels specify these directions. At the same time, the plan of the lower level provides possibilities to make changes in the plan of a higher level. The responsible ministries for spatial planning at the central governmental level changed several times. The planning system is gradually being improved, mainly because of the economic crisis. The analysis of the spatial system initiated in 2010 finalized with the renewed planning law in 2015. The consolidation of the local governments since 2017 should improve the planning capability at the municipality level.

In Lithuania, the reflections of the implementation of land reform on spatial planning have emerged from the first planning law in 1995. Strategic and spatial (territorial) planning have been separated from each other. Planning took place at three levels: national, regional, and municipal. Strategic plans included planning measures and financial resources. Spatial planning documents were arranged for the particular territory. The plans of different levels had to complement and detail each other from the local to the national level. The sophisticated plan may change the procedure to a shorter time, simpler and more understandable. The public participation is a part of the planning process. The spatial planning system has gradually been improved and serious changes took place in 2014, with the entry into force of the new version of the planning law. Several information systems are being developed that serve the process of preparing the planning documents (e.g., TPDRIS, TPSIS, TPDR). The monitoring of planning documents becomes mandatory; the specific indicators are improved. Planning levels had changed state, municipal and locality. The level of the region is treated as part of the state territory. The separate regional level does not exist anymore. Thematical maps are made on the GIS platform. Statutory acts were gradually modified, like technical regulation and recommendation, taking into account the practice of spatial planning. The regulations of the new planning system have been introduced. In 2018, the preparation of a new national Lithuanian territory general plan (LRGP) started, reflecting the next generation of planning system. General plan (GP) and strategic plan connect into joining strategy, developed like comprehensive integrated and orientated to land-use. In all levels, the drawings of the main plan is a land-use plan. The increase of GP status will have some influence on a political decision. All ministries of the Lithuanian government are participating in its preparation. The national level has guiding development strategy and development programs.

5. Conclusions

After the restoration of independence (since 1990), the land reformation policies dominated over spatial planning policies in all Baltic countries. In urban areas, the continuation of a general blueprint planning functions was observed as well. However, the scope of spatial planning broadened gradually from physical planning towards more institutional design, and the techniques evolved from just land-use zoning to more dynamic and process-oriented, including public participation and cross-sectoral debates. The planning systems may be seen as rather heterogeneous; however, the planning practices involve a lot of similarities in the discourse of the Baltic planning experience. Thus, it must be stated that

the spatial planning developed decentralised, integrated and comprehensive but still land-use oriented with the tendency of centralisation for recognising the priorities of national and regional scales. Public activity and participation raised slowly even systematically, cooperation among stakeholders and capabilities of the local governments need improvements.

The scope and main objectives of changes are mainly the same in all Baltic countries, and the main driving forces causing changes differ basically with implementation periods and outcomes of administrative-territorial reforms. Reforms, economic crisis, and restructuring as well as institutional arrangements, challenges of globalization and 'Europeanization' of spatial planning agendas, basically influenced changes into planning systems and practices. The tendency of the last couple of years shows a shift towards the qualitative improvement of planning design and planning practices. The application of GIS solutions and databases supports a spatial planning process and monitoring. A monitoring system and information technology database become the main instruments for spatial planning. The introduction of more strategic planning approach becomes visible, and some initiatives towards informal (complementary) planning mode and related tools could be of great significance. Public participation and publicity in spatial planning processes become essential elements concerning the preparation of planning tools. It is the most significant change in planning practice comparing with the initial post-soviet period. Nowadays, it is possible to find maps of different scales on the web and to use them for no limited needs.

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Comparative Analysis of Spatial Planning-Implementation Practices and Territorial Governance

An outcome of the case studies in selected countries

Abstract

Over the past decades, significant changes in spatial planning policies and territorial governance have been observed across Europe. The analysis of comparative perspectives helps to understand the evolved practices and to use its outcome for cross fertilisation and shaping of spatial and territorial development policies. The study is concerned with an outcome of case studies regarding spatial planning-implementation practices and territorial governance in selected countries. The case studies within developed framework emphasises on (1) territorial governance issues and possible arrangements, (2) applied procedures, modes, planning tools and techniques, and (3) reasonable qualitative assessment of the planning environment and implementation of plans. A systematic, logical and comparative analysis of the outcome of consolidated evidence gathering concerning the implementation of spatial development plans and institutional performance is used for the research. The key results of the research show meaningful movements between command/control and consensus-oriented governances, shifts from just formal institutionalised planning towards complementing informal planning arrangements as well as movements between supply-led and demand-led planning in differently experienced countries.

1. Introduction

Spatial planning is a continuous process, however, the plans are elaborated and accepted considering foreseeable its implementation perspective (Auziņš 2017). Approaches to spatial planning vary considerably throughout the world, reflecting historical and cultural developments as well as geographical and economic conditions (Williamson et al 2010: 176–177). Recently conducted comparative studies on spatial planning systems and practices in Europe show considerable dynamic changes concerning the evolution of spatial planning and territorial governance over past decades (Reimer et al 2014; Auziņš 2018). The studies about European comparative perspectives (e.g. ESPON EGTC 2020: COMPASS, papers of AESOP 2017; 2018) demonstrate focus more on spatial planning systems than practices and more general scales than local planning experience (Auziņš 2019).

Research about spatial planning practice relates to exploring different planning cultures. A planning culture reflects on “an equivalent to the values, attitudes, mind-sets and routines

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shared by those taking part in planning” (Fürst 2009). The comparative study of European scope accentuated the relation between spatial planning systems and significant activities that might be seen as territorial governance (ESPON 2018). In this light, territorial governance comprises the system of assisting institutions, which reflects cooperation among involved stakeholders and coordination of essential actions in land management. The actions are concerned foremost with decision-making that has an impact on the quality of places and their possible development. Public authorities are empowered to monitor and control territorial development. Prepared plans show what types of development would be permitted and where. The system of institutions determines and provides the spatial organisation of socio-economic functions in particular administrative context and scale (national, regional or local).

Need to implement the “place-based approach” also has been emphasised in European applied research (EC 2015). The place-based development policy was conceptualised in an independent report of Barca and defined as “a long-term development strategy whose objective is to reduce persistent inefficiency and inequality in specific places, ..., designed and implemented by eliciting and aggregating local preferences and knowledge through participatory political institutions, and by establishing linkages with other places ...”. The key finding of the applied study pointed out “valuing and reviving territorial identity” as a unique asset and starting point of every place-based initiative. It was also concluded in the study that there is a clear need of changing the mindset of decision-makers, moving from quite administrative and compliance-driven attitude to a more result-oriented and entrepreneurial one in governing territories (EC 2015:3–4). When following a “pragmatist approach” in planning (Getimis 2012), such elements as social setting, planning process and planning environment should be included in planning agenda and key research questions formulated properly.

The main outcome of the ESPON COMPASS study (ESPON 2018) has been published and discussed during conferences of recent years organised by the Association of European Schools of Planning (AESOP). Evidence-based knowledge gained at European level about spatial planning and territorial governance showed a highly differential landscape in terms of terminology, concepts, tools and practices. Therefore, previously done research focussed on how the most relevant outcome of European research may initiate a reasonable in-depth study of concrete planning practices and substantiate an effective planning approach (Auziņš 2019). Synthesising from the key study outcome gathered during analytical research, the main characteristics of planning culture approach have been taken as a reference to develop the methodology for case studies and to create upon key research questions to be explored. *The paper* aims to present and discuss the main outcome of comprehensive evidence gathering (CEG) that has been achieved through empirical research on spatial planning-implementation practices and territorial governance in selected countries.

The framework and methodology for carrying out case studies were proposed and key research questions accordingly formulated in the previous study (Auziņš 2019). CEG within developed framework (Auziņš 2019:8–9) emphasises on three key questions: (1) Who and

under what circumstances organise planning and are involved in it? (2) What are the peculiarities of the planning process and how the planning practice is supported and improved? (3) What is the environment and how well the planning absorbs the intensions and encourages of the actors whose preferences and actions may influence future outcomes? Thus, the first question is concerned more with territorial governance issues and possible arrangements, the second – with procedures, modes, planning tools and techniques, and third – with possible qualitative assessment of the planning and implementation of plans.

2. Methodology

In general, CEG was aimed, based on sufficient participation and targeted challenges and opportunities, to introduce a values-led planning (VLP) approach into practice when linking scientific achievements with the most feasible practical solutions. CEG was accomplished due to case studies in selected European countries. It involves the discussions and essential parts of semi-structured interviews of distinguished experts. CEG complements to the analytical research which in overall forms the basis for methodology development and introduction of a VLP approach for sustainable land use and development. It is based on qualitative research technique mainly for identification of barriers, bottlenecks, good planning-implementation practices, values and preferences, governance and collaboration forms, etc. In this paper, only *the key results essential for VLP approach are presented*. Detailed outcome of the case studies is presented and documented in the unpublished project materials (ERAF No1.1.1.2/VIAA/1/16/161). “The resume of comparative case studies and programme for methodology development” is concerned with a content of the project milestone of WP2, including: “Participant information sheet” (5 pp.), “Draft schedule for semi-structured interview” (3 pp.), CEG (68 pp.), and “Comparative perspectives of spatial planning practices”.

Countries and partner institutions: Criteria and rationale

Countries were selected if considering the peculiarities of previous experience (historical evolution, traditions, institutions, and development level) which preferably represented all spectrum of ‘ideal types’ of spatial planning systems (CEC 1997). Those are affected by recent changes in territorial governance and spatial planning practices (discourses and traditions) which are relevant to the research context (See in Table 1). Institutions were selected primarily from the network of European Academy of Land Use and Development (EALD). The country visits were organised from November 2018 to October 2019 in the way of preliminary informing and discussing with the stuff of the hosting institution on specific agenda and expert(s) to be involved for the research. The invited experts were: professional planners; representatives from local authorities; members of academic and scientific stuff. It was assumed that they are competent enough to deliver a knowledge that represents the dominating opinion of local societies (stakeholders) in some extent. Thus, they may give some discursive influence on research, as they largely are in charge of relevant spatial planning and land use management processes.

Table 1: Countries (in the order of case study), partner institutions and rationale

Country	Institution and participants	Rationale
Belgium (BE)	Department of Real Estate and Applied Geomatics, Faculty of Science and Technology, University College Ghent (HOGENT); two academicians/researchers for discussions and three experts in planning, public development and project management for interviews	Land-use management planning tradition with distinct planning approaches in Flanders; specific interest on changes and continuity of Flanders spatial planning system from land-use planning to structural planning and back; case study in Flanders region, the city of Ghent
Sweden (SE)	Department of Real Estate Planning and Land Law, KTH Royal Institute of Technology (KTH); three academicians/researchers for discussions and three experts in local governance, planning and land law for interviews	Represents dominating Scandinavian spatial planning system and land management domain that in general fits more with the system developed in Latvia and Baltic perspective in planning; case study in Stockholm region, the city of Stockholm
Switzerland (CH)	Lucerne University of Applied Sciences and Arts (HSLU), different departments/institutes represented; three academicians/researchers for discussions and two experts in planning and project management for interviews	Non-EU member state with a tradition of active public participation through referendums; collaborative and negotiated procedures; specific focus on integration of infrastructure objects with valuable landscapes; a case study in the canton of Lucerne, the city of Lucerne
Italy (IT)	Department of Civil, Environmental, Architectural Engineering and Mathematics, Università degli Studi di Brescia (UNIBS); two academicians/researchers for discussions and two experts in planning and urban regeneration for interviews	Urbanism tradition with geographical dimension in the south of Europe where a strong architectural flavour and concern with urban design, townscape and building control through rigid zoning and codes exist; specific interest on urban planning and control techniques and integration of participatory projects into urban environment; a case study in the city of Brescia and nearby peri-urban fringe

Germany (DE)	Department of Civil, Geo and Environmental Engineering, Chair of Land Management, Technical University of Munich (TUM); two academicians/researchers for discussions and two experts/dipl. engineers in planning, architecture and urban development for interviews	Recognised mixt regional-economic and comprehensive/integrated tradition, with geographical dimension in powerful governance area of Germany in Bavaria; specific interest related to urban-rural linkages and public organisation for community development; case study in Bavaria, the city of Munich and its nearest agglomeration
Austria (AT)	Department of Landscape, Spatial and Infrastructure Sciences (TUV), Institute of Surveying, Remote Sensing and Land Information, University of Natural Resources and Life Sciences (BOKU); three academicians/researchers for discussions and three experts in land administration, infrastructure planning and law for interviews	Comprehensive integrated approach and planning tradition under a federal system with regional governments exist; specific interest related to the preservation of valuable landscapes and limitations of urban development, i.e. in peri-urban context and collaborative planning experience for community management; case study in the city of Vienna and nearby peri-urban areas
Latvia (LV)	Planning institutions (central governmental and local) with participation of Latvian Association of Spatial Planners (NGO), a developer, urban planning enterprise Grupa 93, Ltd., a professional planner at the local municipality, as well as other involved participants as key stakeholders for broader picture to be presented	Comprehensive/integrated, land-use oriented tradition developed comparatively recently, where post-soviet attitudes exist; no remarkable differences in evolution since the 1990s with two other Baltic states; better availability and easier involvement of local key stakeholders into debates and getting feedback; case study in the city of Riga and neighbouring local municipality

Discussions and interviews

Discussions were proposed according to mutually agreed and specific agendas but, in general, fitted under the topic “Continuity and key changes of planning systems and practices: expertise, stakeholders’ participation and tools in planning” and included the exchange of ideas from analytical research and possible further collaborative studies due to common research interests. Interviews were semi-structured face to face for identification of sample cases: (1) to address the objectives of empirical research and gather evidence from competent experts in selected planning practices; and (2) to discuss and deliberate new knowledge about

possibilities to improve territorial governance, planning practice and land use management. The results of the evaluation, which are presented in subsections 3.1–3.7, have been agreed with the interviewed experts. They basically reflect the issues in respective case study areas (see in Table 1). However, they can be also generalised to some extent as the dynamic changes were observed during last decades and the experts were able to explain their transfer to larger areas, e.g. a region, whole country.

3. Results and discussion

Exploring the continuity and dynamic changes in spatial planning practices and territorial governance due to empirical research (case studies) in respective areas, some main results are outlined. The outcome of the studies allowed to measure and assess: (1) governance, (2) planning-implementation relationship and (3) planning environment and sharing values. Accordingly, the dynamic shift (direction and intensity) between (1) the models of governance, (2) the planning modes and (3) the planning styles from approximate starting point has been determined if observing the evolution of spatial planning during last several decades in respective area.

3.1 The case of Flanders (Belgium)

Political and territorial agendas are two sides of the same coin which have influenced shifts in planning, e.g. land use planning, spatial structure planning and planning permit system. Protection of private property, priority to local economic development, project-oriented urbanistic approach reflected spatial planning agenda to experiment with planning tools. Spatial structure plans changed to increase local economic development possibilities. Since spatial policy plan and new political influence in 2014 the priority is to diminish the rate of land consumption for urban settlements and development. Strict limitations to land development lead to specific instruments to be elaborated, assessed and discussed before implemented. Changes in discourses trigger institutional settings and influence implementation of spatial plans and provision of their statutory binding parts. Shift towards a network society promotes initiatives of local stakeholders to be considered for discussions and decision-making. They are represented through planning organizations and competent opinions about planning issues. Balancing between values as some kind of intrinsic characteristic of planning reflects on the planning domain. Participatory planning where a planner acts more as moderator, but actual planners are community members is towards neighbourhood/local community planning. The idea to reach consensus is the one behind a planning practice to think about and promote. The continuity and periodical changes of Flemish spatial planning and territorial governance show that the involvement of civil society in planning has been quite far from co-production. It is expected that the involvement of citizen groups in decision making will diminish further problem issues in court cases.

The results of the evaluation in Flanders

- (1) Slight movement towards the command/control governance model can be identified, however, a public sector sees beneficial to promote participation and invol-

vement of citizens into the planning process and decision-making. Bottom-up projects are of accumulative importance, particularly in urban areas. Municipalities support more consensus in decision-making as they are and want to be closer to their civil society as the most important local stakeholders.

- (2) Significant shift towards complementing informal planning arrangements can be recognised and dominating planning mode characterised largely as project-based particularly in cities, towns and villages. Public-led planning contributes more to the countryside.
- (3) Gradual movement from a supply-led planning style towards demand-led planning can be observed. Supply-led planning has been stopped as residential areas designed in the land use plans have not broadly been implemented, however, demand-led planning style dominates significantly since 2010.

3.2 The case of Stockholm (Sweden)

Spatial planning at the local government level also deals with issues of a more regional scope, such as urban-rural interactions and infrastructure provision, e.g. city region as agglomerative creation, which calls for assessment in peri-urban context as well. In spite of a strong local spatial planning position and municipal autonomy, the state can make an order to consider national and regional interests also by involving several municipalities, if it is necessary. If the planning is to a large degree equated with municipal planning, then it provides necessary arguments towards supporting a bottom-up approach in spatial planning and community development as well as an involvement of other stakeholders that promotes sustainability in the planning-implementation process. The changing legislation influenced a decision-making process in the way the planners ruled decisions authoritatively in the 1960s–70s, but they respected more public participation and movement towards participatory decisions since 1987. Stakeholders' engagement in the planning process rises together with ambitions, which should be taken as an advantage to promote a movement towards consensus-oriented model. Formal planning is consistent with the system and fundamental, which makes it difficult to measure between formal and informal planning modes. Moreover, the boundary between both modes is not clear while they depend on created institutions and focus on the planning process. Strong tradition of community culture in neighbourhoods, which supports place-based initiatives and involvement of local stakeholders in different local activities, facilitates cooperation and commitment of interested participants. Municipalities are capable to take more initiatives and responsibilities for considering a sustainability aspect and public benefits in investment/development projects as well as to control developing amount and criteria of resource allocation since the public sector owns the land. The planning-implementation relationship is assessed as strong, without considering a dominance of formal or informal planning mode, while the spatial planning supports a development-driven approach. During last decades as a part of liberalisation of planning agenda it was observed that the proactive and reactive planning approaches, depending on the kind of ideas are promoted and supported in an area, lead to more flexible planning tools.

The results of the evaluation in Sweden

- (1) Slight movement towards consensus-oriented governance model can be identified since a public sector sees beneficial to promote participation and involvement of citizens into the planning process and decision-making. A VLP relates to the basic idea of spatial development planning in Sweden. The support for more consensus in decision-making and the extent to which the planners consider the opinions of local stakeholders and citizens may influence the decisions depends a lot on ambition to build a trust.
- (2) Significant shift from highly formalised planning over a longer period towards complementing informal planning arrangements can be recognised when allocating not only developers' interests through development-driven approach but also the national interests, applying methodologies and standards to comply with sustainability and energy efficiency priorities.
- (3) Significant movement from the supply-led planning style towards demand-led planning can be observed. Supply-led planning supports affordable housing where the market does not provide it, thus the allocation of priority in residential territories promotes the development of housing rental market, however, demand-led planning style dominates in spatial planning practice as its domain may be seen in development-driven approach.

3.3 The case of Lucerne (Switzerland)

After preparation of a local land-use plan by the municipality, it has to be approved by the canton, however, in some cantons, it may also need to be confirmed by a public referendum in the respective municipality. This demonstrates a relation between “top-down” and “bottom-up” approaches in decision-making and involvement of stakeholders in public participation procedures. Beyond the introduced formal planning tools, which are defined in the cantonal legislation, there is a space for elaboration of informal planning instruments as a large variety of other plans exist. Besides those which are strategic at all governance levels and of sectoral/thematic character, they may cover issues such as economic development, infrastructure improvement and environmental protection. Some national legislation has an explicit spatial dimension, for instance, laws are creating an inventory of heritage sites or determining specific restriction areas, which creates a potential for informal institutions and tools to be introduced. If at the national level there is an initiative to promote the development of an effective regional governance system within the functional areas, the current agglomeration policy should be reconsidered and the contribution towards the development, improvement and monitoring of effective forms of cooperation between the actors on the local and regional/cantonal level made. Emphasising the spatial development issues in spatial planning-implementation relation, it is reasonable to introduce a requirement for planning tools to be the subject of a sustainable development assessment before they are finalised and approved. To support this, a programme of research and promulgation of what constitutes sustainable development from a spatial planning perspective would need to be established.

The results of the evaluation in Switzerland

- (1) Slight movement towards consensus-oriented governance model can be identified, although, since over decades ago, the starting point was already more in the direction far from the command-control model. The instruments to control land use have been discussed enough and introduced into land-use management practice, as the society has always been quite opened and active and the professional planners evolved as executives of the planning authority and are more like consultants/negotiators.
- (2) Gradual shift from relatively formalised planning towards more complementing and effective informal planning arrangements can be recognised, even there has always been a tradition to provide informal planning instruments in Switzerland. The informal planning mode becomes increasingly important with the interest to restrict new development areas and to complement formal planning tools after 2014, as well as with the support of regional planning instruments.
- (3) Significant shift from initially supply-led planning over a longer period towards demand-led planning style can be observed, as demand-driven way is closely related to the informal planning arrangements. Based on demand-driven planning style, spatial planning in the country succeeds in achieving the principles such as sustainability, equal opportunities, public participation, transparency, integrated approach and coherence. The community involvement and activity in planning is very important and quite natural, and a social value of planning is relatively high.

3.4 The case of Brescia (Italy)

The concept of spatial planning as a public function of local administration is recognized in Italian jurisdiction and planning experience. Innovations have been seen with the introduction of more flexible instruments and shared decision-making processes based on the direct involvement of private stakeholders. The culture and its milestone re-emerged in the new phase of participatory processes, strategic urban planning and interregional cooperation for spatial planning since the 2000s. In general, the shift from “urban planning” to “spatial planning” concept as well as growing awareness of strategic spatial planning can be highlighted. Regions (provinces in Italy) have been able to release regional laws that are integrated inside the national frame. In implementing the urban planning foresight, the national planning law provides for the determination of minimum quantities of public spaces or public use, which must be reserved in the general master plan and the implementing plans. The shift of the main focus from the plan to the planning process has been observed. Thus, a move from the negotiation of the plan to the negotiation plan, i.e. a plan that, starting from the design of the public city, identifies and conforms the transformations of the private soils if and as compatible and congruent with said design. In this perspective, the plan promotes and directs agreements and negotiations with private stakeholders and is not simply their result. Some territorial platforms for cross-border institutional cooperation have been

created, thus various institutions could implement the instruments for new urban interventions, with the support of planners, academia and municipalities. The public-private partnerships have been established for strategic spatial planning processes, i.e. local administrations, NGOs, regional stakeholders, developers and others.

The results of the evaluation in Italy

- (1) Significant shift from initially command/control governance model over last decade towards consensus-oriented governance can be observed, however, it would have also some negative consequences (list of individual wishes) without introducing a strategic/community initiative-based approach. This approach leads to the development of strategies before planning, thus emphasising on accepted strategies helps balancing of interests due to participatory planning procedures.
- (2) Significant shift from just formal spatial planning over past two decades towards complementing informal planning mode can be recognised with strategic planning to support informal institutions, i.e. councils as voluntary system of participation, to manage neighbourhoods. This demonstrates a strategic, based on community initiatives approach in organising planning process, making desired territorial arrangements and complementing formal plans afterwards.
- (3) Gradual movement towards a supply-led planning style can be observed due to the implementation of local governmental strategies, however, the assessment of this very economic approach to planning during the last decades seems very difficult. Both planning styles appeared when the plans with expanding urban areas were carried out in the past, however, today's priority for urban regeneration and restriction of urban sprawl in peri-rural fringe requires adoption of a strategy as a prerequisite to following possible arrangements into the plan.

3.5 The case of Bavaria (Germany)

Modern territorial governance can be identified when combining both hard and soft modes of control of spatial planning and development. Accordingly, the principle is employed to provide decision-making – soft forms of communication and consensus-building as much as possible, hard forms of binding goals and hierarchical control as much as necessary. The structural weakness (regional planning and sectoral policies) of the traditional (formal) spatial planning makes informal planning processes seem particularly attractive. By creating experimental forms of institutions and planning activities, the effectiveness and sufficiency of formal planning tools and the allocation of responsibilities between regional and local governmental levels can be tested. Informal types of inter-municipal cooperation may help not only to solve conflicting situations, but also reduce tension to structural transformations of the planning system and to rescaling the responsibilities between planning levels, especially, if the spatial planning has become more strategic and more communicative and networked. The traditional spatial planning (*Raumordnung*) practice tend to step-by-step move towards a more active spatial management. With the improvement of communication

between governances in both urban and rural areas and the exchange of knowledge and sharing the experience, the spatial planning may contribute to innovation and increased productivity through mutually beneficial cooperation. Within the context of land-use planning, collaborative governance has been applied in protected area management, forest management, natural resources management, public-private partnerships, open-spaces protection, watershed management, climate change and flood risk management, to mention a few. It is popularly considered as a part of participatory land-use planning. The degree of public involvement in decision-making depends on the thematic that someone wants to discuss, however, the degree to which the public opinion is considered in decision-making depends on organisational tools, e.g. conceptualised frameworks, information channels, platforms. The applied tools to organise public involvement should ensure that the public opinion is considered as much as possible at the end when the final official decision is taken. The informal voting (referendum) is recognised as a tool for involvement of the people directly in some decision-making process before an official/legitim (formal) decision. This demonstrates a pragmatic way to influence possible informal initiatives and gives legitimacy to political bodies as official/elected representatives of a local society. The established forum of professionals, which is in between the civil society and authorities explain commitments of powerful groups of professionals (a group commitment vs. a personal commitment) and emphasises a professionalism as a public value that should be estimated and promoted. Inter-municipal cooperation in the way of developing informal contact between municipalities may solve the problems, which are related to several administrative territories, e.g. mobility, local (selfish) interests of specific municipality, common infrastructure, informal planning-based initiatives to develop or protect certain areas, regional housing preferences, without establishing regional governance institutions and planning tools.

The results of the evaluation in Germany

- (1) Slightly shift from initially command/control governance model over last decades towards consensus-oriented governance can be observed, however, although the scheme changed more to citizen participation (it was introduced a formal participation already since the 1970s), even now, the people are informed about a plan and have a possibility to say something. Thus, they can be heard by decision-makers, but not obligatory involved in a decision-making.
- (2) Significant shift from quite formal spatial planning over past decades towards complementing informal planning mode can be recognised, however, the informal planning mode is good for discussions but often bad for practical implementation. Thus, some direction towards formal planning and formal institutions could be of interest, if the benefits from informal planning do not satisfy enough stakeholders.
- (3) Shift between supply-led planning and demand-led planning is not easy to determine, especially, if the area of Munich is different from others in this respect. Supply-led planning occurs since local planning authorities want to make forecasts to recognise future demands, but those are not based on initiatives. The rearrangement

of land use, e.g. area regeneration for specific activity based on proposed alternatives, demonstrates a demand-led planning. In most places of Munich, the orientation is towards a supply-led planning, however, in rural areas, dominating style is demand-oriented. The reason for this can be found in not so professional planning staff at local municipal administration there, so they are more flexible to accept proposed ideas.

3.6 The case of Vienna (Austria)

As the formal mechanisms are not always sufficient and the practice of involving civil society is gaining ground, cooperative and informal planning processes are becoming more important. In this context, innovative and cooperative solutions are being developed to supplement sovereign regulatory planning. Moving towards more regulation and greater differentiation is identified as an overall trend. In practice, this also means that the implementation and application of planning tools will become more difficult and that expert knowledge is of enormous importance. The creation of regional governance models and cooperation platform for urban regions have been proposed to make effective and efficient communication and coordination processes in the multi-level system, i.e. overcoming borders between federal states and between cities and their catchment areas. The approach to regional policy is traditionally based on cooperation and coordination. The significance of governance-based informal planning processes as a supplement to the instruments of spatial planning is growing because of challenges for further spatial development resulting from the many different trends and tendencies. Informal procedures, e.g. negotiation processes, consensus decisions, persuasion, are not usually regulated by formal procedural rules under law but are organised for specific situations or actors. They are gaining ground over sovereign instruments, with aspects such as flat hierarchies, flexibility, integrated planning flows and informality being features that may contradict traditional administrative structures. Cooperative planning forms are supplementing the normative decision-making structures. The involvement of several actors in the planning process is accompanied by the growing significance of informal planning instruments. As the respective actors often have divergent interests, mediation between individual interests and efforts to help achieve consensus is growing in importance. Guidebook on participation (practical manual) – Developing the City Together compiles the methods and measures needed for the participation processes and can be used to face topical challenges, e.g. sustainable land use in peri-urban fringe and settlement development in agglomerations. Municipalities cooperate a lot at an informal level, thus many activities are not stipulated in the law, they can be initiated by the municipal council. In more concrete projects the project developer may choose this approach. The strategies for involving people in public participation should be deliberative, well-considered because sometimes people are willing to participate and are active when it is discussed, but when it comes to real implementation, then they are often against and passive. Therefore, public participation in decision-making and consideration of public opinion when deciding are different issues, which needs reasonable conceptualisation behind.

The results of the evaluation in Austria

- (1) Quite gradual shift from initially command/control governance model over two last decades towards consensus-oriented governance can be observed, however, the governance in terms of decision-making differs among federal provinces and the formal procedures are established for planning activities/process. Planning bodies have room for discretion, within which they may evaluate the different objectives using the findings from basic research to arrive at qualified and well-founded decisions.
- (2) Gradual shift from relatively formalised planning towards more complementing and effective informal planning arrangements can be recognised, thus in the 1990s a formal planning dominated over informal planning, but twenty years later till today, the proportion in dominating modes is much more to informal. Today, comprehensive plans provide more general information than previously, more strategic view in planning can be recognised, and, in comparison, more informal planning tools than in Switzerland have been introduced.
- (3) Gradual, step by step shift from supply-led planning style towards demand-led planning can be observed. The planning style when stakeholders initiate the planning becomes more and more topical in the urban environment, especially, in larger cities. In rural areas, the competition through the tender of development proposals is not the main driver in planning.

3.7 The case of Riga (Latvia)

Informal planning tools play a more and more important role in supporting spatial planning practice. The experience of employing a “deliberative planning” approach can be identified, where the people from different disciplines are involved for creating and providing new ideas. Sometimes this appears in quite exaggerated (sometimes extreme or aggressive) way but rises the activity and the awareness of topical problems and challenges. Spatial planners represent the multidisciplinary character of planning practice, i.e. architects, geographers, economists, social sciences, environmentalist, etc. In general, the society of spatial planners conform to the characteristics of ‘pragmatic style’. The profession of planners evolved from a single representative at the place (a local government – municipality) towards more a consultant (since 2005). However, the persons who are responsible at the local authority (stuff of the municipality) often represent more controlling and monitoring functions due to formal institutional regulatory framework. “Territorial communities” and their activities sometimes are seen as platforms for active public participation. Mainly by expert consultancy the planners should support these activities and demonstrate a professional and constructive enough attitude. Everyone has rights to participate, but the knowledge has to be respected during discussions at the meetings. The identified and assessed values are subject to such respect but should be ascertained and preferred from possible alternatives. Previous spatial planning practice in Latvia shows that the domain of planning involves the perspective of the creation of life in the future. However, at the same time, it should be admitted that a ‘normative planning practice’ is the product of the system and is present in many places.

The plan of landscapes should be one of the thematical plans due to the integration process at the local municipal level. It is also suggested that nature protection should not be precepted as limiting factor but as a development factor. The process of previously mentioned integration demonstrates the complementary of informal planning to formal planning. Latvian spatial planning practice often shows quite a big gap between planned (reserved) areas and properly to plans implemented (really changed/developed) areas – even in public space. Thus, the planning-implementation linkage does not meet credibility and reliability principles. The planning practice should be improved in the way it provides not only the involvement and discussions among stakeholders, but also ensures that commonly created efforts significantly are considered at final decision-making.

The results of the evaluation in Latvia

- (1) Slightly shift from initially quite command/control governance model over last decades towards democratic decision-making process and consensus-oriented governance can be observed, however, the opinions among experts vary and some distinction should be made among the municipalities (more capable/weaker) and areas (urban/rural). In general, the territorial governance still is 50/50, because the binding decisions do not include the opinion of the majority of stakeholders, they are still quite passive to contribute and authorities quite passive to involve.
- (2) The informal planning is increasing, however, there is still a quite big focus on formal planning instruments. The initiatives of informal planning can be considered for funding and approval if they meet formal institutions. Before 2004 the informal planning tools were developed when the formal planning was not so strong. Then gradually shift towards more informal planning can be identified after 2004 through elaboration of thematical, research-based plans. If considering above mentioned, over the last decades the slight shift towards formal planning can be observed, however, at the same time, the number of informal planning tools has been gradually grown.
- (3) Shifts between supply-led planning and demand-led planning can be recognised. In this respect, the difference between urban and rural areas should be emphasised. In cities a shift towards supply-led planning but in rural areas slightly shift towards demand-led planning style can be seen, however, this still is questionable as not so clearly expressible. In general, a slight shift from initially quite supply-led planning towards a demand-led planning style through 'buy-sell' approach may be ascertained. Today, those are balanced in some way, if not going in details, however, also after 2013, the demand is driving the planning process, but not that chaotic as before this date.

4. Conclusion

Dynamic changes in governance models: A significant shift from initially command/control towards consensus-oriented governance in Italy; a slightly/gradual shift from initially quite command/control towards consensus-oriented governance in Germany, Austria and Latvia;

a slightly movement towards consensus-oriented governance in Sweden and Switzerland; a slightly movement towards command/control governance in Flanders/Belgium. Overall, in all studied spatial planning practices, a *movement towards consensus-oriented governance* model has been recognised, except the case of Flanders, where the priority is to diminish the rate of land consumption for urban settlements and further development. However, the public sector in Flanders region sees beneficial to promote public participation and involvement of civil society into the planning process and decision-making.

Dynamic changes in planning-implementation relationship: a significant shift towards complementing informal planning in Flanders/Belgium; a significant shift from formalised planning towards complementing informal planning in Sweden, Italy and Germany; a gradual shift from relatively formalised planning mode towards more complementing and effective informal planning in Switzerland and Austria; a slightly shift towards formal planning, however, the informal planning is increasing in Latvia. Overall, in all studied spatial planning practices, a *shift towards complementing informal planning mode* has been recognised, except the case of Latvia, where there is still quite a big focus on formal planning instruments. However, the informal/complementary planning is increasing and the number of informal planning tools is gradually growing also in Latvia.

Planning environment and sharing values: a significant shift from dominating supply-led planning style towards demand-led planning in Sweden and Switzerland; a gradual/slightly shift from quite supply-led planning towards demand-led planning in Flanders/Belgium, Austria and Latvia; a shift between both planning styles is recognised but clearly cannot be determined in Germany; a gradual movement towards a supply-led planning style in Italy. Overall, in all studied spatial planning practices, a *shift from initially dominating supply-led planning style towards demand-led planning* has been recognised, except the case of Italy, where a gradual movement towards a supply-led planning style can be observed due to the implementation of local governmental strategies. However, the assessment of this rather economic approach to planning seems difficult. This shift is not easy to determine also in Germany, where the orientation is towards a supply-led planning in urban areas but a demand-led planning style dominates in rural areas.

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Housing Redevelopment in Eastern Germany and Estonia – Comparison of Tools for Local Governments in Shrinking Areas

Abstract

A lot of European countries are facing regional shrinking problems. The aim of this paper is to contribute to the management of this problem discussing different housing redevelopment tools for local governments in shrinking areas in Eastern Germany and Estonia.

The scientific method is a comparative case study in Valga (Estonia) and municipalities in Eastern Germany.

While the population development and the basic strategies of redevelopment are similar in Eastern Germany and Valga, the awareness of this problem on the national level is different.

The discrepancy of measures of urban redevelopment is influenced by different levels of real estate prices and financial support of the public sector.

1. Introduction

After the collapse of the Soviet Union in the early 1990s Eastern Germany as well as the Baltic countries went through radical structural changes in administration, economy and politics. A lot of municipalities had to face out-migration of big parts of population. As a result, an increasing number of urban brownfields and residential vacancies emerged.

However, even if the problem has been discussed in the scientific world for a long time, in practice most of the municipalities adhere to the paradigm of growth. It can be oftentimes observed a parallelism of new constructions, conversion, demolition or deconstruction and vacancies and parallelism of inner and outer development exists. The denial of shrinkage is especially a problem in slowly shrinking areas. There are several reasons for this behaviour. First of all, shrinking is a political unpopular topic. Secondly, shrinking is a long-term process and the space of time is much longer than the term in office of local politicians. For these reasons the politicians tend to avoid discussions of this problem. Furthermore, they fear a negative image of their municipality and in consequence a worse position in competition for immigration or investments. Another point is the widespread basic scepticism about forecasts. The first and most important step is changing minds. The awareness of the problem is the essential prerequisite to solve it (cf. Hendricks 2015).

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Both authors met in Valga in 2017 in an ERASMUS exchange to discuss the resulting challenge of urban redevelopment. The problems of Valga and municipalities in Eastern Germany seemed to be similar. This was the motivation to start a deeper investigation about similarities and differences of housing redevelopment in Estonia and Eastern Germany to give mutual impulses for the improvement of redevelopment measures. The results may be also helpful for other countries facing similar problems. Important research questions are: Is there adequate problem awareness? – Are there appropriate strategies to solve the problem? – How are the strategies influenced by national/local conditions?

The scientific method is a comparative case study. On the one hand, this method has its strength in obtaining detailed and relevant data. On the other hand, a commonly discussed disadvantage is the difficulty to generalize from a single case (Krusvenik, 2016). This paper uses Valga, a small Estonian city, to examine the complexity of housing redevelopment within shrinking Estonian cities. Valga is a strategic case due to its decades-long struggle with population loss, property disinvestment and vacancy and on-going comprehensive planning process that aims to adapt urban space to a shrinking population (first comprehensive plan in Estonia with such goal). For the comparison with Valga it will be focused on Eastern German cities because of the comparable shrinking and vacancy problem between 1990 and 2015. Furthermore, the housing redevelopment in Eastern Germany is mainly determined by programmes of urban redevelopment. This operating level has such a wide influence that the authors decided to choose a relative large region compared to Valga instead of picking a singular city in Eastern Germany. Furthermore, the mentioned problem is reduced to generalize from a single case.

2. Causes and consequences of urban shrinkage

- The phenomenon of shrinking cities has been examined by scholars from different points of views. Researchers investigate urban shrinkage for its economic (Bogataj et al. 2016) and social (Hollander and Németh 2011; Großmann et al. 2015; Ročák et al. 2016) aspects, impacts of shrinking population on land use (Kroll and Haase 2010; Chengbin and Ma 2015), and the challenges of urban governance of shrinking cities (Wiechmann 2008; Rhodes and Russo 2013). The concept of urban shrinkage was firstly described among scholars in the USA and Western Europe and only during recent years post-communist and post-soviet countries of Eastern Europe have started to study the impacts (Leetmaa et al. 2015; Pužulis and Kūle 2016; Strykiewicz and Jaroszewska 2016). Though there is no singular definition of shrinking cities, the term “shrinking city” is mainly used for a city which is losing its population and also losing its economic importance (Reckien and Martinez-Fenandez 2011; Martinez-Fernandez et al. 2012; Kotilainen et al. 2014; Eisto and Vatanen 2015; Sousa and Pinho 2015; Wiechmann and Bontje 2016).
- Existing research documents the drivers of shrinkage such as economic decline with job losses and out-migration, suburbanisation and natural population decline (Reckien and Martinez-Fenandez 2011; Martinez-Fernandez et al. 2012; Großmann et al. 2015;

Haase et al. 2016). Wiechmann and Pallagst (2012) specify shrinkage in Eastern Europe to be the result of a combination of post-socialist and post-Fordist transformation including deindustrialization, suburbanization, post-Soviet re-composition and demographics factors. Urban shrinkage results in falling property values, over-dimensioned and underused infrastructure, social problems, out-migration, and waning social life and public spaces (Sousa and Pinho 2015). Two of the most prominent symptoms of shrinkage are housing vacancies and urban brownfields (Wiechmann and Pallagst 2012; Haase et al. 2016).

- For planning professionals there is a clear need for a paradigm shift from traditional urban planning orientated towards growth to planning for shrinkage (Martinez-Fernandez et al. 2012). Shrinking is a natural part of urban development (Sousa and Pinho 2015). Residential and job growth is no longer seen as indispensable for urban areas to be economically efficient (Wiechmann and Bontje 2016). The goal of planning should be a smaller, but nevertheless a viable city (Kotilainen et al. 2015). Those right-sizing strategies require demolitions. Improvement to residential attractiveness can be achieved by physical intervention in urban space through housing demolitions and quality renovation (Camarda, Rotondo and Selicato 2015; Miota 2015; Hackworth 2016).

3. Urban shrinkage in Germany and Estonia

In this chapter some data is given concerning the population density and development in both countries to improve the understanding of the problem of shrinking areas.

Both countries border on the Baltic Sea. The distance between the capitals Berlin and Tallinn is around 1000 km.

3.1 Germany

The area of Germany (around 357,400 km²), the population (around 82.8 million) and the population density (232 inhabitants/km²) are much bigger than in Estonia. The highest number of inhabitants has North Rhine-Westphalia (17.912 million). In contrast, the Federal State Bremen has only 0.681 million inhabitants (as at 31 December 2017; Source: Statista). In Eastern Germany, the highest number of inhabitants (4.081 million) and the highest population density (221 inhabitants/km²) is noticed in Saxony. The further federal states have a much lower population density between 69 and 133 inhabitants/km². At the communal level most people live in Berlin (3.574 million; as at 31 December 2016; Source: Statista). In total, there are 80 big cities in Germany (more than 100,000 inhabitants).

The population development in Germany was very different after German reunification (cf. Fig. 1). A lot of people moved from Eastern to Western Germany searching for a job, training position or university place. This is one of the main reasons why cities like Hoyerswerda lost nearly a quarter of their population. Migration increases the development

pressure in the urban agglomerations in Western Germany because the immigrants move mostly to the economic successful regions there. In future, there will be a further diversification of development: Development pressure especially in the urban agglomerations in Western Germany, different types of shrinking regions especially in Eastern Germany (Hendricks 2013).

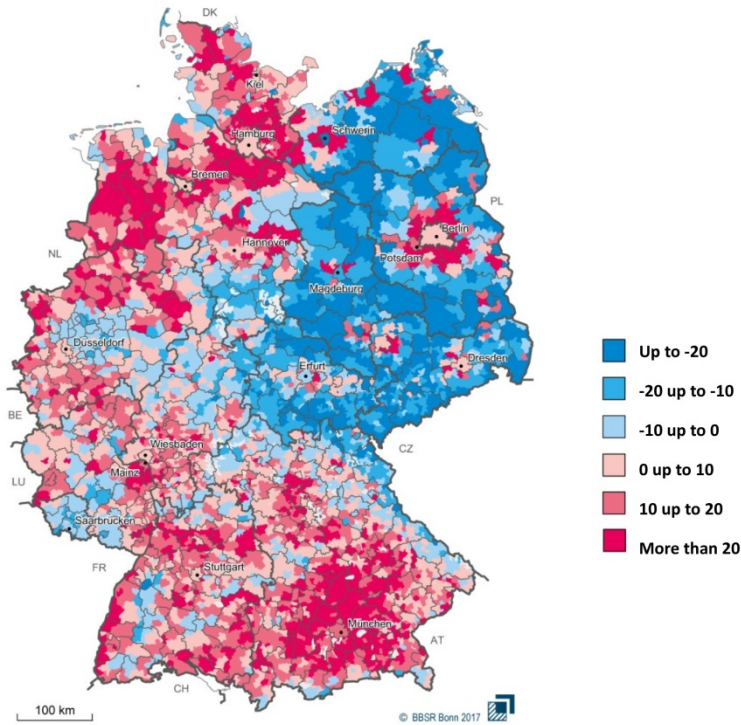


Figure 1: Population development in Germany between 1990 and 2015 in per cent, blue: shrinking areas, red: growing areas (Source: BBSR 2017).

For the comparison with Estonia it will be focused on Eastern Germany because of the comparable shrinking problem in this region despite of particular growing municipalities.

3.2 Estonia

Estonia has an area of 43,465 km². The population is 1 319 133 inhabitants (as at 1 January 2018; Source: Estonian Statistics) and the population density is 29 inhabitants/km². The biggest city is the capital Tallinn (430 805 inhabitants, as at 1 January 2018; Source: Estonian Statistics). The second biggest town Tartu has close to 100,000 inhabitants. All other municipalities have less than 100,000 inhabitants. Population is distributed unevenly, with a higher density in northern parts of the country. The location and size of Estonian towns mirror the distribution of population. Apart from the capital of Tallinn in Harju County and the towns of Tartu (Tartu County) and Pärnu (Pärnu County), all other larger towns are concentrated in the East-Viru County in the most north-eastern part of Estonia.

Estonia is among the EU countries whose population is decreasing due to migration and low birth rates. The general speed of population decrease in Estonia is comparable to other Eastern European countries. However, the decline is somewhat slower compared to the other Baltic States. Estonian population is moving to the three biggest cities for economic reasons (Tallinn, Tartu, Pärnu) and from there to their neighbouring municipalities (Fig. 2). Communities in other regions are shrinking at a varying pace, depending on their size and location. Smaller communities which are further away from the Estonian capital Tallinn are likely to shrink more quickly than the average (Tintera et al. 2014).

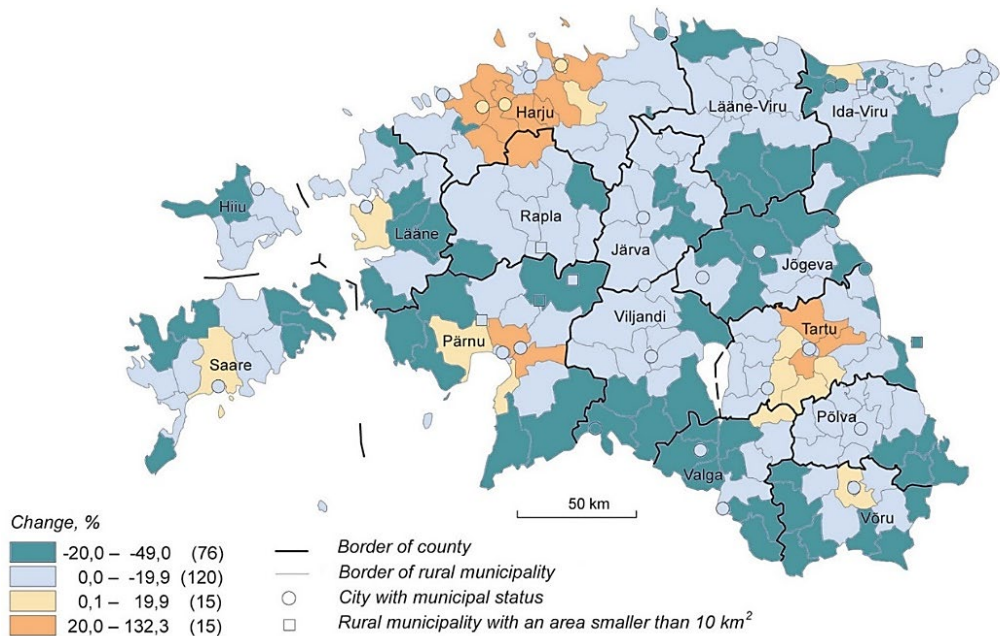


Figure 2: Relative change in population in local government units, 31.03.2000–31.12.2011 (Statistics Estonia 2015; Graphic courtesy of Statistics Estonia).

Valga town has reputation as an example of shrinking town within Estonia where local government shows current stabilisation efforts. Insofar Valga is a suitable case study to demonstrate consequences of urban shrinkage and tools for housing redevelopment in Estonia.

Valga is located on Estonian-Latvian border and forms a twin town with Latvian Valka (cf. Fig. 3). Valga and Valka descend from the town of Walk which was divided between Estonia and Latvia when both countries got independence from the Russian empire in 1917. Valga is situated 267 kilometres from Tallinn and with its 12,452 residents the town places 12th out of a total of 47 Estonian cites. Valka has 4,718 inhabitants.

Historically, Valga has experienced two periods of rapid growth, while at other times it has lost its population. The connection of the town to the rail network of the Russian Empire in 1889 caused explosive development of industry in the last decade of the 19th century and

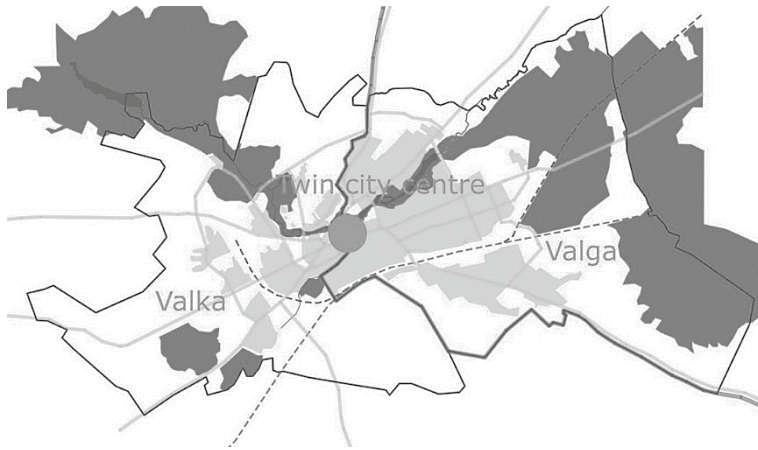


Figure 3: Twin city Valga/Valka (Source: authors).

the first decade of the 20th century. During this first period of growth the population increased from 2,473 people in 1867 to 14,179 people in 1919. The town was split in two when Estonia and Latvia regained their independence in 1918 and exports to Russia decreased considerably. After World War I the town continued to grow as a result of the increase in its administrative territory and continuing urbanisation, but this trend turned during the Great Depression. Then the population decreased from 14,746 in 1929 to 10,842 in 1934 and continued to decrease until World War II. As a result of the war, Estonia lost its independence and was incorporated into the Soviet Union. The town started to grow again in the 1960s and 1970s. Valga became once again an important industrial town due to the opening of the Soviet market and a military base was established there. Both of these activities had a significant impact on the population growth: from 13,354 people in 1959 to 18,474 in 1979. After Estonia regained its independence in 1991, the Soviet army left Valga and the town's industry collapsed. The town's population decreased by 3,172 people between 1989 and 2000 as a result of these changes and the population has continued to decline at a similar pace as in other towns in the region. The Population and Housing Censuses issued in 2000 and 2011 Valga showed a 14.4% loss of population (Statistics Estonia 2013).

4. Measures on national level

This chapter focuses on an overview of measures taken by the national government to face the shrinking problem.

4.1 Germany

One of the first reactions of the German government because of the problems after the German reunification was an amendment of the German Statutory Code on Construction and Building (BauGB) concerning the so called "urban contracts". After realizing the big problems of shrinking cities and poor condition of buildings in Eastern Germany the

German government realized another amendment in 2004 to define a cooperative proceeding by urban contracts for the urban redevelopment. The course of action is defined in Art. 171 a-d BauGB. The high awareness of the problem (cf. Chapter 1) resulted in the development of important legal norms.

First of all the municipality has to answer the question, if there even are structural vacancies (no temporary vacancies). If the answer is yes, the municipality has the option to establish an urban redevelopment concept (Art. 171 a and b). In the next step she has to look for a consensus with all of the affected parties, because a successful realization of all the different measures of the redevelopment is only possible, if a consensual behaviour of all the participants is probable. Afterwards, the local authorities have to adopt a resolution of the concept and the area or redevelopment (Art. 171 b). The final steps are the conclusion of urban contracts (Art. 171 c), the realization of the different measures of redevelopment, and the safeguarding of the whole project (Art. 171 d).

Art. 171 c includes some special restrictions of the legal terms of contract of this kind or urban contracts. A possible topic is the extensiveness of demolition or deconstruction. Another legal topic is the temporary use of the plot (e.g. the conservation of buildings for a while before the area will be turned into a green space). Other important points are on the one hand the cost responsibility for the demolition/deconstruction and on the other hand the subsidies for the accrued costs. Furthermore, time limits for the demolition/deconstruction should be declared. It is also important that the property owner declares the relinquishment of compensation pursuant to Art. 39–44 BauGB. In Germany, the municipality generally has to pay compensation, if she changes the legally binding land use plan and the new planning is less economic than the planning before. For this reason, the relinquishment of compensation is an important term of contract to avoid that the property owner may apply a compensation for formal reasons. One of the most important points is the equalization of burdens between the involved property owners. It is also one of the biggest problems, especially if we have a lot of private property owners in the redevelopment area.

The contracting parties are the municipality, the property owners of parcels and buildings in the redevelopment area, the tenants (especially those who should move), the creditors (in general the banks), the public utility companies (who have to adapt the local infrastructure to the new situation) and the property owners of other buildings out of the redevelopment area (e.g. new apartment buildings for the tenants).

The second measure of the German government to face the problem of shrinking cities was the start of the programme “urban redevelopment east”. In February 2000 a commission of experts recommended a structural change in Eastern Germany. The main objective was the demolition of 300,000 to 400,000 flats. The details of this programme will be explained in chapter 5.1 (Hendricks 2013).

4.2 Estonia

The awareness of the shrinking problem is fairly limited in Estonia. The consequence is a low provision of financial means. A similar national programme as “Urban redevelopment east” for dealing with housing redevelopment is not available. The Estonian government has shown a certain interest in the issue, however. Several already-functioning actions can be pointed out. Site owners have the possibility to apply for a grant from the government agency Environmental Investment Centre (EIC) for the “demolition of structures damaging the landscape” within their property. Since this measure is applicable only to old industrial, military and agricultural facilities situated outside of urban areas or in their periphery, it can be a tool for remediating only a small part of urban brownfield sites. To solve the problem of empty apartment houses, the demolition support for apartment houses in public possession was developed in 2016 by Ministry of Economic Affairs and Communications. In this case apartment buildings need to be completely owned by local government, which limits substantially the use of the tool. From 2017, investment support for housing fund development for local governments is also available.

5. Tools for housing redevelopment in Eastern Germany and Estonia

The population development in Eastern Germany and Valga is similar (cf. chapter 3). On the other hand, there is a very different awareness of this problem on the national level (cf. chapter 4). This chapter illustrates the different measures taken to face the shrinking problem on the operating level.

5.1 Eastern Germany

The programme “urban redevelopment east” started in 2002.

The first promotion period

The first promotion period started in 2002 and ended in 2009. The financial volume of this period was 2.5 billion € and it was co-financed by the different levels of the German administration: The German federation, the federal states and the municipalities. The main objectives were the demolition or deconstruction of vacancies and the improvement of districts worth to be conserved.

The vacancy rate of the building companies decreased from 16.2 to 10%. Accordingly it was a quite successful first promotion period, but on the other hand there was still a lot of work left. Regarding the improvement of urban districts the programme was successful concerning the historic centres in the classic style of the period of industrialization (“Gründerzeit”, ≈ 1840–1870), but still big problems concerning elementary districts out of this period exist (Bundestransferstelle Stadtumbau Ost 2010).

In the whole, more than 260,000 flats have been demolished from 2002 to 2010 (≈ 85% of the recommended quantity). If we have a look on the chronological progress of the demolition activities (cf. Fig. 4), we notice that the process was slowing down. The biggest part of the demolition was realized from 2002 to 2006. Afterwards the process was significantly

slowing down (except Berlin where we had a lot of activities in 2009). One reason for this trend was the problem that there were no more potentials for a demolition covering a large area. A big part of the structural vacancies has been eliminated and now we have to face a lot of dispersed vacancies. Furthermore, there are fewer vacancies of unrenovated buildings and the resistance to a demolition is much higher, if the property owner invested a lot of money in the renovation. Beyond that there are a lot of low-income households who create a demand for cheap living space even in unrenovated buildings. On the other hand, many building companies do not have enough available flats where the tenants could move in. For this reason, they try to delay the demolition until they have solved this problem because they do not want to lose tenants.

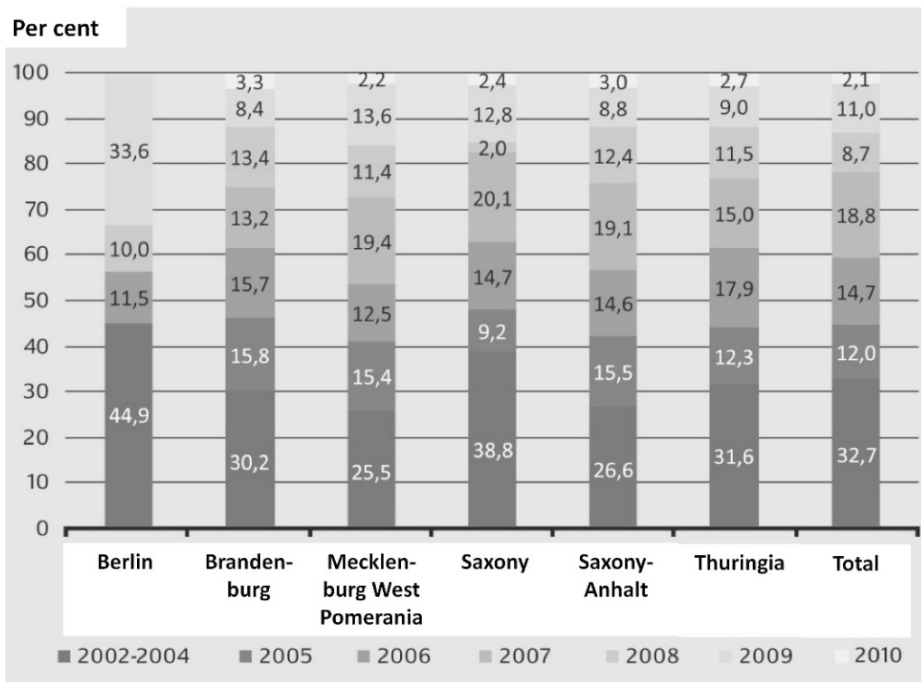


Figure 4: Chronological progress of demolition activities in the different federal states (Source: Bundestransferstelle Stadtumbau Ost 2010).

One of the biggest problems is the fact that a big part of the remaining potential of demolition is individual private property and not property of a building company.

In general it is much easier to realize a redevelopment, if the buildings are property of building companies. In this case optimal conditions are given to realize a redevelopment by elimination of vacancies. Though the building companies have to face the loss of apartments, on the other hand they have different advantages (e.g. decreasing running costs and costs of maintenance, increasing value of the remaining buildings due to the elimination of vacancies and the new green space after the demolition). Furthermore, the possible promotion of the programme “urban redevelopment east” may help to convince the tenants to move.

The situation changes a lot if we have individual private property. In this case, the very difficult question is to answer how can be realized an equalisation of burdens between the affected property owners (Hendricks 2013).

There is another point why the elimination of structural vacancies worked quiet good in the first founding period. This is the possibility of a partial debt cancellation. It was another measure of the German government. Pursuant to the German legislation communal building companies may apply for a debt cancellation of 77 €/m², if the borrow was before 1990. The legislative authority made this restriction because the corresponding law is especially dedicated to the follow-up building companies of the former German Democratic Republic. Other restrictions are that the vacancy of the housing stock of the company is bigger than 15% and that the economic survival of the company is imperilled. 77 €/m² does not seems to be a lot of money, but it has to be taken into account that we are generally talking about old buildings which have been constructed in a low standard and for this reason the remaining value is not very high. Finally, the applied debt cancellation of 1.1 billion € from 2001 to 2010 shows clearly that there was a lot of interest in this programme.

In total, the programme “urban redevelopment east” was an appropriate strategy for re-development in cooperation with building companies.

The second promotion period

In the first promotion period the process of demolition activities was slowing down. Accordingly the corresponding part of the annual budget was decreasing in the last years of the first promotion period (27.6% in 2009, cf. Fig. 5). On the other hand, the part for the improvement of urban districts (59.8% in 2009) and the adaption of the local infrastructure (9.9% in 2009) was growing. These have been important facts for the planning of the second promotion period.

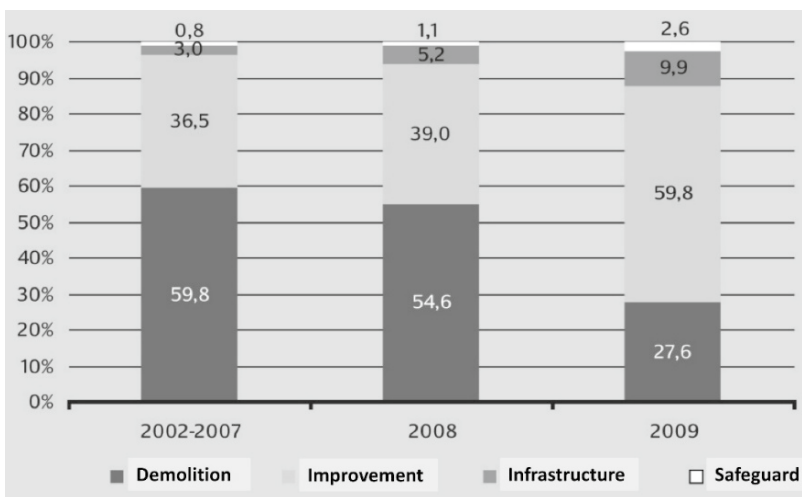


Figure 5: Apportionment of the annual budget (Source: Bundestransferstelle Stadtumbau Ost 2010).

However, the German experts still recommended a demolition of 30,000 flats per year, especially in the sector of rented apartment houses.

Due to these facts the legislative authority modified the objectives of the programme. The main objectives of the second promotion period (from 2010 to 2016) have been the improvement of districts worth to be conserved, the demolition or deconstruction of vacancies, the improvement of singular old buildings (constructed before 1949), and the adaption of the local infrastructure. The first two points have been the same as in the first period, but now the focus is on the improvement. The budget of this promotion period has been around 2.1 billion €.

Current situation

The programme “Urban redevelopment west” started in 2004 and had a more preventive orientation than the programme in Eastern Germany. It had generally similar objectives but due to a lower vacancy rate (in 2011: 3.7% in Western Germany and 8.0% in Eastern Germany) it was not so much focussed on the demolition of vacancies. Instead of that it had a focus on the revitalisation of brownfields.

In 2017, the programmes “Urban redevelopment east” and “Urban redevelopment west” have been merged into the programme “Urban redevelopment”.

The consolidated programme has generally a preventive orientation. Important criteria are the demographic development (e.g. regional and nationwide movements, immigration and birth rate), the economic development (migration, brownfields), the development of size of households and living space per person, and the development of vacancies. The fields of action are overall focussed on inner development. Important points are the stabilisation and strengthening of city centres, improving the quality of residential areas (including the demolition of vacancies), the revitalisation of brownfields, and the adaption of infrastructure (cf. BBSR 2016).

5.2 Estonia

Valga town has reputation as an example of shrinking town within Estonia where local government shows current stabilisation efforts. As similar tools as “Urban redevelopment east” for dealing with housing redevelopment on national level are not available in Estonia, this paper uses Valga as case study to demonstrate possibilities which Estonian local government have in dealing with housing redevelopment.

Urban regeneration policy of Valga town government

Valga town authorities have formulated an urban regeneration policy for the shrinking city attempting to adapt it to the needs and expectations of its current 12,500 residents. The regeneration policy of local government includes the development of the new Comprehensive Plan, housing demolitions, and investment in urban space in the city centre.

A New Comprehensive Plan for Valga territory has been developed taking into account the declining population. It aims to adapt Valga's urban space into a compact, high-quality environment, with an emphasis on the revitalization of the city centre, renovation of residential buildings, and brownfields redevelopment. The development of the city would be directed towards a denser and more concentrated urban area in the town centre and greener public space outside the centre (Valga town government 2016). The plan is currently the only Comprehensive Plan in Estonia that aims to adapt urban space to a shrinking population.

The physical size of the town still corresponds to the needs of the population from 30 years ago but the number of citizens has actually decreased by a third. This leads to building underuse and vacancy. One of the first tasks of creating a Comprehensive Plan was to undertake a detailed land use inventory. For each of the 3,038 plots in Valga, their actual use and/or vacancy was visually determined. The results of the land use inventory conducted by the town government to get an overview of the extent of vacancy show that 2,226 (80%) from 2,781 usable plots are in use. Since the area of vacant or underused plots is on average bigger than the area of plots in use, only 72% of the usable area within the town territory is currently in use. 45 of the 379 apartment buildings in Valga have been completely abandoned, and 34 are less than half-occupied. From 206 buildings with commercial purpose, 42 are empty and 22 underused, from 128 industrial buildings 19 and 9, respectively.

The vacant or underused apartment buildings are mostly two-storey wooden buildings, usually without central heating, bathrooms or sewerage. This type of wooden apartment buildings represents key building type from the first period of growth of Valga town. They can be found in various neighbourhoods but most of them are located in the centre of the town and as such their vacancy is more apparent than the vacancy of other types of structures. The occupancy rate of four- and five-storey brick or panel apartment buildings dating from the second period of growth is higher due to better living standard they offer.

A larger share of unused residential premises on the market lowers the value of property. The average price of an apartment sold in 2016 in the town of Valga was less than 150 euros per square metre in contrast with average price for whole Estonia exceeding 1000 euros. The apartments in two-storey wooden buildings described above are generally sold at auction by law enforcement officer for a few hundred euros per flat. Low price does not allow owners to sell their properties or use them as collateral for loan agreements. The private sector is not interested in investing in renovating properties or building new apartment buildings. Only one apartment building has been erected since 1991 and residential premises are predominantly of low quality.

Housing demolitions

Due to the process of apartments privatisation after the collapse of the Soviet Union the majority of housing is privately owned. In this fact, the Estonian situation differs from most similar situations in Western Europe (Großmann et al. 2015; Haase et al. 2016) and limits local government's ability to act in case of vacancy.

Eight apartment buildings have been demolished in Valga since 2015. Demolished structures laid generally outside the city centre. The demolished buildings have been replaced by low-cost temporary public green areas. Residents would even welcome more rapid demolition works. However, this is delayed by the complicated ownership relations of the abandoned buildings. The buildings are privately owned and often co-owned, and in the case of apartment buildings, there may even be dozens of owners. The property is often mortgaged, part of an insolvent estate, or the owners may live abroad. All this requires time-consuming and complicated negotiations.

Depending on the circumstances, the local government offers one of the following options to owners of abandoned real estates:

- The owner gifts the plot with the building to the city. Many owners of buildings that have been empty for extended periods are no longer interested in their property because its worth is negligible or negative. They are also often burdened with property tax and city directives on the technical conditions of the building.
- The town government makes a bilateral agreement with the owner of the building. The owner transfers the building rights of the plot to the government for 10–15 years and the town demolishes the existing buildings, covering all relevant costs, creates low-cost open green areas or temporary structures. During this period, the town maintains the plot and exempts the owner from property tax. At the end of the period, the owner can decide if he or she wants to use the plot or extend the agreement. For example, in the summer of 2015, the town demolished the former dormitory for railway workers on Pikk Street as a result of the building rights being transferred.
- Flat owners living in under-occupied apartment buildings (i.e., where more than half of the flats are empty) are offered a chance to exchange their flat for another of similar worth, located in a building with a better outlook. People living in buildings where only a few flats are still inhabited are happy to take the town government up on this offer. In 2016, a dozen such exchanges took place.
- If the owner is currently not living in that building, the local government generally does not offer an exchange. If a building is empty, the town prepares a technical expert analysis of the building that declares it unsuitable to inhabit, withdraws the right of use from the building and orders a real estate value evaluation of the building. The value of an apartment without the right of use is zero and if the value of the plot does not exceed the demolition costs of the building, the value of the property becomes negative. The apartment owner is left with two options: they can gift their apartment to the town or participate proportionately in covering the demolition costs. In the latter case, the owner would remain a co-owner of the plot. In 2016, Valga authorities took away the right of use from three apartment buildings.
- In special cases, the town buys the property from the owner at market price, which is not high for buildings set for demolition. This option is usually employed for real estate

that is part of an insolvent estate, because current laws do not allow the bailiff to give away property for free. In 2015, the city used this method to demolish a former apartment building on Haru Street.

Investment in urban space in the city centre

As the majority of the abandoned and underused houses in Valga are privately owned, public sector cannot directly invest in their renovation. However, the town government does own the public space between these buildings. Two large projects are currently underway in central Valga. The first creates a new intimate square on the brownfield area in the city centre between the three oldest streets of Valga. The second is linking Valga and Valka city centres with a pedestrian street between Jaani Church in Valga and Lugaži Church in Valka and creates a new central square of Valka town. The length of the new pedestrian street will be 650 m. The town government hopes that if environment in the city centre becomes more attractive, the value of buildings in the city centre will increase.

6. Discussion and conclusion

The population development in Eastern Germany and Valga is similar (cf. chapter 3) and in consequence also the problem of vacancies. On the other hand, there is a very different awareness of this problem on the national level (cf. chapter 4). While Germany has an adequate awareness of the problem, Estonia should take measures to raise it. In this context, science in particular plays an important role. This is very important in order to convince politicians to provide the necessary financial resources and, if necessary, to develop supporting legal norms. Both are important conditions for a successful redevelopment.

The strategies for redevelopment on the operating level are similar. Important points are the demolition or deconstruction of vacancies, the improvement of districts or objects worth to be conserved, the strengthening of city centres and increasing the attractiveness of the urban space.

The property structure is an important condition for the strategy of urban redevelopment. The demolition or deconstruction of vacancies decreased significantly the vacancy rate in Eastern Germany. This success was primary based on the cooperation with big building companies. For this reason, the programme “Urban redevelopment” was an appropriate tool in this situation. Nowadays the German planners are facing similar problems as their colleagues in Estonia to convince private property owners to cooperate. The tools used in Valga can be an interesting inspiration. Giving away real estate is an option in case of very low property values. From a German perspective, the transfer of building rights for 10 to 15 years is particularly interesting as the owner keeps his property. This can counteract the frequently observed speculative attitude that growth could return in the future (cf. Chapter 1). On the other hand, in the case of very poor building condition the withdrawal of usage rights is a reasonable alternative to increase the pressure on the owner. However, there is more research needed to develop adequate tools to solve this part of problem.

The low prices of residential properties in Valga have different effects. On the one hand, there is a negative effect on the improvement of buildings because of the bad profitability. On the other hand, the property owners can be easier convinced to agree to a planned demolition of their buildings. In Germany, the unrealistic fiction of high values of real estates in shrinking areas is one of the biggest problems for urban redevelopment. For this reasons, the local real estate market is an essential framework condition for the tools of urban redevelopment.

The programme in Eastern Germany was also quite successful regarding the improvement of urban districts worth to be conserved. Of course, it has to be taken into account the big financial volume of the support programme. The available financial resources are another important framework condition. Furthermore, it is much easier for private investors to refinance their investments in German cities.

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The Conflict between Urban Redevelopment and Heritage Protection

A comparative case study in Görlitz (Germany) and Valga (Estonia)

Abstract

This paper gives an overview of frame conditions and strategies to handle the conflict between urban redevelopment and heritage protection in Görlitz (Germany) and Valga (Estonia).

Preservation policy needs to adapt to the market realities in shrinking cities. Historic preservation is an internal component of a larger system and must align its aims with those of this larger system.

The analysis of existing tools and problems in Görlitz and Valga leads to a list of requirements for a successful management of the mentioned problem. Crucial points are an accepted system for decision-making and financial incentives for heritage protection.

1. Introduction

After the collapse of the Soviet Union in the early 1990s Eastern Germany as well as the Baltic countries went through radical structural changes in administration, economy and politics. As a result, an increasing number of urban brownfields and residential vacancies emerged.

Both authors met in Valga in 2017 in an ERASMUS exchange to discuss the resulting problem of urban redevelopment. The problems of Valga and municipalities in Eastern Germany seemed to be surprisingly similar. This was the motivation to start a deeper investigation about similarities and differences of housing redevelopment in Estonia and Eastern Germany to give mutual impulses for the improvement of redevelopment measures. A first paper has been published in 2019 focussing on tools for urban redevelopment (Hendricks and Tintera 2019). This paper is a kind of continuation and considers the conflict between heritage protection and urban redevelopment.

This paper aims to give an overview about the challenges of heritage protection in area of urban shrinkage and present examples of different approaches local governments use to address them. The scientific method is a comparative case study. This method has its strength in obtaining detailed and relevant data. On the other hand, a commonly discussed disadvantage is the difficulty to generalize from a single case (Krusvenik 2016). This paper

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uses Valga, a small border town of Estonia and Latvia, to examine the complexity of housing redevelopment within shrinking Estonian cities. Valga is a strategic case due to its decades-long struggle with population loss, property disinvestment and vacancy and on-going comprehensive planning process that aims to adapt urban space to a shrinking population (first comprehensive plan in Estonia with such goal). For the comparison with Valga it will be focused on Görlitz because of the comparable shrinking and vacancy problem, similar conflicts concerning heritage protection and the location (border town of Germany and Poland). Furthermore, Görlitz has been chosen because of its innovative and pragmatic procedure to find a decision in case of conflicts between heritage protection and urban redevelopment. "A survey of approaches aimed at tackling the conflict between revitalisation and heritage preservation in Germany has confirmed that no other model is comparative in form of complexity" (Knippschild and Zöllter 2019).

2. Heritage protection and urban shrinkage

The phenomenon of shrinking cities has been examined in detail in our previous paper (Hendricks and Tintera 2019).

Shrinking cities pose particularly interesting challenge to heritage preservation. On one hand, the importance of heritage protection in the revitalization of urban space in shrinking cities is largely recognized. Historic buildings, if renovated, help to improve the spatial attractiveness of the neighbourhood (Reckien and Martinez-Fernandez 2011) and building heritage can play a role in city centre revitalization (Wiechmann and Pallagst 2012). Historic buildings carry a memory of the place and as such help to strengthen community identity (Ryberg-Webster 2016). The rehabilitation of the historic centre helps to promote the entire city as a venue for tourists and investors (Sánchez-Moral et al. 2015). On the other hand, preservation policy needs to adapt to the market realities in shrinking cities. Historic preservation is an internal component of a larger system and must align its aims with those of this larger system. Preservation needs to balance the past with the economic needs of contemporary society (Newman and Saginor 2014). Till now preservation research has been largely disconnected from the dominant urban policy and it has offered minimal guidance for communities where vacancy, abandonment, and property deterioration pose the greatest threat (Ryberg-Webster 2016).

Mallach calls for balance between demolition and preservation. In a context of large over-supply of houses in shrinking cities, a building can be preserved only if there is an appropriate use. Any use depends on enough money being available to restore and maintain the building. If more than isolated handful of building in shrinking cities to be preserved, it will happen only if enough demand exists or can be generated to provide the financial underpinnings for their reuse. In shrinking cities most of houses will never find a buyer as there is simply too many buildings for the needs of actual population. A lack of market demand discourages the private sector from investing in historic buildings as the cost of restoration exceeds the post-restoration market value of the property. This means that many historical buildings will never find a buyer and remain empty and deteriorating. The aesthetic quality

of a building must be weighed against the effect that a vacant building has on its neighbourhood (Mallach 2011). Vacant buildings have a negative social and economic impact on its surrounding. People are less likely to move into a building close to a deteriorated building or invest in small entrepreneurial activity that could positively influence real estate values (Hackworth 2016). The core value to be protected is the urban community as a living entity (Mallach 2011). Low value of properties in combination with restriction for the conservation of structures under heritage protection often leads to a situation when a lot of properties are disregarded by their owners to the point where the property suffers damage, collapse and need to be torn down. Newman and Saginor (2014) call such process 'demolition by neglect' and define it as the destruction of a heritage through abandonment or lack of maintenance. Local governments can use different economic incentives, legal penalties, and land use policies to prevent demolition by neglect. Financial incentives are one of the most successful means of counteracting demolition by neglect but underfunding forces to focus on only the most important structures of historic significance. Legal penalties for allowing the process to continue tend to be heavily reactive to structures already succumbing to neglect. Other available tools such as land use policies including incentive zoning, transfer of development rights, design review and interim zoning suit the cities with growing population and remaining development potential.

Finally, shrinkage is a universal phenomenon with local specifications. The consequences of shrinkage depend on the current institutional settings and market conditions in a particular location (Tintera et al. 2018).

3. General framework in Germany/Saxony

In Germany, heritage protection is in responsibility of the particular Federal States due to their cultural sovereignty. For this reason, the Heritage Conservation Act of Saxony is the decisive legal norm for heritage conservation in Görlitz. It is a declarative system (*ipso jure* system). The law puts under protection all objects, groups of objects and parts of objects which should be maintained because of their 'historical, artistic, scientific, urban developmental or landscape architectural value' (Sächsischer Landtag 2019). The register of monuments has only a reporting and clarifying character. That means that the protection of a monument does not depend on the registration.

Generally, the restrictions of heritage protection result in higher costs of conservation and restoration, even if monuments do not have to fulfil the high standards of energy efficiency in Germany. On the other hand, there are several options of financial support for affected property owners. In 2007, the spent public budget for heritage protection was 476.9 m. € (311.6 m. from Federal States, 121.6 m. from municipalities and 43.8 m. from the Federal Government). These numbers do not include spending for monuments in public property. Saxony invested nearly one billion Euros in the conservation of state-owned monuments between 1991 and 2010. Furthermore, the Federal State spent 552.5 m. € for the support of affected private property owners in the same period. The funding focussed on the additional costs of heritage protection for the conservation and restoration of individual monuments.

Another important programme in these years was the programme urban heritage protection (Städtebaulicher Denkmalschutz, SDP). Saxony and the Federal Government invested 1.107 billion Euros in the restoration of city centres worth to be conserved (both parties ca. 50%). Additionally, there are some smaller public programmes and private foundations supporting the heritage protection. Finally, affected property owners have the opportunity to apply for tax reduction for certain expenses. Pursuant to a study from 2008 a tax reduction of 1 € resulted statistically in subsequent investments of 15 € (Staatsministerium des Innern 2011).

The demolition of cultural monuments is allowed with permission of the monuments protection authority (Art. 12 of the Saxon Heritage Conservation Act). On the one hand, the responsible authority has to weigh up different public interests against each other (e.g. heritage protection versus urban development). On the other hand, economic criteria have to be taken into account. Disproportional burdens have to be avoided (BVerfG 1999). The property owner has no entitlement to realise the most profitable use of his property but it is an unacceptable burden, if the costs of the maintenance of the monument are higher than the income out of the property. For this reason, the monuments protection authority has to conduct an objective cost-effectiveness analysis (OVG Rheinland-Pfalz 2006).

In Germany, there are around one million protected real estates. Around 100,000 monuments are located in Saxony and 80% thereof are residential buildings. The Federal State has the highest percentage of residential buildings constructed before 1918. The share of 30% is more than twice as high as in Western Germany. At the same time, the vacancy rate in this market segment was 26% in 2008 (Leutert 2008). Important reasons for this situation are better energetic efficiency of modern buildings, lower rents (especially in buildings made with precast concrete slabs, “Plattenbauten”) and senior-friendly constructions (e.g. elevator, broad doors, etc.) This problem results in mayor conflicts between urban redevelopment and heritage protection.

4. General framework in Estonia

Heritage conservation in Estonia is regulated by The Heritage Conservation Act. This Act regulates the rights and obligations of state and local government authorities, and the owners of cultural monuments for the preservation of monuments and heritage conservation areas. A cultural monument is structure(s) ‘under state protection which is of historical, archaeological, ethnographic, urban developmental, architectural, artistic or scientific value’. Heritage conservation areas are defined as historical settlements ‘of cultural value which have developed under the joint influence of natural phenomena and human activities’ (Riigikogu 2002). The state supervision over monuments and heritage conservation areas is exercised by the National Heritage Board.

Building classification as cultural monuments or building location within the conservation area restricts building conservation and restoration. Monuments or structures located within heritage conservation areas may only be conserved, restored or constructed on the basis of a

conservation, restoration and construction plan which adheres to the special conditions for heritage conservation. Both, plan and special conditions need to be developed by a licenced specialist. These requirements raise the construction costs significantly (Tintera et al. 2018).

The Heritage Conservation Act gives the owner of a monument or structure located on heritage conservation area the right to apply for support from the state budget to maintain, conserve or restore the building (Riigikogu 2002). In practice, the allocated support is insufficient. 641,197 € were distributed between 73 monuments with the average subvention under 9000 € in 2017 (National Heritage Board 2017a). There are more than 6000 monuments in Estonia. Buildings located on a heritage conservation area are not supported at all due to underfunding.

The demolition of a historical building in a heritage conservation area is impermissible if the building can be preserved. The Heritage Conservation Act states directly in its introduction that it 'is prohibited to destroy or damage monuments' (Riigikogu 2002) and there are no rules on how to proceed with the demolition of a historical building within a heritage conservation area. A building can be demolished only if the special conditions for heritage conservation have not detected it as a valuable building. The only legal way to remove a structure with cultural value within a conservation area is to wait till a structure becomes a ruin. The removal of a wreckage is allowed.

There are 12 heritage conservation areas in Estonia. Eight of them are inside smaller towns losing population with decreases between 10.7% and 15.8% from the census in 2000 to the census in 2011 (Statistics Estonia 2013). It means that two-third of heritage conservation areas in Estonia are located within small shrinking towns. Valga with its size of population (12,182 residents in 1.1.2019) and pace of shrinkage (-11.8% between 2000 and 2011) is a typical representative among them.

5. Case study Görlitz

Görlitz has been founded in 1071. The first period of prosperity has been in the 13th and 14th century because of its exposed significance for the European trading. In 1635, the dominion changed from Kingdom Bohemia to Electorate Saxony. The second period of prosperity has been initiated in 1815 by the change to Kingdom Prussia (Staatsministerium des Innern 2011). The population increased from 8800 persons in 1815 to 81,000 persons in 1900. Important factors have been the new railway to Dresden and Berlin and the resulting industrialisation. The number of inhabitants was around 94,000 before the Second World War. After the war the city has been divided. The (smaller) part east of the river Neiße has been renamed to Zgorzelec and belongs to Poland. The number of inhabitants decreased to 74,000 people. Afterwards, there has been a strong increase to more than 101,000 persons in 1949 due to displaced persons from former German regions in Eastern Europe. The population decreased to around 77,000 people during the period of the Soviet occupation zone and the German Democratic Republic. Furthermore, the urban planning in this period resulted in a lack of renovation. For this reason, a lot of buildings have been

in bad conditions in 1989, even if there have been few demolitions in the Second World War. The city lost another 20,000 inhabitants after the German reunification. However, in the last years a small increase of inhabitants can be noted (Wikipedia 2019). The estimated total investment in the past 18 years is around 500 m. € (thereof 66 m. € public funding, especially from the programme urban heritage protection) for the renovation of 3500 monuments. As a result, the historic centre of Görlitz is one of the biggest national conservation areas attracting tourists as well as new inhabitants (Staatsministerium des Innern 2011). Especially pensioners from Western Germany enjoy the atmosphere and the relatively low rents in Görlitz.

However, there are still a lot of vacancies in the city centre (24.5% in average and 30.8% in the historic city centre). On the one hand, it is a result of the massive loss of population. On the other hand, a lot of inhabitants prefer the cheaper living space out of the city centre. For this reason, it is necessary to find a compromise to solve the conflict between heritage protection and urban redevelopment. In 2016, Görlitz adopted the “urban redevelopment matrix” as a new and innovative tool for corresponding decisions (Menzel 2016).

5.1 Urban redevelopment matrix

The logic of the matrix is to take into account heritage aspects as well as post-refurbishment functions of a building before launching the approval procedure for construction work. It is an approach to facilitate informal communication between the private (e.g. planners, owners and investors) and the public sector (e.g. authorities for urban development or heritage protection) (Knippschild and Zöllter 2019).

5.2 The assessment procedure

The assessment procedure includes 5 dimensions that have been selected to map general topics of urban development on particular buildings:

- a) Potential structural interventions
- b) Building typology and year of construction
- c) Location (“degree of consolidation”)
- d) Urban design evaluation
- e) Assessment of the planned project and forecast of the urban impact

Dimension a: Potential structural interventions

Structural interventions are an indicator for the development potential of the building. The higher the degree of interventions, the higher is the potential and chance to give a positive impulse for development. The matrix includes 12 categories of potential interventions ranging from “no intervention possible” to “demolition without replacement”. Intermediate levels are changes of the use of the building, facade, ground plan or roof or partial demolition/reconstruction (cf. Fig. 1).

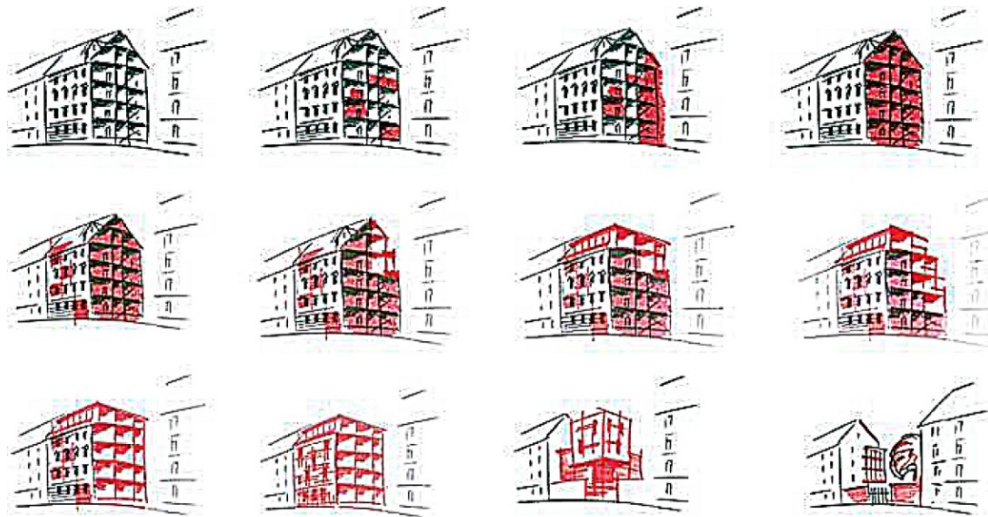


Figure 1: The 12 categories of structural interventions (Source: Knippschild and Zöllner 2019).

The demolition of a building is not excluded but it is the last option after checking before all other options. Furthermore, the remaining dimensions have to be taken into account. The demolition is an extreme measure to avoid hardship cases. Generally, the matrix aims to preserve as far as possible the historic building stock and the urban fabric.

Dimension b: Building typology and year of construction

The dimension “building typology” bases on the size of the building and the coverage type (attached or detached). The three groups are “small terrace houses”, “big terrace houses” and “detached houses”. In these groups are distinguished different age classes. The older and rarer a building, the lower should be the degree of intervention. The basic assumption is that individual buildings of high historical value can easier be developed, rented and marketed.

Dimension c: Location (“degree of consolidation”)

Three zones indicate a different degree of urban consolidation (cf. Fig. 2):

- G1 – Consolidated area (dark grey): “Heart of the city centre” including the historic city centre, high share of renovated houses, low vacancy rate, balanced social structure
- G2 – Area undergoing consolidation (medium grey): Transition zones especially in Western and South-eastern direction
- G3 – Non-consolidated area (light grey): Western city centre including brownfields, high demand for urban restructuring, high vacancy rate, social segregation.

The higher the degree of consolidation, the lower are the permitted structural upgrades of buildings.

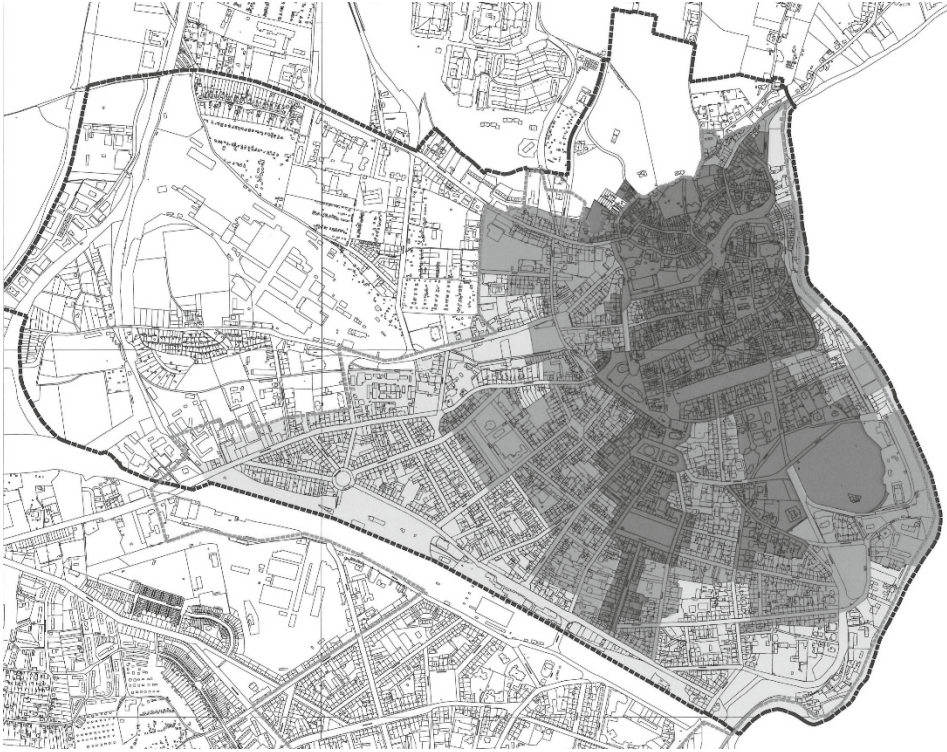


Figure 2: Zones of urban consolidation (Source: Stadt Görlitz 2013).

In total, the guideline pursuant to dimension a) to c) is: Higher level of permitted structural interventions for common and new buildings in non-consolidated areas and lower level of permitted structural changes for rare and historical buildings in consolidated areas. This is an important intermediate result of the assessment procedure.

Dimension d: Urban design evaluation

This dimension includes the criteria building condition, homogeneity of the neighbourhood and landmark function (source of identity).

A bad condition of the building justifies a higher level of structural interventions. Modifications should be avoided, if the building has already taken part in a former restoration process.

The criterion homogeneity depends on the coverage type, gaps between buildings and the construction type. Few modifications will be accepted in case of attached and homogeneous buildings. A higher level of interventions will be permitted in case of open coverage type and different construction types.

Some buildings have a distinctive impact on their neighbourhood due to their exposed location, local arrangement, historical value or function (e.g. church or town hall). This may

result in a source of identity for the neighbourhood, the district or the whole city. The higher the impact of a building, the lower is the level of potential structural interventions.

Dimension e: Assessment of the planned project and forecast of the urban impact

This dimension includes the criteria of architectural quality and building culture as well as the potential impact on urban development.

The higher the degree of structural interventions, the higher is the need for high architectural quality and building culture.

Structural improvements of a real estate may give a positive impetus for the development of the city, the district or the local neighbourhood. The bigger the interventions and the more consolidated the area, the bigger must be the impact on the urban development.

5.3 Final result

The final result bases on the intermediate result of dimension a) to c) and the results of dimension d) and e). The lowest level of potential structural interventions is the standard depth of interventions. The remaining results limit the scope of regulations in special cases.

6. Case study Valga

The population development in Valga and the urban regenerations policy have been described in detail in our previous paper (Hendricks and Tintera 2019).

6.1 Valga heritage conservation area

Valga heritage conservation area was declared in 1995 with the objective to preserve the town centre as an urban whole as it had developed historically till the 1940s. The conservation area covers the town centre with an area of 22.7 ha and 137 plots. Kesk (Central) street, which is the Valga business, administrative and cultural centre of the town, is located within the conservation area (cf. Fig. 3).

There are 119 buildings in the centre of Valga within the Heritage Conservation Area. The oldest buildings date from the second half of the eighteenth century and most of the structures were built-up after the town connection to the railway network in 1889. Therefore, 24% of the preserved buildings date from the second half of the nineteenth century and 50% from the twentieth century before the Second World War period. 16% of the existing buildings were built during the Soviet occupation (1944–1991), and then only 6 buildings (5%) were added later (Kooskora 2016). 48% of edifices are residential buildings, mainly apartment buildings. The city centre of Valga has an important public and commercial function. Stores, cafés, hotels and other commercial buildings account for 22% of the existing buildings, 9% represents local government, educational and cultural buildings. 24 of 119 buildings within the conservation area are classified as cultural monuments (Kooskora 2016).

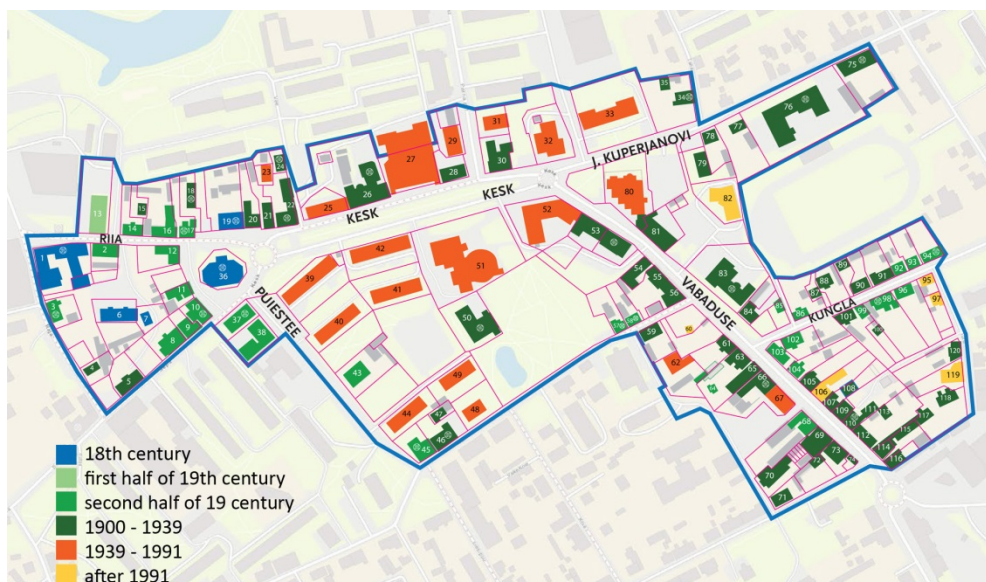


Figure 3: Valga heritage conservation area: buildings by the period of erection (Source: Tintera 2018).

There were 735 inhabitants living within the heritage conservation area according to the Population and Housing Census from 2011 while 932 inhabitants were enumerated in year 2000, which contributes to 21.1% population decrease. The number of apartments decreased from 548 in 2000 to 502 in 2011 and their occupancy rate from 82.1% in 2000 to 78.3% in 2011. 96% of all apartments were private-owned in 2011 (Statistics Estonia 2013). The pace of population shrinkage within the heritage conservation area (21.1%) is substantially faster than the decrease of the town population during the same period (14.4%). Despite the fact that the demolition of a historical building in a heritage conservation area is impermissible, a decrease in the number of apartments was detected during the period. It means that apartment buildings had turned to be uninhabitable and were removed, so they have gone through the process of ‘demolition by neglect’ as described previously (Tintera 2018).

6.2 Challenges of revitalisation of Valga city centre

Higher population decrease between Population and Housing Census in 2000 and 2011 within the Heritage Conservation Area in comparison with population decrease in the whole town is in correlation with the lower use of buildings in the centre. The lower use of buildings under heritage protection compared to not protected ones can be explained at least by two independent aspects.

Firstly, one of the reasons for a building to be listed in the state register of cultural monuments is its historical value. Similarly, to constitute a Heritage Conservation area the presence of monuments and other structures with historical value within the area is important. This means that structures under heritage protection or within a Conservation Area are

typically older than average structures in the town. Population shrinkage leads to disinvestment and in this context the age of a building negatively influences the quality of life and amenities inside the buildings. The quality of life is one of the important factors in deciding whether the building is in use or abandoned (Prada-Trigo 2014). From this aspect, buildings in the town centre would presumably be vacant more frequently even if not protected because of their age and chronic disinvestment caused by shrinkage.

Secondly, one of the main reasons for vacancy is a market gap between the costs of restoration and the post-restoration market value of the property, which discourage the private sector to invest in historic buildings (Mallach 2011). Preservation increases this gap even more as licenced works and special requirements for the rehabilitation of protected buildings raise the costs of design and construction works. From this aspect, preservation can be seen as an extra barrier impeding the reuse of a historic building.

The process can be demonstrated through the residential building at Kesk Street 20. This typical wooden apartment house in the heart of the town had been losing inhabitants for a long time and insufficient maintenance degraded the quality of life in the building. The town government evicted the last residents in 2015 when the conditions in the building had become uninhabitable. As a result of the process of privatization from the 90s, each of the ten apartments had a different owner or multiple owners, and the majority of apartments were encumbered with debts and mortgages. The town government could not acquire the flats as such. The roof of the building at Kesk 20 was leaking and the condition of the building was deteriorating rapidly. The town government made all the preparations required for demolition and requested a permit from the National Heritage Board. After lengthy discussions the National Heritage Board refused to issue the permit for demolition in 2017. They argued that the building, despite its major reconstruction during the Soviet era, represents a valuable example of this type of residential structures in Valga and due to the location in the heart of the town it plays an important role in the urban pattern of the conservation area. From the technical point of view they found the building to be possible to preserve. The decision did neither address the strategy how to force owners to invest in the reconstruction nor did give guidance for the local government how to eliminate the danger building represents to its surrounding. The building remained standing at first, but the students' parents from the music school next to the building started raising their voices in early September 2017 due to the unsafe structure. The police sent a memo asking for the building at Kesk 20 to be demolished, as they had repeatedly been called out to the building. Unfortunately, it is very difficult for local governments to justify the use of public funds for the renovation of a privately owned building, especially for a building without use. The town government had two options: wait for the building to collapse or demolish it. On 22 September 2017 the town government implemented immediate substitutive enforcement without a precept for the demolition of a dangerous building and on the same day the structure was demolished (Tintera 2018).

Kesk 20 is not a singular case but represents the pattern how the Heritage Board has behaved in similar cases in Valga. Property owners have mentioned identical experiences with their

application to remove vacant structures within the conservation area during informal interviews. This corresponds with Newman and Saginor (2014) observation that preservationists in the US often overestimate the value of historical integrity and architectural significance over function.

Demolishing a building at the heart of a heritage conservation area is an extreme measure, which shows the difficult choices faced by the town government and the National Heritage Board in the centre of Valga. Existing heritage conservation system prohibits the National Heritage Board to permit the demolition of a structure with cultural value and does not offer sufficient tools to save it. The barriers of preservation here are not only limited financial resources of the National Heritage Board. Even if it were possible to allocate the support from the state budget, the owner of the building must apply for it. If there are multiple owners, who have already lost interest in their property, as in the case of Kesk 20, no one is prepared to apply. The town government, on the other hand, has many other functions and heritage conservation is only one of them. Safety, the attractiveness of urban space, citizens' expectations, and rules for the use of public resources force local government to act, even if this means a conflict with the National Heritage Board.

7. Discussion

In Germany, the legal norms of the Federal States generally allow the demolition of cultural monuments with permission of the monuments protection authority. On the other hand, there have been massive investments in the maintenance of protected monuments in the past decades. However, because of the number of protected buildings and substantial vacancy rates in historic city centres, it is not possible to avoid modifications of the historic building stock.

The urban redevelopment matrix is a new and innovative tool to find a compromise to solve the conflict between heritage protection and urban redevelopment. However, the matrix has been from the beginning subject to heated discussion by local actors and public authorities responsible for heritage protection. Many of those involved were sceptical of the matrix, especially fearing an increase in demolition activities or massive interventions. There was less heated talk in the municipal authority itself since the officials charged with heritage protection are also responsible for urban development. But the agency at state level feared a weakening of heritage protection in Saxony and agreed finally in an experimental phase of two years. First preliminary conclusions can be drawn. The urban transformation matrix is certainly an innovative instrument but the city is doing too little to raise awareness of it. The dissemination of information among professionals and potential investors is crucial to increase the acceptance and to reach a comprehensive application (Knippschild and Zöllter 2019). Further research is needed to determine how far and under what circumstances the matrix approach can be transferred to other contexts or cities or extended to address additional aspects of urban development (e.g. energy efficiency).

The situation of Valga's town centre highlights the bottlenecks in the current heritage conservation system as a whole. It is necessary to develop a new set of heritage conservation rules for shrinking cities and adapt the actual heritage conservation system to urban shrinkage. There is a need to understand the most valuable features of Valga's heritage conservation area and to focus conservation resources on those features.

The town centre plays an important role as a venue for commercial activities, tourism and residents. Even if the town centre is declared as a heritage conservation area, one cannot solely concentrate on historic preservation as the main function of the centre. Heritage preservation needs to be weighed against other values of the area. The urban community has to be protected as a living entity. A town centre filled with vacant and derelict buildings worsens the citizens' attitude towards the town and hinders future developments.

In the case of possible demolition of a structure only the historical and architectural values of the building and its importance in urban space is actually assessed. The officials of the Board argue that we cannot foresee whether someone might want to save the building in the future. However, this argument seems inadequate in the context of a shrinking town. In addition to historical and architectural value, an assessment of whether the building is in use and what the likelihood is that the building would be reused before it collapses should be undertaken. The latter is significantly influenced by the structural condition and ownership status of the building. The aesthetic quality of the building must be weighed against the effect that a vacant building has on its neighbourhood.

In shrinking cities the public sector is the biggest investor. Limited taxpayers' money needs to be preferably used for investments in the city centre. In Valga, the biggest state investments have been made in new buildings in the outskirts of the city centre. This requires changes in the state subvention rules to prioritize the rehabilitation of monuments.

The private sector is not motivated to invest if the cost of restoration exceed the post restoration value of the building. This motivation can be supported by increasing post-restoration market value and by decreasing the costs of restoration. Despite requiring a lot of resources, investment in urban space in the city centre is an effective way to improve the residential attractiveness of the area. Together with the demolitions of buildings reducing the oversupply of residential premises, investments in urban space raise the property value of buildings in the area.

If increasing the value of a property depends mostly on local government's activity, building heritage rules play a crucial role in reducing the cost of restoration. The cost of restoration can be reduced by the public sector subsidies or by the mitigation of requirements for preservation works. Subsidies from state budgets allow a high standard of restoration but the funds are limited. In the context of urban shrinkage, we need to prioritize the use of subsidies to revitalize the most valuable cultural monuments. The cost of preservation works is influenced by the requirements of material integrity such as using historical windows or prohibiting low maintenance materials. Preservation efforts should focus preferably on first keeping the building in use, and then on material requirements. Inconsistent material or window can be replaced in the future but the future of an empty and unused building is often short.

8. Conclusion

Several crucial points can be identified to handle the conflict between heritage protection and urban redevelopment in shrinking cities:

- First of all, the phenomenon of urban shrinkage has to be accepted and understood.
- Legal norms must allow selective modifications and demolitions of monuments.
- Heritage preservation needs to be weighed against other values.
- Dimensions/criteria have to be developed to find a compromise between divergent interests. These criteria have to be developed individually for every city (e.g. in Görlitz demand for high quality architecture and in Valga lower demand to reduce the costs of restoration).
- The matrix (or similar solution) has to be promoted intensely to increase the acceptance among professionals, potential investors and the general public to reach a comprehensive application.
- Given the case, another crucial point is the reduction of the gap between the costs of restoration and the post-restoration market value of the property. Possible options to reduce the costs of restoration: subsidies, tax reduction or mitigation of requirements for preservation works. Possible option to increase the post-restoration market value of the property: urban redevelopment (improvement of the urban space and reduction of vacancies).
- Public support is very important to give incentives for heritage protection (financial subsidies, organisational issues, planning).
- Finally, there is a need of coherent political decisions on all administrative levels.

There is no simple solution to the conflict between society's need to conserve architectural heritage and to adapt a shrinking town according to the expectations of its current population. The preservation of historic buildings can only be successful, if the development of the town itself is successful. Heritage preservation cannot be seen as an independent value superseding the needs of the town residents.

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A Digitalized Property Formation Process?

Comparative study of legal qualifications in Finland and Sweden

Abstract

Digitalization and automation of different elements of the land development process are frequent and highlighted phenomena in both Finland and Sweden. Several projects focus on standardization of spatial data, electronic transactions of real property, physical plans in digital format, etc. The focus of most projects is on technical and organizational aspects of these potential developments. Legal features do occur, but are mostly devoted to protection of personal data and privacy.

The emphasis in this study is on legal structures and relationships in real property law, applicable in property formation processes. The objective is to compare the legal system for property formation in Finland and Sweden concerning potentials and obstructions for digitalization and automation of the legal process for examination and adjudication. Apart from some minor obstacles, the findings indicate that the Swedish legal system for property formation, to a larger degree, suffers from a complex interconnection between the legislation on real property formation and the public regulation of permitted land uses. This interconnection is not present in all processes in the Finnish system, which will simplify the road towards digitalization of the property formation process in Finland.

1. Introduction

Since a number of years, large-scale undertakings in development, adoption and management of digital infrastructure, technologies and services are widespread, where the Nordic countries at times are seen as forerunners (Randall and Berlina 2019). One crucial dimension in this transition concerns the digital transformation of the public sector – e-government (European Commission 2016).

In Finland and Sweden, digitalization of different elements of land development processes is a highly prioritized topic during the current period (Lantmäteriet 2018a, NLS 2018a). The overall objective is to accomplish simpler, more open and efficient procedures for physical planning and permits for land use alterations, real property transactions, and property formation, as well as to provide an information and communications technology (ICT) for accessible, standardized geodata at all different stages in land development projects.

In Finland, the National Land Survey has been in the forerun of digitalization and opening their data. National Geoportal (Paikkatietoalusta) provides geodata for everyone to use in

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different digital formats free of charge. In addition, e-transactions for properties, as well as automated titles, application for mortgages and initiatives for subdivisions were introduced in 2013 (NLS 2019a). The latest project of NLS concerns building a national digital register for shares of apartment house companies (NLS 2019b). For the Finnish government, digitalization of public services was top priority for 2018–2019 (Finnish Government 2018). Interestingly, this has effected almost entirely only on state's services. The 311 municipalities, of which 73 are acting as Cadastral Authorities within areas of their Detailed Development Plans, have more or less failed in digitalizing their processes (Suuronen 2017). Where the NLS strives towards more customer-friendly solutions in all their procedures, similar examples on municipalities are harder to find (Sulonen 2019). Having said this, there is an ongoing pilot project for digitalizing land use planning initiated by the Ministry of Environment. At the moment, five municipalities (Tampere, Lahti, Kuopio, Kempele, and Inkoo) take part in this pilot, and the aim is to provide tools for fully digitalised land use planning in 2030 (ME 2019).

In Sweden, a new strategic research program – “Smart Built Environment” – has recently been launched, comprising e.g. the project “Information provision for planning, property formation, and building permits”, with the purpose to create standardized and digital public decision-making processes.¹ Several projects are also in progress with an aim to digitalize the municipalities' Comprehensive Plans, Detailed Development Plans, and building permit procedures (Lantmäteriet 2018a, Boverket 2019). In a collaborative project, the Swedish National Board of Housing, Building and Planning, the Swedish National Land Survey, and the Swedish Association of Local Authorities and Regions have proposed a number of measures in order to create a coherent digital application for detailed development planning, property formation, and building permits (Boverket 2013). The Swedish Land Registry Authority has explored possibilities for using blockchain technology for electronic transactions of real property and title registration (Lantmäteriet 2018b), and in the specific domain of property formation, the Swedish National Land Survey has investigated the legal qualifications for a transition from physical boundary markers to coordinate determined cadastral boundaries (Lantmäteriet 2017).

In order to develop digitalized – and ultimately automated – systems for assessment and decision-making with application in such complex areas as land use planning, real property transactions, and property formation, detailed analyses of the technical, legal, and organizational conditions are required. It is, in that light, notable that the initiatives and projects so far launched focus mainly on technical, and to some extent organizational, issues. Recurring themes are: Standardized and integrated digital geodata and exchange processes, coordinated information models for geodata/GIS and BIM, standardized delivery formats and interfaces, unbroken information flows between different process steps, 3D-visualization and web-based map portals, and e-archiving.

¹ <https://www.smartbuilt.se/> (accessed 19.08.2019).

Legal features do occur, but are mostly devoted to roles and responsibilities for data management, financial responsibilities, protection of personal data and privacy, and revisions of the real property register legislation (cf. SOU 2018:25). There is an evident absence of explorative analyses concerning the substantive and procedural rules in the real property law domain. It seems, a number of fundamental legal complexities have been overlooked or avoided:

- Are there impediments or restraints in the structure and internal relations of the legal system? Decision-making systems must reasonably reflect the logic on which the legislation is based.
- How can the digital technology handle legal provisions requiring qualitative assessments, where the underlying criteria are neither quantifiable nor well-defined?
- Can the ICT be designed to make trade-offs between public and private interests or between conflicting private interests?

Before answering these and related questions, the above-mentioned initiatives will not be fully employable in the visionary, digital and automated decision-making processes. The present work is an attempt to spread some light on a few components of these issues.

The objective of this article, therefore, is to explore and evaluate one specific element of land development processes, namely the property formation segment. The emphasis is on legal structures and relationships in real property law, applicable in property formation processes. The approach is to compare the legal system for property formation in Finland and Sweden in an explorative analysis of the legal processes for assessment and adjudication. In the comparison of the two national systems, differences can be evaluated as either potentials or impediments for digitalization and automation.

The study will specifically focus on the relationship between property formation and land use regulations, i.e. the coordination of property division to existing land use legislation, land use planning, and requirements for permits for alterations of land use.

2. Property formation in Finland

Cadastral surveys and procedures are regulated in several different enactments according to Finnish legislation, e.g. the Highway Act, the Mining Act, or the Water Act. Such cadastral procedures can involve land acquisition for private and public roads, mining areas, recreational routes, railways, and other specific land uses

Conventional property formation measures are governed by provisions in the *Real Estate Formation Act*, and can be divided into *property formation* (formation of new properties) and *property rearrangement* (reformation of existing properties).

New properties are created by *subdivision*, *partitioning* and *amalgamation*. Rearrangement of existing properties can be undertaken as *land exchange*, *reallotment*, *land consolidation*, establishment of *jointly owned forests*, establishment or removal of *easements* or *subdivision of common areas*.

2.1 The cadastral procedure

Property formation in Finland is executed by a Cadastral Authority, which normally is a cadastral surveyor from the National Land Survey (NLS) or by a municipal cadastral surveyor. The main responsibility as Cadastral Authority is placed on the NLS, although there are 75 municipalities responsible for property formation and maintaining the cadastre within areas of Detailed Development Plans. The cadastral procedure for property formation is, however, the same regardless of the responsible authority.²

The required qualifications of a cadastral surveyor are stipulated in the Real Estate Formation Act. In most property formation cases, the cadastral surveyor carries out the procedures single-handed, although in more complicated cases the surveyor may be accompanied by two trustees.

The Cadastral Authority makes legally binding decisions, in some situations decisions can be compulsory without the consent of affected landowners and other parties. In this sense, the Cadastral Authority can be depicted as a first level court. The decisions of the Cadastral Authority can be appealed to the special Land Courts (and in certain situations further on to the Supreme Court).

A cadastral procedure normally starts with an application from a landowner or some other interested party, e.g. a buyer of a plot. In cases where a partial area of a property unit is transacted by using the electronic property conveyancing system provided by the NLS, the subdivision procedure starts automatically by the system itself. The Cadastral Authority is initiated by examining the case and the interested parties ex officio (on its own). Official meetings are held and the documentation of the procedure is recorded in digital format. If new properties are created, their boundaries shall be clearly marked in the terrain (Halme et al. 2006). However, the marking of boundaries is not necessarily employed in urban areas with Detailed Development Plans. In these areas the marking of boundaries is not mandatory, since the boundary coordinates fulfil this function (Rummukainen 2017).

2.2 Correlation between property formation and land use regulations

The principal regulation of land uses and building development in Finland is governed by the legislation on planning and building: *The Land Use and Building Act*.

There are several different types of connections between property formation and the legal possibilities to undertake different land uses, since in some situations the property formation is a prerequisite for obtaining a necessary permission for the intended land use (this is the case in areas of legally binding plot divisions).

However, in this subsection we will mainly focus on the opposite interdependency, i.e. situations where legislation or regulations on land use become prerequisites for the intended

² The composition of the Cadastral Authority is mainly governed by the Real Estate Formation Act, Chapt. 2, while the details of the cadastral procedure are stipulated in the Real Estate Formation Act, Chapt. 3 and 15.

property formation measures. Since this latter type of correlation is different for property formation within versus outside of Detailed Development Plans, the following presentation will be structured accordingly.

Property formation within a Detailed Development Plan

In areas with a Detailed Development Plan the underlying principle is that property formation measures may not be undertaken in conflict with the plan regulations.³

The substance of this condition differs somewhat depending on the existence and status of a *Plot Division Plan* which normally is included in the Detailed Development Plan. The purpose of this Plot Division Plan is to regulate the territorial division of building sites within the plan area, and it may be legally binding or merely guiding.

If the Plot Division Plan is legally binding, the property formation must follow the division according to the plan. This is also a prerequisite for obtaining a building permit. In cases where the Plot Division Plan is merely guiding, or where no such regulation exist, the Real Estate Formation Act stipulates that the property formation must not jeopardize implementation of the Detailed Development Plan.

Property formation outside of a Detailed Development Plan

In areas outside of a Detailed Development Plan, the correlation between property formation and land use regulations becomes dependent on whether the property formation is undertaken for building purposes or not.

Property formation for building purposes

When the property formation is executed with the intention to create a new building site – which in practice is limited to subdivision and partitioning – the Real Estate Formation Act refers to the provisions in the Land Use and Building Act.⁴

According to the Land Use and Building Act, each municipality should adopt a *Building Ordinance*, with regulations for the municipality (in areas outside Detailed Development Plans) regarding requirements for building sites, arrangements for water supply and sewage treatment, definition of areas in need of planning, and other local building conditions.⁵ Since the requirements in the Building Ordinance can vary from one municipality to another, so can the conditions regarding property formation for building purposes.

The Land Use and Building Act also comprises some general requirements for building sites: “A building site outside a Detailed Development Plan shall be suitable for its purpose, suitable for construction, and have a sufficient size, at least 2 000 square meters ...”⁶ As

³ Real Estate Formation Act, Chapt. 4, Section 32.

⁴ Real Estate Formation Act, Chapt. 4, Section 33 and Chapt. 7, Section 53.

⁵ Land Use and Building Act, Chapt. 1, Section 14.

⁶ Land Use and Building Act, Chapt. 17, Section 116.

mentioned above, this minimum size can be increased by local regulations in the municipalities' Building Ordinances.

In other words, property formation for building purposes is strongly related to the regulations regarding building sites in the Land Use and Building Act. E.g. will a subdivided property of less than 2 000 square meters probably not receive a building permit, although the area can still be subdivided – the subdivided plot will not fulfil the requirements for a building site.

For *shore line areas*, special restrictions on property formation follow the stipulations in the Land Use and Building Act. A new building site in a shore line area must be regulated in a Detailed Development Plan, or in a General Plan, unless the specific area is exempted from this requirement in the municipality's Building Ordinance.⁷

There are some exceptions from the above presented requirements, e.g. when the municipality concedes to the subdivision even though the provisions are not fulfilled or if the intended plot is already built with a dwelling house or if a building permit has already been issued for the site. In the last case, where a building permit has been obtained before the property formation is undertaken, the new property must meet the previously presented requirements for building sites.

Property formation for other purposes than buildings

Needless to say, property formation is also carried out for other purposes than building sites. The land use of such areas is normally forestry, agriculture or fishing purposes, just to mention a few. For purposes other than building sites, the Finnish legislation has no restrictions correlated to the intended land use, nor the size or design of the new property. In these cases, an application for property formation should always be completed according to the purchase deed or other documentation that forms the basis for the application. Legal requirements for permits, concessions, dispensations, or other for the intended land use are, in these situations, not related to the property formation measures.

3. Property formation in Sweden

Real property formation in Sweden is mainly governed by the stipulations in the *Real Property Formation Act*, which defines property formation as a measure whereby the division into property units is modified, easements are formed, modified or cancelled, or a building or other facility belonging to a real property (fixture) is transmitted to another real property unit.

Property formation are of two types: *Formation* and *reallotment*. Formation of (new) property units can be of three different categories. *Subdivision* denotes separation of one or more new property units from an existing property unit. *Partition* means division of an existing

⁷ Land Use and Building Act, Chapt.10, Section 72.

property unit under co-ownership, according to the ownership shares of each co-owner. *Amalgamation* refers to unifying two or more property units into one single property unit.

Reformation of property units is undertaken as reallocation, which comprises *land transmission* between properties, formation of *joint property units*, formation, modification or cancellation of *easements*, and transfer of certain *fixtures* from one property unit to another.

3.1 The cadastral procedure

Matters of property formation are handled by the Cadastral Authority, by means of a regulated cadastral procedure.⁸ Normally the authority consists of one cadastral surveyor, which in exceptional cases may be assisted by two trustees. A cadastral procedure is, in most cases, initiated by application from a property owner, which may be in written or electronic form.

The characteristics of a cadastral procedure rest on the principle of official examination of all relevant aspects of a case by the Cadastral Authority. This means that the authority must on its own initiative investigate, examine and assess the legal prerequisites that may affect the permissibility of the property formation, such as existing property division and rights, existing plans and land use regulations, etc. The Cadastral Authority is also responsible for technical tasks (surveying) and necessary valuations of economic matters.

As part of the process, the authority must investigate the identities of interested parties, such as partners in joint property units, holders of easements and usufruct rights, etc. When needed, the Cadastral Authority can confer with the interested parties. It is also possible to hold formal meetings, where the parties can negotiate binding agreements and decisions can be made.

Other authorities that may be concerned should be consulted by the Cadastral Authority, in order to coordinate the property formation measures to land use permit requirements in other legislation. In many situations, a requested property formation measure presupposes that the applicant has, or can get, permission for the planned land use, e.g. a building permit. As part of the assessment of the substantive stipulations (see section 3.2 below) the Cadastral Authority must examine the applicant's possibilities to obtain such required permissions.

New and modified property boundaries should be demarcated by special boundary markers. The physical marking of boundaries has important legal consequences, since provisions in the Land Code stipulate that the location of property boundaries is legally determined by the physical boundary markers. Normally, one or more maps are designed in order to illustrate the changes and the new property division.

Several decisions are made, e.g. cadastral decision, cost-distribution decision and completion decision. These decisions can be appealed to the Land and Environment Courts, and to higher instances if review permit is granted. When the decisions come into legal force, the

⁸ The features and details of the cadastral procedure are mainly governed by the Real Property Formation Act, Chapt. 4.

Cadastral Authority updates the real property register, which finalizes the cadastral procedure.

3.2 Correlation between property formation and land use regulations

As mentioned in the previous section, there is a complex and intrinsic relationship between property formation and regulations concerning permitted land uses in the Swedish system. At property formation, the suitability of the new or modified property units are assessed based on the intended land use, e.g. residential housing, agriculture, etc. However, the purpose stated in the cadastral procedure is not a decision, but only part of the basis for the assessment of the property formation's suitability. And the assessment does not replace the need to apply for permits according to other legislation, e.g. building permit pursuant to the Planning and Building Act.

Property formation for land uses requiring permissions

When the purpose of the property formation concerns a land use that requires permissions, there is no general requirement in the Real Property Formation Act that land use permissibility should be settled before property formation takes place. The applicant may choose to obtain the necessary permits before the application for property formation, or choose to first undertake the property formation.

In cases where property formation takes place first, the Cadastral Authority must investigate the qualifications for the applicant to be able to obtain the permits that are needed. The basis for this assessment is obtained through consultation with the relevant authorities, e.g. the municipality in case of building permit. The Cadastral Authority's standpoint does not, however, have any conclusive effect on the land use issue, but may be seen as an estimation of the future decision. Thus, even if the municipality is in favour of a proposed new building, the applicant must subsequently obtain the building permit to carry out the intended development.

Substantive provisions and requisites

The substantive requirements for coordination with land use regulations are stipulated in the Real Property Formation Act, Chapt. 3. These specific provisions are mandatory for all property formation measures, and can be said to represent the public interest requirements regarding property division.

According to Section 1, the property units formed or reformed by property formation must be *suitable for a specific purpose* (i.e. intended land use). This purpose can be expressed in some local area regulations (e.g. a Detailed Development Plan), or it can be formulated by the landowner. Outside plan regulations, as mentioned above, this purpose will not be compelling for the final choice of land use – it is not a decision but rather a basis for the public assessment of this provision. Property formation is thus subsidiary to land use rulings in plans, regulations and permits, and has no direct implication for permitted land use. This “suitability condition” does not only involve an examination of the intended land use, but

also such aspects as appropriate size, design and location of the property unit. These aspects are likewise based on the purpose stated by the landowner (outside Detailed Development Plans).

According to Section 2, property formation may not deviate from *legally binding plans* (Detailed Development Plans or Area Regulations, according to the Planning and Building Act). This provision relates to plan regulations of land uses or specific directives for the property division. The second paragraph of Section 2 also states that property formation in areas with *nature protection regulations* may not be undertaken if it counteracts the purpose of these regulations. The most common situation is property formation for housing purposes within shoreline protection areas. In many cases, property formation is denied on the grounds that it may restrain the public from exercising the public access right. However, all measures or activities that may impede or restrain the public from accessing shoreline areas by virtue of public access right require a special dispensation, according to stipulations in the Environmental Code. As mentioned previously, property formation does not supersede the need for such dispensations.

Section 3 establishes a connection between property formation and different types of planning in areas located *outside Detailed Development Plans* (e.g. rural areas). In these areas, property formation may not:

- obstruct suitable usage of the area, or
- induce inappropriate constructions, or
- counteract suitable planning of the area.

Interestingly enough, the first two provisions are in most situations connected to the type of land use changes which require building permits, according to the Planning and Building Act (Ekbäck 2019).

For *agricultural and forestry properties* there is, in Section 5, an additional provision regarding suitability, stating that these properties must have a size and design sufficient for the business to produce an *acceptable economic yield*. This condition builds on the perception that business structure in agriculture and forestry coincides with property division, which ignores the more frequent use of leasehold for possession during later decades (Jupiter 2014).

In Sections 6–8, certain provisions stipulate a protection for *agriculture, forestry and fishery* resource management. If a property formation measure causes damage or inconvenience of some extent for one of these sectors or resources, it may not be undertaken.

To summarize, measures of property formation are in several ways connected to the domain of land use regulation, but the relationship is complex and unclear and in some cases rather inconsistent. The inconsistency concerns the duplication of the permitted land use examination, as well as the perception that property formation itself may result in land use alterations that actually require permission according to other legislation.

4. Comparisons of institutional potentials and impediments for digitalization

The development towards digitalization and automation of legal decision-making procedures poses a significant challenge concerning the nature of criteria and variables, which constitute the basis for assessments and adjudications. In the property formation context, both the Finnish and the Swedish systems include legal provisions that are neither clearly defined nor quantifiable.

In order for digitalization and automation, the assessment criteria must somehow be transformed into logical algorithms (Odelstad 2017). This is obviously problematic with purely qualitative – or non-quantifiable – provisions which require balancing of different interests, public as well as private. The challenge includes developing an algebraic version of the legal provisions and criteria. In the end, operationalization of the law into executable logic software packages must also be achievable (Hjelmblom et al. 2019). We will return to these endeavours in the closing subsection.

Apart from these aspects, there are additional prerequisites in the endeavours to digitalize and automate property formation processes, which are shortly commented in the following subsections.

4.1 Some technical qualifications common for both systems

There are several preconditions that need to be in place for digitalization and automation of property formation, of which two are of more fundamental importance. Although these factors are of a technical nature, they should nonetheless be overlooked, since these requirements need to be in place before any potential revisions of the legal structures and provisions can be utilized and produce any digital benefits.

First, the information basis for the assessments must be in digital format, and when the procedures are executed by different authorities, the format of the data must support interoperability between the registers (Krigsholm et al. 2018, Riekkinen et al. 2016). This is particularly crucial for existing property boundaries, legally binding plans and other regulations (Detailed Development Plans, nature reserves, public road plans, etc.), as well as other real property rights (e.g. easements). This constraint also includes land use, infrastructure, buildings and constructions, etc. The development of databases for these purposes is at present extensive and widespread. However, although many current projects have been launched in that direction, both countries still have a long way to go before the task is completed.

Second, a rather open-and-shut precondition is for a computerized processing system, with documents, maps etc. in electronic form, and access to the real property register and the digital register map. There is also a need for the relevant legislation to admit for applications and documents (e.g. title deeds, purchase contracts, power of attorney, etc.) to be created or submitted in electronic format. These prerequisites present no impediments, as they are already in place, both in Finland and Sweden.

4.2 Legal definition of digital boundaries

Historically, the location of property boundaries in both Finland and Sweden have been legally defined by apparent boundary markers, such as upright stones, fixed metal pipes or knobs, etc. In order to fully utilize the potentials for digitalization and automation, however, the law must give priority to reference system based coordinates, rather than the physical marking.

In the *Finnish system*, the provisions on property boundaries in the Real Estate Formation Act do not give priority to any specific criteria or evidence regarding the legal delimitation of boundaries.⁹ This initial position will probably facilitate, in giving the coordinates significance as firsthand evidence for legal definition of property boundaries, at least in comparison with Sweden (see below).

As mentioned under section 2.1, the basic rule still is that property boundaries should be marked on the ground, with exception for urban areas with Detailed Development Plans.¹⁰ So, the demand for boundary markers in the Real Estate Formation Act, as part of the cadastral procedure, would of course have to be eased.

Several municipalities in Finland do make use of the exception for urban areas, which means that parts of Finland is already operating in a legal coordinate cadastral system. There are also frequent discussions in Finland about a transition to a general digital boundary system, as is already the case in many Detailed Development Plan areas. The problem with such a transition, however, relates to the varying precision of the coordinates in different areas. Urban areas are characterized by a high accuracy, while coordinates in e.g. remote forest areas may have a standard error of up to four meters. One solution could be to move only partially to a coordinate-based cadastre, where all the boundaries in urban areas would be legally defined by coordinates and rural and/or remote areas would remain in the prevailing system (Parikka 2019).

The *Swedish system* regarding boundary locations is, on the contrary, built on the principle that the physical boundary markers have the position as the primary evidence.¹¹ A legal reform where property boundaries primarily are defined by coordinates will to a large extent facilitate the utilization of the potentials with digitalization. Such a transformation would denote that boundary coordinates in the national digital register map have precedence over other facts, such as boundary markers, cadastral maps, possession, and other circumstances.

This concept has also been the subject of several investigations, without resulting in any actual reforms (Lantmäteriet 2017). The reason for these failures stems from two important obstacles that need to be overcome before this transformation is feasible. Firstly, the quality of the boundary coordinates in the digital register map must be improved in some areas, in

⁹ Finnish Real Estate Formation Act, Chapt. 11, Section 104.

¹⁰ Finnish Real Estate Formation Act, Chapt. 15, Section 185.

¹¹ Swedish Land Code, Chapt. 1, Section 3.

order to reflect the true location of boundaries. Secondly, due to divergences between the location of physical boundary markers and the corresponding coordinates, the risk of economic losses (e.g. territorial deviations) connected to the legal transition must be investigated and prevented with some sort of transitional regulations.

As in Finland, the demand for boundary markers as part of the cadastral procedure would have to be eased also in the Swedish system.¹² A moderation of the need for physical boundary markers would reduce most of the field work in both the Finnish and the Swedish cadastral procedures.

4.3 Interconnections between property formation and land use regulations

As mentioned in the introduction of this section, the major challenge in the transition to digitalized and automated property formation is the presence of both quantifiable and non-quantifiable assessment criteria. These are defined in the legislation on property formation in the respective countries. Since both national legislations to varying degrees establish interconnections between the pure property formation (cadastral) measures and the suitability assessment of the intended land use, it may be useful to try to separate the typical character of the different assessment types, on a theoretical plane.

In that view, *property formation assessments* would involve pure cadastral and economic variables, which have a potential to be quantifiable. The technical elements in property formation seems rather uncomplicated, given that the previous comments on geodata, processing system and boundary definition are fulfilled. The economic aspects, involving valuation and compensation assessments, may prove more challenging, but this is mainly dependent on the quality of existing geodata support regarding land use and land values.

On the other hand, for *land use alteration assessments*, the criteria can to a large degree be characterized as qualitative or non-quantifiable. As a general principle, assessments of land use alterations involve identification and definition of a number of public and private interests. Land use alterations for building purposes can be used as an illustration.

According to the stipulations in the Swedish Planning and Building Act, land for building purposes must be suitable for this purpose from a public interest viewpoint.¹³ Hence, at planning or building permit assessments for buildings the location and design should be suitable with regards to health and safety, soil and water conditions, possibilities for providing traffic, water and sewage facilities, the townscape and landscape, natural and cultural values, prevention of accidents, energy management, good climate and hygienic factors, etc. The provisions in the Finnish Land Use and Building Act are of a corresponding nature, supplemented by more specific requirements in each municipality's Building Ordinance.¹⁴

¹² Swedish Real Property Formation Act, Chapt. 4, Section 27.

¹³ Swedish Planning and Building Act, Chapt. 2, Sections 4–7.

¹⁴ Finnish Land Use and Building Act, Chapt. 1, Sections 12 and 14.

These types of legal criteria often require challenging judgements that are not easy and straightforward to formalize into logical algorithms. To enable technical implementation these interests must somehow be quantified, or else the balancing and assessment must take place outside the digital system. Under those circumstances, a combination of automation and manual assessments of more qualitative aspects might be necessary. One possibility is semi-automated decision-making, where a computer identifies decision points and presents a complex decision situation to a human decision-maker, who then makes the necessary judgements and trade-offs (cf. Odelstad 2017). This approach can also be combined with a feature where the computer suggests or recommends a particular decision.

The inference of the above reflections is that for property formation, the major impediments to digitalization and automation are the structural interconnections to land use regulations and land use assessments, stipulated in the legal provisions for property formation. For the discussion of these interdependencies, it may be helpful to make a distinction of property formation within or outside of a Detailed Development Plan. This is because the qualitative balancing of interests, underlying the Detailed Development Plan, actually results in quantifiable criteria in the form of plan regulations connected to geographical reference points when the completed plan is in digital format.

Property formation within Detailed Development Plans

In situations where property formation takes place within a Detailed Development Plan, the Finnish and Swedish systems are very similar in the sense that property formation must be in line with plan regulations on land use, size, design, boundary distance to existing buildings, etc.

The equivalent systems with a superior significance of legally binding plans seem logical and rational. In these cases, the cadastral procedure becomes somewhat of a completion measure to promote and enable implementation of the designated land use. From a digitalization perspective, there would be several advantages by legal requirements for conformity between property division and the land use regulations. As mentioned above, the planning process in itself requires balancing of several public and private interests, which at present is only feasible in a qualitative format. However, once the plan is decided, opportunities for quantitative assessments regarding the conformity of different measures with the plan regulations are vastly improved.

The above standpoint is built on the important precondition that the plan is digital, a development that is currently underway in both Finland and Sweden. With the development and transformation of Detailed Development Plans into digital format, coordination and seamless transmission of plan regulations in electronic, computerized form will be enabled, which can be used in a digital and automated cadastral procedure. This puts a pressure for converting the cadastral systems into legally binding coordinate systems and raises a question of the legal standing of a cadastral map, which is currently in both countries an index map.

Property formation outside of Detailed Development Plans

Since the Finnish legislation has special stipulations regarding property formation for building purposes, the analysis below is separated concerning property formation for building purposes and for other purposes, respectively.

For building purposes

The interconnections between property formation for building purposes and land use regulations are also similar in both countries, even though the regulations are laid down in different legislation and in different forms.

In Finland, the basic requirements for the size of the building site (2 000 square meters) and the suitability conditions laid down in the Land Use and Building Act, which may be specified further in municipal Building Ordinances, constitute the legal conditions for property formation for the establishment of new building sites. As previously noted in subsection 2.2, property formation is still possible although the new plot will not fulfil the requirements for a building site and can probably not obtain a building permit.

The Swedish Real Property Formation Act does not have different provisions depending on the presence or absence of a building purpose for the property formation. However, for building purposes, Sections 1–3 of Chapter 3 are primarily applicable in those cases (see previous subsection 3.2 for details).

As illustrated below in figure 1, both national systems uphold this interdependency in property formation for building purposes outside Detailed Development Plans, although they are also alike in having a flexibility regarding the sequential order. The building permit may be obtained either before or after the property formation in both national systems.

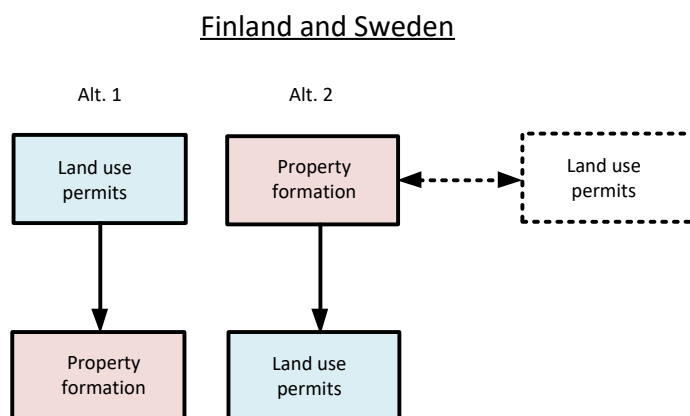


Figure 1: The interdependence between property formation for building purposes and land use regulations, outside Detailed Development Plans. Procedural sequences of assessments and decisions in the national systems are analogous.

In the former case (Alt. 1), the opportunities for digitalization and automation of the property formation seem unproblematic with regards to land use regulation, particularly when the building permit is issued in digital format. In the latter case (Alt. 2), the Cadastral Authority has to examine the preconditions for a permit through investigations and communications with other authorities etc. before property formation is completed.¹⁵

The assessment at property formation in these latter cases will thus require the same type of qualitative assessments that take place in a planning process, although on a smaller scale. On a structural level, we find the same type of impediments for digitalization and automation existing in both systems.

For other than building purposes

When the purpose of the property formation is not for buildings, the legal systems are very different. The Finnish Real Estate Formation Act has no interconnections to the permissibility of the intended land use at all. The Swedish Real Property Formation Act, on the other hand, still upholds the previously presented stipulations regarding suitability for the intended purpose. This means that the assessment in Sweden will, to a large degree, resemble the situation for building purposes.

The structural differences between the national systems for non-building purposes are illustrated in figure 2. In the Finnish system the examination and outcome of property formation and land use permission are independent of each other in these situations. The Swedish system, in contrast, upholds this interdependency for all land use purposes. Both systems have a flexibility with regards to the sequential order also in these cases. A necessary land use permit can be obtained either before or after the property formation.

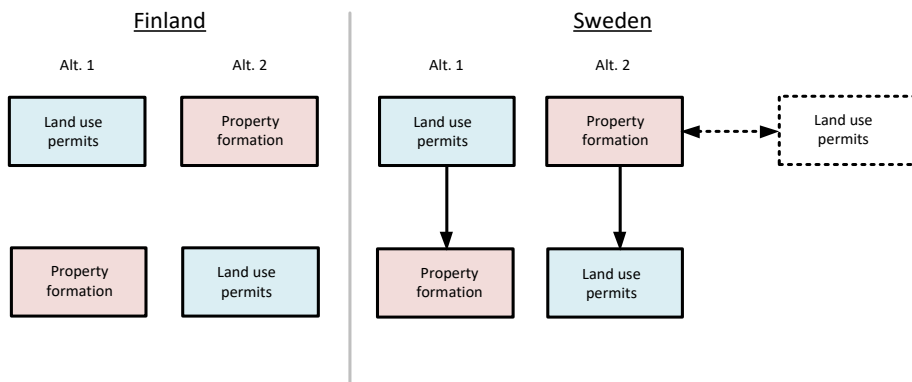


Figure 2: The interdependence between property formation for non-building purposes and land use regulations, outside Detailed Development Plans. Procedural sequences of assessments and decisions in the different national systems.

¹⁵ The responsible authority for the formal assessment and granting of building permits is the municipality in both countries (see the Finnish Land Use and Building Act, Chapt. 19, Section 130, and the Swedish Planning and Building Act, Chapt. 9, Section 20, respectively).

For the Swedish system, the former case (Alt. 1) is unproblematic, while in the latter case (Alt. 2) the Cadastral Authority has to examine whether a permit may be granted through investigations and communications with other authorities etc. before property formation is completed.

For Sweden, there is a significant impediment to digitalization and automation in the substantive stipulations in the Real Property Formation Act, Chapt. 3, which interconnect the assessment at property formation to obvious qualitative – non-quantifiable – assessments for all types of land uses. So, here the impediments are only present in the Swedish system. Obviously, the problem is amplified when the property formation is undertaken with the intention to carry out a land use alteration which requires some other kind of permission, e.g. a permission for undertaking environmentally hazardous activities, dispensation from shore line protection, etc.

5. Discussion and conclusions

The purpose of this article is to explore and analyse legal structures and relationships in real property law, in order to evaluate potentials and impediments for digitalization and automation of property formation processes in Finland and Sweden. The previous presentation and analysis have identified and commented on some technical qualifications and the need for a legal transformation to digital property boundaries, with some technical, legal and economic difficulties identified for the latter reform. The most important challenge, however, is found in the legal interdependency between property formation and land use regulations.

The legal endeavour to coordinate property formation measures with the land use regulations outside Detailed Development Plans generates obvious impediments for the current objective to digitalize and automate property formation. For Finland this concerns property formation for building purposes, while the Swedish system is problematic independent of land use purpose. The problems are reinforced by the present flexibility in the systems, where an applicant can choose in which order the property formation and the land use requirement should be assessed and decided.

In a digitalization perspective, the prevailing situation means that the qualitative assessment of the permissibility of the intended land use must not only be assessed in two different procedures, but also that the property formation will require a number of qualitative assessments in addition to the other quantifiable criteria. Two diametrically opposite legal measures are conceivable in order to improve the conditions in order to fully utilize the digital technology.

One of the pathways could be to further *strengthen and clarify* the connection between permitted land uses and property division, and to cancel the present procedural flexibility. That is, in cases where the property formation relates to a purpose subject to a permit, an unconditional requirement to first obtain the permit could be introduced. The requirement for prior land use permission, before the property formation is assessed, avoids both the risk of

double assessments of the land use and the element of qualitative assessments, both of which are associated with the land use issue.

The opposite path of reform could instead be to *repeal* the stipulations connecting property division to land use, and untie land use issues from property formation outside Detailed Development Plans. The cadastral procedure would then not include any assessment of the likelihood for obtaining necessary permits for the intended land use. The responsibility for this coordination will then instead rest completely on the applicant, who naturally still should be able to apply for and obtain necessary permits before the property formation. This solution would be equivalent to the Finnish system for both building and non-building purposes, outside Detailed Development Plans. This last suggestion would only involve legal reforms of property formation on the Swedish side, for all land use purposes. However, both suggestions above would facilitate a transition to digital and automated property formation.

As noted in the introduction to this article, digitalization and automation of land development processes require studies and advancements of technical, organizational as well as legal conditions. To a large degree, analyses of the legal substances, structures and systems in real property law have so far not received much attention. Hopefully, this study is a small step in that direction.

Finally, we would like to point out that the presented suggestions are founded on one specific dimension of digitalization and automation of property formation. One should be aware of that other factors in the legal system may come in conflict with our recommendations, when a broader perspective is applied. This question is, however, outside the scope for this article, but must of course be carefully investigated and analysed in order to fully understand the consequences at large.

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Controlling Land Consumption for Urban Development

in Light of UN's SDG 11.3

Abstract

United Nations (UN) calls on all countries to limit land consumption to an appropriate level. More specifically, the UN asks all countries *“By 2030, to enhance [...] sustainable urbanization [...] and sustainable human settlement planning and management in all countries”*, cf. SDG 11.3 To reach this target, it is suggested to use *“Ratio of land consumption rate to population growth rate”* as an indicator (indicator 11.3.1).

Some countries have already implemented strategies or other measures to control land consumption – some have even had it for a long time – while others are considering how to approach the challenge. There are basically two different approaches that countries can implement to reduce land consumption: to determine quantitative provisions or to apply more qualitatively oriented political strategies. While most countries that have already implemented measures to control land consumption have chosen the quantitative approach, the Danish Government has chosen a qualitative approach – starting many years ago. There are definite advantages and disadvantages of both approaches, but the Danish one has turned out to be quite effective. The article will present and analyse Denmark's approach to act as inspiration for countries focussing on SDG 11.3 and indicator 11.3.1.

1. Introduction

The year of 2015 marked a defining year for sustainable development worldwide. At the 70th United Nations General Assembly on September 25, world leaders adopted a new global sustainable development framework: the 2030 Agenda for Sustainable Development that includes the so-called Sustainable Development Goals (SDGs).

Since 2016, the EU has committed to be a frontrunner in implementing the 2030 Agenda and the SDGs, together with its Member States (COM(2016)739 final). One of the SDGs is about limiting land consumption.

The terms “land consumption”, used in United Nations' (UN's) sustainable development goals (SDG 11.3) and indicators (indicator 11.3.1)¹, and “land take”, used by the European Environmental Agency (EEA)², are synonyms and describe the conversion of semi-natural

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¹ United Nations 2016.

² European Environmental Agency, 2019.

and natural land into developed land for different urban purposes. Both institutions – UN and EEA – argue for the need for systematic solutions to reduce the scale of land take and soil sealing that are implications of the ongoing urbanization at the expense of agricultural and natural areas and forests in particular.

1.1 United Nations' targets and measures regarding reduction of land consumption
UN's SDG 11.3, encouraging all countries to reduce land take, asks specifically "[...] to enhance [...] sustainable urbanization and [...] and sustainable human settlement planning and management in all countries". Thus, both central and local governments have been given an important guidepost to act on in their spatial planning and other activities.

Although SDG 11.3 is specifically about sustainability, it is still unclear what specific targets and standards are to be used to monitor the development and progress towards the achievement of the objectives. Therefore, while achieving the targets of sustainable urbanization and sustainable human settlement planning, it is proposed to monitor developments with indicators like "*Ratio of land consumption rate to population growth rate*". But there is no numeric standard specified that tells if the growth in land take relative to population growth is too large or appropriate.

1.2 EU's targets and measures regarding reduction of land take

Already since 2013, the EU subscribed to a goal of "no net land take by 2050" (Decision No 1386/2013/EU of the European Parliament and of the Council, 2013). Neither the SEA Directive (2001/42/2001) nor the EIA Directive have had "land" as a specific subject area. Nonetheless, it has been assumed that the "no net land take by 2050"-goal should be achieved in particular through Environmental Impact Assessment (EIA). The EIA Directive contains a catalogue of "factors" for which direct and indirect significant effects – particularly adverse environmental impacts – are to be identified by an EIA-procedure.

The EIA Directive was amended in 2014 (2014/52/EC). Originally, the catalogue of "factors" contained soil besides water, air, climate and landscape (Art. 3 EIA Directive (85/337/EEC)). In 2014, the catalogue was extended by "land" (and further factors) making it clear that it is the legislator's intention to distinguish between "land" and "soil".

Just as the UN conceptual distinctions are not entirely clear, the same applies in the EIA Directive with regard to the distinction between "land" and "soil". However, directive's recital 9 provides some explanation: "(...). *Public and private projects should therefore consider and limit their impact on land, particularly as regards land take, and on soil, including as regards organic matter, erosion, compaction and sealing; appropriate land use plans and policies at national, regional and local level are also relevant in this regard.*"

Member States had to bring into force the laws, regulations and administrative provisions necessary to comply with the amended EIA Directive by 16 May 2017, but they were not provided with any further definition of "land" or "land use" or with a differentiation between "land" and "soil". However, it could be argued that recital 9 at least gives some indication.

Nevertheless, the question remains, what to focus on when assessing the impact on “land”. Here, the Danish implementation of the EIA directive may contribute to a better understanding.

1.3 The immediate national implementation of the supranational targets and measures on reduction of land take in Denmark

The objectives of the EIA directive, and thus the SDGs on land consumption and land degradation, are reflected in the Act on Environmental Assessment of Plans and Programs and of Specific Projects (EIA) (hereafter: the Danish Environmental Assessment Act).

The act states that the purpose of an environmental assessment is to take into account the likely significant impact of plans, programs and projects on the environment. In the listing of the influencing factors to be included in the environmental assessment a wide range of factors is mentioned: Biodiversity, population, human health, flora, fauna, soil, *land*, water, air, climatic factors, material assets, landscape, cultural heritage including churches and their surroundings, architectural and archaeological heritage, greater human and natural disaster risks and accidents, resource efficiency, and the interrelationship of these factors (cf. the Danish Environmental Assessment Act, § 1–2).

The Danish Environmental Assessment Act may provide some clarification as land is consistently (or at least 5 out of the 8 times the term “land” is mentioned in the law) linked to “natural resources”. In addition, the law mentions separately landscape, cultural heritage including churches and their surroundings, and architectural and archaeological heritage.

Overall, it could make sense to define “land take” as something to be assessed. Not just because land is a scarce resource, but especially if the land take entails adverse and irreversible interventions in natural areas, landscape, cultural heritage including churches and their surroundings, and architectural and archaeological heritage.

In the following, the Danish way to approach the challenge of land take is presented and analysed, starting with a brief country description to put the analyses in context. Further, it is discussed how well the Danish approach functions as a limiter of land take. It also serves as inspiration for countries focussing on SDG 11.3 and indicator 11.3.1.

2. The Danish approach how to control land take through the planning system

2.1 A brief overview of Denmark

Denmark’s land area is 43,000 km² (excluding Greenland and the Faroe Islands). Denmark consists of the peninsula of Jutland and 406 islands, of which 73 are inhabited. The total length of the coastline is 7300 km.

Like most other countries, Denmark is governed centrally by the Parliament, the government and the state administration, but also by 5 regions and 98 municipalities, each with politically elected politicians with extensive decentralized competences. However, in terms of planning, management and land use, the regions play a negligible role. As documented

in section 2.2, the power over planning and land use is distributed between the state and the municipalities.



Figure 1: Denmark with the three main areas (the peninsula Jutland and the islands Fyn and Zealand) and the location of the five biggest cities (Ministry of the Environment, Nature Agency, 2012: 2).

The land use is around 66% agriculture, 16% forest, 8% other natural areas, and 10% urban areas and transport facilities.

Denmark has 5.8 million inhabitants (2019), and the latest population projection from early 2019 shows that until 2030, the total population is expected to grow by 268,000 people or 4.6 per cent. The population density is 135 inhabitants per km² (2019). Around 87% of the people live in towns and urban areas with more than 200 inhabitants³, while 13% live in the countryside and small villages. I.e. 87% of the population is more or less concentrated on approx. 10% of the land area.

As in most parts of the world, the trend is that the influx of cities is increasing, influenced by the continuous population growth. Furthermore, there is an increasing demand for better housing conditions, for more and better traffic infrastructure, etc. Together, this results in continuous increased pressure on – or land take from – nature and semi-nature areas, which are gradually being transferred for urban and infrastructure purposes.

The increasing pressure and increased land take in Europe and the rest of the world is not a new phenomenon. On the contrary, it has been known for decades – also in Denmark. Therefore, Denmark has for more than half a century tried to handle the ongoing pressure to transfer nature, semi-nature and also agricultural land for urban and infrastructure purposes.

³ In Denmark, a village/town/city is defined as a naturally connected settlement with at least 200 inhabitants, cf. Statistics Denmark.

2.2 How is land take for residential, industrial, commercial and transportation purposes controlled in Denmark?

The entire planning system as a whole plays an important role in the control of land take in Denmark. Therefore, the Danish planning system will be the subject of a brief presentation in the following.

A brief overview of the Danish planning system (by January 2020)

The Danish planning system consists of two levels: a *national planning level* and a *municipal planning level*. From the 1970s to the beginning of this millennium, the Planning Act also contained a regional planning level, but it gradually thinned out after the municipal reform in 2007.⁴ Today there is no longer any regional spatial planning in Denmark.

The *national planning level* is defined by a number of substantive provisions in the Planning Act, including on zoning. In addition, it is defined by a series of powers assigned to the National Planning Authority, i.e. the Minister of Business and Industry in Denmark. See Figure 2 below.

The *municipal planning level* consists of the 98 municipalities in their capacity of local planning authorities. Danish municipalities are self-governing with tax collection rights, and they have a high degree of decentralized decision-making competences, also in planning. They do most of the planning in Denmark by preparing and maintaining a comprehensive municipal structure plan for each municipality. They prepare a detailed land use planning in the form of legally binding local plans and they enforce the plans. In addition, they are also responsible for administration of the limited development activities in the rural area (rural zone administration).

However, as can be seen in Figure 2 below, Danish municipalities are intensively guided in their behaviour by both the Planning Act and National Planning. The number of instruments at national planning level alone is a clear indicator for the distribution of power between the national and local planning authorities.

The central government's control of the municipal planning authorities is based on an idea of so-called "*framework management*". The large number of concrete standards, interventions, and control options to subordinate planning authorities constitutes one half of the Danish planning system's so-called framework management principle. The other half consists of the rule that plans, permits and other decisions at subordinate levels must respect plans and decisions at superior planning levels. The framework management principle has greatly contributed to the fact that Danish planning is relatively coherent and well-coordinated from top to bottom. The framework management entails that the building permit simultaneously functions as a planning permit. And it should be emphasized: a planning

⁴ Up until the municipal reform in 2007, there were 273 municipalities and 16 counties (including 3 municipalities with county function). After the municipal reform they were reduced to 98 larger municipalities with better capacity, including within planning, and 5 regions.

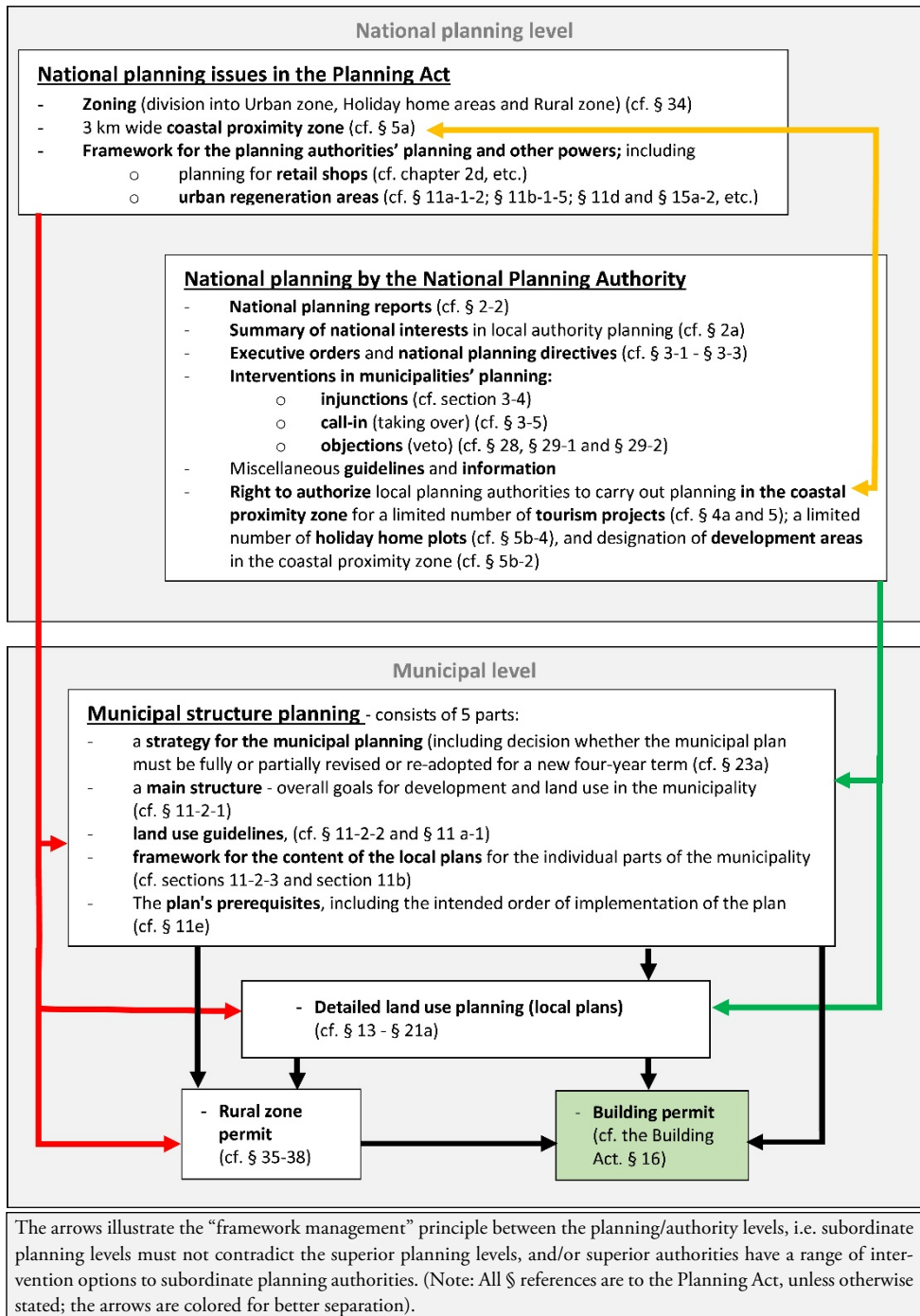


Figure 2: The Danish planning system as of January 2020. The "framework management" entails that the building permit simultaneously functions as a planning permit.

permission which respects the guidelines at all levels of planning. Thus, the building permit becomes the “crank” or focal point of the entire planning system.

National planning level

The most fundamental national planning instrument laid down in the Planning Act itself is zoning, i.e. the division of the entire country into zones. Zoning has had a great impact on Danish planning, which is evident in the Danish landscape to this day. The division into *urban zone*, *holiday home areas* and *rural zone* dates back to the Zoning Act of 1969. But already with the City Regulation Act of 1949 it became possible to regulate the urban land use and also to exclude areas from urban development.

The zoning scheme was supplemented in 1991 with the Coastal Circular (National Planning Directive, no. 215/1991) that introduced a new *coastal proximity zone*. It covers the coastal strip from the seashore and about 3 km inland and thus overlaps with holiday home areas and rural zones. The coastal proximity zone is a prohibition zone that must be kept free of buildings and facilities that do not depend on coastal proximity. The *coastal parts of the urban zones* that lie off the coasts are not prohibition zones as such. Here the rule is simply that buildings must fit into the coastal landscape as a whole. In 1992, the Coastal Circular was merged with the Zoning Act and the two previous planning laws (the National and Regional Planning Act, and the Municipal Planning Act) into one law, the first Planning Act, which includes all statutory land use planning provisions.

A major amendment to the Planning Act came in 1997. The law was added a number of planning principles and rules, primarily intended to limit the expansion of large malls and hypermarkets outside the cities to ensure a continued supply of *retail shops* within the cities. The general rule was, and still is, that new retail trade shall be located in the centre of a town or in larger towns in the centre of an urban district.⁵ Although it was not a stated goal to reduce land take, the amendment was, at least indirectly, a contribution to reduce land take. The same applied to the next major amendment to the Planning Act in 2003 on *urban regeneration*.

Since 2003, municipalities were allowed to designate *urban conversion areas* in the municipal plan in order to help and to improve the opportunities for converting disused industrial sites, including harbours, for new urban purposes.⁶ Reuse or regeneration of land in urban conversion areas also contributes to reduce land take.

⁵ The Planning Act includes a few exceptions from this rule, for example small, local shops and shops with goods that require unusually large quantities of floor space. The retail regulation is integrated in many paragraphs of the current Planning Act but appears mainly in chapter 2d.

⁶ With the designation *urban conversion area*, it is allowed to lay out noise-sensitive land use purposes (e.g. housing), including preparing local plans, even if the noise level is currently too high due to ongoing industrial activity in the area. However, it is a prerequisite that the noise in the local area can be reduced to an acceptable level over a shorter period of time (ca. 8 years). This means that there will be a transition period where the new noise-sensitive land use must tolerate an elevated noise level, while the noisy companies can be obliged to reduce the noise (or move to another address) after not substantially more than 8 years.

The Planning Act also establishes a precise framework for both the national and municipal planning authorities' planning rights and obligations and other powers. Regarding national planning by the National Planning Authority, it is about explaining, defining and enforcing national interests that must be reflected at the municipal planning level. More details are documented in Figure 2 (under "National Planning by the National Planning Authority").

Municipal planning level

Two planning instruments exist at the municipal level: the semi-binding *municipal structure plan* and the *local plan*, which is a detailed land use plan with immediate legal binding effects for landowners and landusers. However, local plans do not imply an "obligation to act", in the sense that existing land use etc. must be changed in accordance with the plan. Current lawful use of buildings and land within the plan's area may continue despite a new local plan, until the use of the land or buildings in question is to be changed.

Every municipal council acting as local planning authority must prepare – or rather maintain⁷ and enforce – a *municipal plan* with a 12-year horizon. The municipal plan consists of five parts (see Figure 2). In particular, the *land use guidelines* (part 3) are worth to be mentioned: The guidelines and the area designations entail state what considerations the local council will include in the assessment of whether new local plans are to be made for the purpose to transfer land zone to urban zone or to holiday home area (= land take). The guidelines and the area designations also specify the assessments carried out for applications of *building permits*, *rural zone permits* or exemptions under the legislation. In addition, the guidelines form the basis for the municipality's nature management and other initiatives for new activities, etc.

The "rolling" municipal planning, i.e. the fact that the municipal plan is updated at least every four years (see note 8) with a new 12-year horizon, has the particular advantage that the municipal planning is continuously calibrated in relationship to superior planning. Among other things, municipalities are forced to revoke unused land reservations for urban purposes – at least to some extent.

That the municipalities are only to some extent forced to revoke unused land reservations for urban purposes is due to the fact that some land reservations have been subject to detailed land use planning and are thus covered by a legally binding *local plan*. Since the 1970s, more than 40,000 binding local plans have been drawn up and local plans are in force until they are possibly repealed, which requires an active decision from the municipality. In other words, Danish local plans have no automatic expiry or expiration date. Although the Planning Act allows for the repeal or revision of a local plan, usually local plans are rarely changed or repealed. The binding effect of local plans in Denmark means that to some extent they

⁷ Only exceptionally, a municipality prepares a completely new municipal plan from the start. The maintenance of the municipal plan follows from the fact that the municipalities are obliged to draw up a strategy for municipal planning at least every four years (cf. § 23 a) by which it is decided whether the current municipal plan should be revised or not – and if so, what parts.

create a building opportunity or even a building right. To a certain extent, rights and obligations are adhered to. Therefore, both the legislative authority and the planning authorities are very reluctant to change or cancel local plans.⁸

Preliminary conclusion on the efficiency of the Danish planning system

Disregarding the inertia of the planning system because of older local plans with in fact everlasting building options, the Danish planning system is an effective implementation system for superior, national and supranational policies due to:

1. the division of the entire country into *urban zones*, *holiday home areas* and *rural zones* from 1969,
2. the determination of the *coastal proximity zone* in 1991, which states that coastal areas must remain free of building and constructions not necessarily be located close to the coast,
3. *special rules for planning for retail trade purposes* since 1997 to curb out-of-town shopping centres and hypermarkets, and
4. the opportunity of municipalities to designate *urban conversion areas* since 2003 in the municipal plan in order to “recycle” disused industrial sites, including harbours, for new urban purposes.

The above documented points can be considered as the four basic statutory regulations against uncontrolled land take. They bind the planning authorities’ planning practices and both the national planning authority and the appeal bodies enforced them continuously. And, although old existing local plans’ building options, which the authorities are reluctant to repeal, potentially counteract this, no uncontrolled land take has been opened – at least not to any significant extent.

Therefore, it can be concluded that the entire planning system plays both an important and decisive role in the control of land acquisition in Denmark and that it is fairly effective.

However, the question is whether the change of the Planning Act in 2017 (the so-called “liberal planning law”) will undermine the well-functioning built-in protection of the planning system against uncontrolled land take, as the first three points were affected by major or minor easing.

⁸ Danish planning legislation is based on the principle of compensation-free regulation. Therefore, a local plan can basically both be provided and repealed without compensation. However, if a landowner loses a building opportunity, for example, if a local plan is repealed, the compensatory consequences can be difficult to foresee by the authorities. Therefore, there is generally a restraint in revoking local plans and, thus, building opportunities. This was confirmed once again in a decision by the Nature Protection Board of Appeal in 2007 (NKN-33-00580): Although the Planning Act contained provisions for max. shop sizes, and the municipal plan was adjusted and contained corresponding provisions on max. shop sizes, then an older local plan, although it did not contain provisions for max. shop sizes, continue to form the basis for establishment of store construction in contravention of the current Planning Act.

The “liberal planning law” from 2017

As seen above, Denmark usually had a rather restrictive regime against land take, at least since 1969. The regulation for coastal areas from 1991 and regarding retail business from 1996 was conducted under Social-Democrat led governments. The regulation regarding urban conversion areas was implemented in 2003, shortly after the accession of the Conservative-Liberal Government, which has led Denmark for most of this millennium. Over the past nearly 20 years, no further and major regulations have been implemented against land take. Rather, on selected fields restrictions have been loosened up.

By amendment of the Planning Act of June 2017, the national planning authority (which in the same Act was transferred from the Minister for the Environment to the Minister for Business and Industry) was enabled to allow Danish municipalities – by request of municipal councils – the transfer of rural zone areas to holiday home areas, equating to *6000 new summer cottages*⁹ in coastal holiday home areas (cf. § 5b–4) and in addition, up to *25 tourism projects in the coastal proximity zone* (cf. § 4a–1 and 5–1). Moreover, the amendment from 2017 permitted the Minister for Business and Industry – also by request of municipal councils – to designate so-called *development areas in the coastal proximity zone*, which enables urban development if the development areas do not include areas with special natural, environmental and landscape interests.¹⁰ Finally, with the new Planning Act of June 2017 a bundle of concrete *easements of the rural zone regulations* was implemented to promote rural growth and development. Citizens and businesses have hereby been granted a number of immediate rights under the Planning Act, without having to apply for a rural zone permit from the municipality in advance (e.g. transformation of redundant farm buildings to facilities for craft firms and industrial companies, small shops, etc.).

For the Conservative-Liberal Government these relaxations in the 2017 Planning Act was a long-standing political desire to support rural life, including life in the coastal outskirts. More broadly, the government’s intention was to stress that planning and the Planning Act should not only play a role in protecting nature and landscape, but as stated in the current Danish Planning Act, cf. section 1, it should *both* protect nature and the environment *and* provide a good framework for growth and development in all parts of the country.

It is largely the view of the current government that protection of nature, the environment and cultural values must take place in a “balanced interaction” while creating growth and development throughout Denmark, which is also an important prerequisite for sustainable development. In other words, sustainable development is also seen as economic development through business and job creation in preparation for good living conditions in all parts of the country, also in (selected) coastal and rural areas and in the villages. The Planning Act of 2017 emphasized that “use” and “protection” of land must go hand in hand and should not to be considered as incompatible.

⁹ Provided that areas meant for at least 5000 undeveloped summer cottages (building plots) are returned to rural zone.

¹⁰ Cf. The Planning Act § 5b-2.

3. Does the current Danish planning system support or undermine limitation of land take?

Despite the relaxations in the 2017 Planning Act, the Danish planning system – as the article authors see it – is both a restrictive and an effective regime of instruments against uncontrolled land use. Something that emphasizes the continuing restrictive nature of the planning system, including in terms of land take, is that Danish planning practice always had a distinctive character of *traditional rational planning* (analysis→objectives→instruments), although many different theoretical directions have influenced the planning system over time.

The restrictive and rationalistic analytical-methodological approach in municipal planning was emphasized in 2017, when the national planning authority laid down stricter rules on the municipal council's method for calculating the expected need for new areas for urban development.

For several decades, the Danish Planning Act has required Danish municipalities to plan for – and to estimate the need for – new housing areas, business areas (not least manufacturing companies), retail space, transport facilities and other service constructions. Until 2017, there was extensive “free choice of method” regarding the estimation of need. However, in 2017, the National Planning Authority released a new ministerial “*Guidance on urban growth*”, which is largely aimed to limit land take.

The guidance contains a rather simple method for calculating area needs in three steps:¹¹

- (1) The municipality calculates the total expected area requirements for the next 12 years (gross need).
- (2) The municipality identifies the spatiality, i.e. areas for urban growth in the current municipal plan, which have not yet been utilized.
- (3) The municipality assesses if there is a need to dedicate new areas for urban growth. This is based on two criteria:
 - (a) The municipality realizes that the need for urban areas is greater than the available space, corresponding to a positive net need, or
 - (b) Overall, the municipal plan contains sufficient land to cover the need for the coming 12-year period, but they may be in the wrong place. The municipality considers that there has been a change in the composition of the need for land for urban growth as a result of new conditions in the municipality or the development of society in general, which gives rise to redistribution of land for urban growth.

In calculating its need for new urban areas, the municipality must consider the opportunities for urban conversion and densification of already utilized land, as this may affect the amount of land take.

¹¹ Cf. Danish Business Authority, 2017. p. 7–8.

These tighter rationalistic guidelines on how to estimate the need for new urban areas after 2017 – which are possible to review and verify – maintains and reinforces the restrictive nature of the Danish planning system. Thus, the guidelines for the assessment of needs become a counterbalance to the relaxation of the planning system that took place that same year.

It could be argued, that such rational and analytically based planning also increases the quality and legitimacy of municipal spatial planning (and in particular as regards the topic of land use for future urban purposes). By this, planning is understood as a process facilitated by planners, the result is decided by the municipal council and implemented by the property market, but where the whole process must be open to public input (or at least oversight and control).

The raised question above was: Does the current Danish planning system support or undermine limited land take? The answer to this should be in the affirmative: The Danish planning system certainly supports a limited land take.

Firstly, because of the restrictive and rationalist nature of the planning system, which has even been reinforced by the aforementioned new *“Guidance on urban growth”*, which is largely aimed to limit land take. By virtue of this, Danish municipalities must always ensure that their concrete municipal and local planning strive to balance land take based on the principle: *“as little as possible, but as much as necessary”*. On the one hand, land is recognized as a scarce resource. On the other hand, development is also needed, and a certain amount of land take for residential, industrial, commercial and transportation must be accepted.

Secondly, there are measurable indications that the Danish planning system entails a relatively small land take in relation to the population development. In the period from 2011 to 2016, i.e. before the enactment of tighter guidelines in 2017, population growth was significantly higher than the growth in buildings, built-up areas, infrastructure and more. While the population has grown by 2.6% from 2011 to 2016, areas with buildings, residential areas etc. only grew 0.4%.¹²

It is difficult to evaluate the two percentages in a relevant way. When is the growth in land take relative to population growth too large or appropriate? However, it can be found that the Danish population growth is largely maintained within existing urban areas. During the same period, agricultural land has been reduced by 1.2% and areas with nature have grown by 3.1%.¹³

4. Concluding remarks

There are examples of countries operating with goals and visions for land take like “less than 30 ha/day by 2030”.¹⁴ In Denmark, neither the Parliament nor the national planning

¹² Cf. Dansk Arkitekturcenter og Rambøll Management Consulting 2019, 43.

¹³ Ibid., p. 43.

¹⁴ The Federal Government in Germany, 2016, 38.

authority has decided such quantitative targets. We should not directly advise against this type of targets. They may be good enough to apply at an aggregate level. However, we would not recommend that they are used as the only strategic goal or guideline for land take.

Rather than a one-sided focus on “ratio of land consumption rate to population growth rate” – or at least as a supplement to it – there should be a focus on “*so little (land take) as possible, but as much as necessary*”. Therefore, instead of – or as a supplement to – quota management and fraction accounting, *traditional rational planning under central government control and with public participation* should be considered. In this way, there is even a chance of an even better fulfilment of target 11.3, which is precisely about public participation.

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The Urban Planning Split: Area Based Qualities vs. Efficient Project Implementation

Abstract

Scarcity of land and land resources is a fundamental aspect of the public need to manage land use. According to the Norwegian Planning and Building Act, its purpose is to “promote sustainable development in the best interests of individuals, society and future generations” (section 1-1). General densification, understood as any infill development within the existing urban structure, specific densification of hubs on the public transport system and brown-field transformation of the urban fabric are all a part of the land-use policy for such development. However, there are few examples of land assembly strategies from public authorities aimed at providing land for such densification and transformation. Thus, such land assembly is left to private property developers and most urban transformation relies on private real estate development (Holsen 2019).

Norwegian statutory land use planning is a relatively unique system internationally in the way it allows for private initiation and preparation of detailed zoning plans (Fredricsson and Smas 2013). Private real estate developers, aiming for delivering economic surplus for their owners, initiate and prepare the vast majority of all approved detailed zoning plans. Achieving sustainable development for the society at large while securing efficient project implementation for the specific development, then, might be characterized as “the urban planning split”. Several studies indicate that the initial phase of the planning process and deliberation ahead of the formal planning process is crucial for overcoming this split (Børrud 2013; Meyer 2014; Holsen 2018; Tiller and Ekrene 2019). The purpose of this article is to frame what characterizes the initial phase of a private development plan and to discuss possible new perspectives on how to understand problems of implementing detailed zoning plans.

The experienced urban planning split is, first, a knowledge issue due to different expectations of how to interpret the urban situation, and, second, how on one side the private developers understand their responsibility to achieve a sustainable environment and on the other side how the planning authority understand the calculations of risks and costs of real estate development. It is reasonable to assume that the urban planning split might be reduced through better communication and a shared understanding of the urban context of the development project. However, it is also reasonable to assume that completely removing the split is impossible.

Keywords: urban planning, urban design, implementation, real estate development, transaction costs, sustainability

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1. Introduction and background

The current Norwegian Planning and Building Act of 2008 consists of two separate parts – on planning and on building matters respectively. The purpose of planning according to the Act is to “establish goals for the physical, environmental, economic, social and cultural development of municipalities and regions, identify societal needs and functions, and indicate how these functions can be solved” (section 3-1), i.e. a rather encompassing definition. The purpose of the building part of the Act is, on comparison, quite narrowly to ensure the predictable and efficient processing of building applications (Proposition to the Storting 45 B 2008).

From mid 1990s, transformation and densification of the urban fabric has been a national Norwegian land-use policy. This might happen as general densification, understood as any infill development within the existing urban structure, specific densification of hubs on the public transport system or brownfield transformation of the urban fabric. There are few examples of land assembly strategies from public authorities aimed at providing land for such densification and transformation. Thus, such land assembly is left to private property developers and most urban transformation relies on private real estate development (Holsen 2019).

Most likely, approval of a new detailed zoning plan is a necessary part of the process. The Norwegian planning legislation is a relatively unique system internationally (Fredricsson and Smas 2013) as it allows for private actors to initiate and propose detailed zoning plans. Most plans approved by Municipal Councils are the result of such private plan proposals. Usually this process includes negotiation between the municipal planning agency and the private developer prior to a compulsory public inspection of zoning proposals and the final approval of the plan by the municipal council. Municipal authorities and private developers pursue some quite opposite goals. Municipalities are bound by the law’s aim of coordinating interests and considerations across sectors and areas of society within the system of the law.

Private property development that includes drafting zoning plans consists of two phases. First, what can be characterized as an initial and informal phase. Here the developer, within the framework of overall municipal plans, must prepare a plan proposal that is economically feasible. Basically, the property developer has the main responsibility for progress in this phase. Then follows a formal phase of public inspection. The decisions to submit a draft zoning plan for public inspection is a part of the municipality’s discretion. In this phase, the municipality is responsible for progress. Both phases are described and defined through the Planning and the Building Act. When planning work is commenced in the informal phase, the planning question shall according to the law be put before the planning authority at a formal meeting between the developer and the municipal planning agency. This meeting is the start of what national planning authorities denotes as a dialogue. In practice, this dialogue is a process of negotiations.

Due to the split nature of the objectives of the Planning and Building Act the initial and informal phase might be characterized as ‘the urban planning split’. The expression refers

to the situation where the municipal planning agency aims to both provide professional builders an efficient, satisfactory and reliable administrative consideration and to protect the common goods within an overall area to achieve a sustainability future. If the attention towards these goals go in opposite directions, it might be difficult to reach them both. As in the gymnastics, doing the split can be rather impressive, but also painful if you do not have the skills or do not have practiced enough. This situation is frequent in urban planning, and how municipal planning authorities in Norway deal with it is the topic of this article. It is based partly on document studies of legal preparatory work and partly on empirical studies of Norwegian planning practices.

2. Plan-led and development-led planning

Public authorities might take a passive or active role in the planning and implementation of urban transformation (van der Krabben and Jacobs 2013) and planning systems can be characterized as either plan-led or development-led (Muñoz-Gielen and Tasan-Kok 2010). Norwegian statutory planning consists of legally binding zoning at two hierarchical levels where detailed zoning plans shall comply with the overall municipal master plan. Based on the legally binding nature of statutory land-use planning, the Norwegian planning system is characterized by a desire for plan-led urban development. The 2008 Act was developed with the aim of strengthening the municipal master plan as a coordinating instrument for private property development (Proposition to the Storting 32 B 2008). However, as most detailed zoning plans are initiated and prepared by developers, the Norwegian planning system is in practice passive-secluded and development-led. The private right to initiate planning extends the developers' position from an implementer to an initiator of development and a responsible plan-maker (Kalbro and Røsnes 2013). Today urban transformation hardly takes place in Norway unless real estate developers consider property development as profitable. Seen this way, it should not be an antagonistic relationship between Norwegian public planning and real estate development, but rather an acceptance of a symbiotic and necessary cooperation.

However, several studies indicate that the initial planning phase is characterized by disagreement about goals and that it takes a disproportionately long time to adopt a zoning plan based on private initiatives (Børrud 2013; Lind and Kiil 2014; Tiller and Ekrene 2019). Other studies conclude that insufficient communication between developers and the municipality strongly contributes to the increased use of time in the planning process (Meyer 2014; Askjer and Borchsensius 2015; Holsen 2018).

The features of the Norwegian planning system seem to have consequences both for the time spent on planning (Holsen 2018; Tiller and Ekrene 2019), as well as for the efficiency of implementation. The system acknowledges private property development as important for urban development, yet has clear intentions to curb private initiatives to conform to the Municipal Master plan. The Planning legislation has been designed with comprehensive ambitions for compliance between the hierarchical levels of the legally binding land-use

plans (Kalbro and Røsnes 2013). However, the discretionary room for negotiations is relatively prominent. One assumption might be that in order for the development project to contribute to overall area based common goods and sustainable qualities, there must be links between on one side the aim for efficient planning processes and the achievement of more predictable implementation, and on the other side the aim for not only project quality but also area qualities caused by the development itself. The principal question, then, is if and how public planning authorities can steer the private development to achieve sustainability and at the same time run an efficient planning process.

3. Negotiations – linking ends to means

Urban design is both an integral part of development initiatives, a method for placemaking and a result conceived by public-private negotiations. When investigating the challenges of plan implementation and the urban planning split, it may be useful to ask what it takes to get property developers to achieve good design, contribute to placemaking and deliver good design? Is it possible to conduct negotiations that promote such a result? As noted by Tiesdell and Adams (2011) developers have power to shape the built environment in their funding of development and public authorities through their regulatory power. They suggest that the answer lies in facilitating for developers to pursue this through financial and other benefits of better urban design rather than forcing them to do so through detailed zoning. The idea is that good urban design might increase profitability to developers as well as promote better qualities for the society at large. It is necessary for both parties to understand where and how they can meet and make compromises.

To ignore or reject the influence of project-based development does not seem to be a good solution neither for a better process nor for a sustainable design. It might be a question of how the public planning authority understands and define their role in this position, but it might also be a question of how achieving it fits into the statutory planning system. One point emphasized by Tiesdell and Adams (2011) is that the developer's and their designer's interpretations ought to synchronize, if to succeed in real estate development. Since the forces that frame the opportunity space will change over time, the concept has a dynamic dimension. Both developers and planning authorities wish to control the room for manoeuvre.

Negotiations take place because there is reason to believe that a negotiated deal is a better solution (Rognes 2015). Trust is integral to negotiations because of each party's interdependence with the other in achieving a resolution (Lewicki and Polin 2013). Further, there is a relationship between trust and risk. In negotiation theory, a distinction is often made between distributive and integrative negotiation (McCarty and Hay 2015). Distributive negotiations are win-and-lose games, usually about a single dimension, e.g. price. What one actor earn through the process, the other lose. Integrative negotiations, on the other hand, is about win-win resolutions. Such negotiations presuppose that several dimensions can be negotiated at the same time.

As stated by Fisher and Ury (1991) you should not bargain over position but focus on interests. Positions tend to obscure what you want to achieve. By focusing on interests, there is a possibility for broadening the basis for solutions so that both parties achieve solutions they think are better for themselves. For this reason, integrative negotiations tend to be more complex and demanding than distributive (Rognes 2015), and, above all, rely on trust between the parties involved (Butler 1999). Trust seems to inhibit distributive behaviour and facilitate integrative behaviour, leading to the sharing of information, which subsequently promote the joint outcome of negotiations (Kong et al. 2014). However, integrative behaviour is inherently risky (Kong et al. 2014:1238) as the other party might exploit your trust. Hence, if you do not trust the other party in a negotiation, the risk associated with information sharing tend to lead to a withdrawal to distributive bargaining. Legally binding plans tend to focus on positions as land-use objectives, maximum densities and building heights, etc. are fixed positions. This easily leads to positional bargaining and distributive negotiations between developer and planning authorities. How then, could the informal initial phase of planning processes make space for integrative negotiations?

4. New perspectives needed

Simultaneously with the changes in urban policy towards densification, Norway has seen the emergence of a neoliberal real estate development industry. Urban development is increasingly managed through collaborative projects between public authorities and the private market based on negotiations constituted in ownership rights as an alternative to traditional public regulation. This situation has changed the conditions for public planning practice in Norway and is often described more as a challenge than a possibility (see e.g. Falleth and Saglie 2012; Guttu and Schmidt 2013; Hanssen et al. 2015). However, as described by Børrud (2005; 2012), the situation could also be understood as a bottom-up project-based process forcing public planning to rethink methods, particularly regarding the possibilities for approaches which might turn such antagonistic attitudes towards integrative cooperation.

Neoliberal political practice involves deregulation (Harvey 2005). Former public tasks are now being solved jointly by public bodies, market players and civil society through competition, networking and semi-public cooperation (Rhodes 2007). Market-based solutions are prioritized in response to regulatory challenges (Brenner et al. 2010), providing the foundation for flexible and negotiation-based public planning regimes (Taşan-Kok 2012). Swyngedouw et al. (2002) describes this neoliberal urbanization trend as 'fragmented' both as urban space and as decision-making. The projects do not create good spatial connections or contribute to good democratic processes, despite the fact that they were created through bottom-up processes. They state that large-scale urban projects (waterfront transformations, buildings for international art collections etc.) has been a source of inspiration for the practice of urban planning and politics in European cities.

The spatial fragmentation and focus on the 'exceptionality' of these projects seem to affect the relation to existing planning instruments and regulations. These project-based conditions are a reality of densification and urban transformation forcing a more nuanced perspective

of how the private right to plan influence public planning and urban structure. Private real estate developers cannot be and are not indifferent towards sustainability issues. The question, then, is rather how and not if the safeguarding of long-term environmental concerns should influence on urban projects. If so, why does the planning process take so long time and create so much distrust?

Private developers understand that it is not possible or right to get a limitless building permit. Rather they aim for predictability and clear guidelines in the development process (Børrud 2013; Meyer 2014). They share this goal with public authorities. Even if both the municipality and the private developer agree on this demand for predictability, there is a question of what 'a clear advice' might be in this situation and how much leeway there is for negotiations. Presumably, the advices given by the planning authority supports overall goals towards a sustainable development. We must also presume that both parties agree that developments should contribute to 'a better place'. However, we cannot expect that they agree on what these qualities are and what constitutes them.

Several Norwegian cities are currently developing a model of strategic land-use planning outside the statutory system, mainly because higher-level legally binding statutory planning is not suitable for controlling the dynamic reality of urban transformation (de Vibe 2015). Unlike statutory planning, this model named 'Guiding Principle Plan for Public Spaces' (in Norwegian 'Veiledende Prinsippplan for Offentlige Rom', abbreviated VPOR) rests on indicative planning. The purpose is to improve the municipality's negotiation base vis-à-vis developers (de Vibe 2015). The main issues relate to the management of public infrastructure, street pattern, squares and parks. In addition, VPOR sets out principles for the design of the green structure and the approximate location and need for schools, kindergartens and other social infrastructure. A third area governed by VPOR is density and categories of land use, more overall stated than usual in statutory terms.

Real estate development is a process often explained in steps or different phases from 'idea' to 'constructed building' (Miles et al. 2015) and is more than just designing and constructing. The dimensions of finance, market and planning are intertwining the entire process. The steps are overlapping and will sometimes move in loops. At every stage the developer deals with potential risks that might influence the implementation of the project. Financial, entrepreneurial and market risk mainly arises from transaction costs and differ from planning risk as it to some extent is possible to estimate a risk premium in the cost estimates. Public planning, on the other hand, is an activity in order to reduce externalities. Planning risk is thus the risk of not being allowed to zone as desired by the developer. As a result, planning risk tends to be of an either-or type and difficult to consider when calculating costs. Hence, it is sensible to reduce this type of risk through negotiations.

If one accepts that today's neoliberal urban development must be based on cooperation between public authorities and private developers, it is necessary to examine the possibilities of changing the conditions of cooperation from control-based regulation to a situation where good urban design that benefits society at large can also benefit the developer's financial

motives. This form of bottom-up collaboration must be based on trust and integrative negotiation rather than distrust and distributive negotiations.

5. From theory to practice

Unfortunately, several studies (Nordahl et al. 2007; Meyer 2014; Holsen 2018) show a lack of trust between municipal planning authorities and property developers. Generally, developers believe that municipal planning authorities have too little understanding of the financial aspects of project implementation (Børrud 2018a), while others believe developers are too much concerned about profit (Falleth et al. 2010). However, trust between the parties is necessary both for the efficiency of the planning processes (Tiller and Ekrene 2019) and for the quality of the approved plans (Børrud 2005). Both builders and municipalities perceive the statutory start-up meeting as important (Børrud 2018b), but how should the actors interact from there? The relationship between the two parties can be governed in various ways. One direction is by developing more rigid public planning systems, another by developing more strategic tools (Booth 1995).

Today's Norwegian planning legislation has been developed as a response to the desire for a plan-led system. Legally binding land plans are understood as project plans, i.e. a blueprint of the implemented result. Such plan-led processes are perceived as predictable but providing less flexibility. The result is often negotiations based on positions. Thus, such plans reduce the scope for interest-based integrative negotiations. Planning practice show a development towards more detailed zoning plans (Børrud 2018a), which also contributes to distributive negotiations.

The other approach is to develop more indicative land-use plans (Booth 1999), which are perceived as more flexible providing room for manoeuvre. There is no necessary contradiction between plan-led development and interest-based integrative negotiations. Indicative strategic processes, such as the Norwegian VPOR, can also be plan-led. The aim is to build a normative consensus on the values to be used for development (Bafarasat 2016).

Consequently, project plans and strategic planning have different functions. Project plans primarily have a control function. Strategic planning, in contrast, primarily serves as a basis for decision-making. A planning system like the Norwegian one, with legally binding project plans at both the overall and the detail level, is less suitable for managing today's neoliberal, project-based urban development. The higher-level plans should be developed as strategic tools for a plan-led urban development, while the detailed zoning plans still should be understood as the result of integrative negotiations and the legal tool for controlling plan implementation.

According to Lu et al. (2017), both the characteristics of the person who wants to trust a counterparty, the characteristics of the counterparty and the context of the negotiations will affect the trust relationship. Individuals concerned about common values tend to act more collectively than people more concerned about own gain. This affects the willingness to find solutions through integration negotiations. Narratives that convey a message that actors in

the informal planning phase distrust each other and exhibit antagonistic behaviour can reduce the room for integrative processes.

Another key point is what should constitute the substantial core of integrative negotiations. A procedural basis is empty without good content. Here, urban design might be the key concept. Urban design, on the one hand, is about the physical urban structure, the design of the street network, building heights, densities, etc. including the relationship between buildings and the public spaces between them. On the other hand, urban design also is about how the various functions – housing, public and private service, schools and kindergartens, business, green structure, restaurants, etc. – are assembled into the physical structure.

As Tiesdell and Adams (2011) argue, urban design is the key interest which can enhance positive and minimize negative effects and avoid market failure. The question is if urban design can also bridge the problems with integration and manage to either reduce the ‘planning split’ or make it more comfortable. A key question is therefore whether authorities and developers have the same understanding of the content of the concept of ‘good urban design’. In practice, trust-based dialogue will probably be the only viable way to find out if the parties share such an understanding. This recognition makes trust-based negotiations even more important.

According to Swyngedouw et al. (2002) and Tiesdell and Adams (2011) private developers pay attention to the design quality of the projects they intend to implement. Yet, we must assume that developers and the municipality might have different perceptions of urban quality. However, to achieve ‘better land use decisions’ must be in every participant’s interest. The question is if urban design can be a method of identifying common interests and possible solutions within the framework of strategic land-use plans? It seems increasingly important that public planners have knowledge and insight in the market and of the risks in the procurement process. We must question how the public planning authority understands the uncertainty in the room of manoeuvre when private developers use their right to plan. The everyday experience of doing ‘the split’ is very much a pragmatic practice where different stakeholders navigate and negotiate to achieve common understanding of urban quality (Børrud, 2005).

6. Conclusion

The purpose of this article has been to frame what characterizes the initial phase of zoning processes and to discuss how to develop the planning system based on integrative negotiations in order to achieve better urban design. Our hypothesis is that it is possible simultaneously to achieve sustainable societal solutions and an efficient processing of building applications, i.e. to do ‘the urban planning split’. However, if the developers and the municipalities are not trained for this exercise, they tend to end up in distrust and risky distributive bargaining (Holsen 2018). The uncomfortable urban planning split is more than anything a knowledge issue due to different expectations of how to interpret the particular urban situation. It is reasonable to believe that a planning system which provide for better communication and a more precise and shared understanding of the urban context

of development projects could help doing the split more elegantly. However, it is also reasonable to believe that the split is embedded in the nature of planning and impossible to completely avoid, as long as planning both is a system that needs thorough screening and efficient decision-making.

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A Return to Prejudicial Effects from Time-Consuming Planning Processes

Municipal planning and the ghost town case of Folkesta

Abstract

In the 2009 EALD Symposium, a presentation and succeeding publication (Ekbäck and Kalbro 2011), identified situations where negative value effects for property owners, generated by time-consuming infrastructure planning processes, were in conflict with Sweden's commitments under the European Convention for the Protection of Human Rights and Fundamental Freedoms. The publication ultimately triggered amendments in the legislation on planning, acquisition and compensation for national roads and railroads.

In the present paper, new situations are identified where again the Convention's articles for protection of property and the right to a fair trial may be violated. The topic analysed and discussed concerns municipal planning for development of the built environment, resulting in planning blight, i.e. a reduction of property values in a particular area resulting from expected or possible future development or restriction of development. The particulars of a case study are compared to the standard planning model and the generic situation where the proposed land use leads to a local depreciation of property values compared to current land use.

1. Introduction

Physical planning for land development such as housing, industry and infrastructure normally stretches over a considerable length of time, from the first proposals and drafts until the project finally is realized. The employment of a certain amount of time is an inevitable feature in the core of decision-making by planning. The pursuit of high quality planning outcomes may, however, in some situations be at odds with the affected property owners' more pecuniary interests. We are here dealing with cases where the planning phase creates a negative impact on property values during the period before possible acquisition and compensation can be accomplished, and the plan be realized.

In an earlier article, Ekbäck and Kalbro (2011) related these situations to Sweden's commitments under the European Convention for the Protection of Human Rights and Fundamental Freedoms, with some case studies concerning national road projects and railroad

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projects. The following development ultimately led to some amendments in the legislation on planning, acquisition and compensation for national roads and railroads.

The aim of this article is to anew illustrate a different context where a similar type of problem still persists, namely during municipal planning for the built environment.

2. The european convention and the Sporrang-Lönnroth case

In 1982, the European Court of Human Rights found that Sweden had breached its obligations under Article 1 of Protocol No. 1 and under Article 6, par. 1, of the European Convention for the Protection of Human Rights and Fundamental Freedoms (Judgement 23 September 1982, Series A no. 52).

The case concerned two properties with multi-story buildings in the central parts of Stockholm. As part of a large-scale inner-city redevelopment scheme, the properties had been subjects to an expropriation permit and a prohibition on construction for around 15–20 years, without legal possibilities to seek reduction of the time limits, to claim compensation, or to challenge the restrictions in a court of law.

Regarding Article 1 of Protocol No. 1 – Protection of property – the Court considered that the expropriation permit and the prohibition on construction in practice significantly restricted the owners' right to use and dispose of their properties. Taken together with the long period of time, the measures created a situation which upset the fair balance between the protection of the right to property and the requirements of the general interest.

Article 1 of Protocol No. 1: Every natural or legal person is entitled to the peaceful enjoyment of his possessions. No one shall be deprived of his possessions except in the public interest and subject to the conditions provided for by law and by general principles of international law ...

Concerning Article 6, par. 1 – Right to a fair trial – the Court declared that the property owners' right to property was without doubt a "civil right", and that the decisions (by the Swedish Government) were not open to appeal, which meant a violation of the Convention.

Article 6, par. 1: In the determination of his civil rights and obligations or of any criminal charge against him, everyone is entitled to a fair and public hearing within a reasonable time by an independent and impartial tribunal established by law ...

After the verdict in the European Court several legal reforms were implemented in order to ensure that Swedish law satisfied the obligations under the Convention.

3. Planning processes for national roads and railroads

Based on the attributes of the Sporrang-Lönnroth case, and the arguments of the Court in the verdict, a closer analysis was undertaken concerning planning processes for national roads and railroads (Ekbäck and Kalbro 2011). The study concluded that these planning processes consist of several phases, and that the combined planning phases often extend over a long period of time. The long time span during the planning phases could also be related to the emergence of negative expectation values, which fall on the properties affected by a proposed or planned infrastructure project. As illustrated in figure 1, it is conceivable that a

negative economic impact may occur already at an early stage of planning, and that the more concrete and specific the proposals become, the greater the influence.

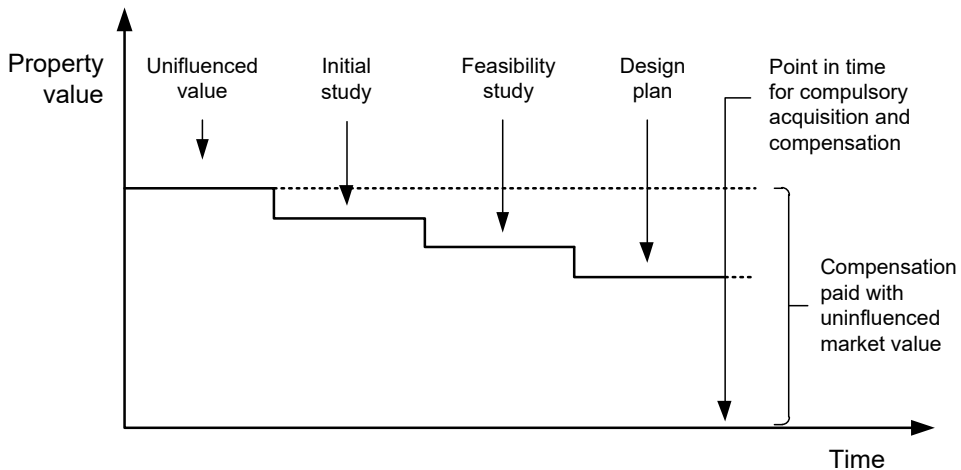


Figure 1: *Theoretical value effects from time-consuming planning procedures (Ekbäck and Kalbro 2011:144).*

Apart from affecting the market values of the influenced properties, one can also expect lower utility values (rental revenues), higher financial costs, and reduced incentives for investments and maintenance.

At the time of the article (Ekbäck and Kalbro 2011) there were, however, no legal possibilities for the affected property owners to receive any compensation until the planning process was completed and the properties could be acquired subsequent to the adopted final plan.

Following the article, some important amendments were introduced in the legislation on planning for national roads and railroads. In short, a property owner was given a legal right to demand premature redemption of the property when it is affected by a proposed route, in situations with unreasonable consequences – e.g. disposal of property due to divorce, unemployment, death or similar circumstances.

The Roads Act, Sect. 55b: A property unit, or a part of a property unit, must be redeemed at the property owner's request even if there is no approved road plan, if

1. it is likely that the property unit will be needed for road purposes, and
2. there are exceptional reasons for getting the property or part of it redeemed.

When the compensation is determined, Chapt. 4 of the expropriation act (1972:719) applies in relevant parts.

The Railroad Construction Act, Chapt. 4, Sect. 2a: A property unit, or a part of a property unit, must be redeemed at the property owner's request even if there is no approved railroad plan, if

1. it is likely that the property unit will be needed for railroad purposes, and
2. there are exceptional reasons for getting the property or part of it redeemed.

In the Government Bill with the proposal for the amendments, it was specifically pointed out:

“In a system with an open planning process it is unavoidable that property owners are affected by uncertainty about the continued use of land. The effects for individual property owners can, however, in exceptional cases become unreasonable. This may be the case when a property sale becomes necessary due to divorce, unemployment, death or other circumstances. Then, according to the Government, it is not fair for the individuals to bear the negative effects that are a consequence of the ongoing infrastructure planning [authors’ translation].” (Proposition 2011/12:118 p. 135)

4. Municipal planning for the built environment

Pursuant to the Planning and Building Act, the Swedish planning system consists of the Regional Plan, the Comprehensive Plan, the Area Regulations, and the Detailed Development Plan. For this article, the provisions and legal aspects of the Comprehensive Plan and the Detailed Development Plan are of primary interest. The Comprehensive Plan can be seen as indicating the overall direction of the municipality over a significant time period and as guidance in the design of the Detailed Development Plan and in the permit granting process, see figure 2.

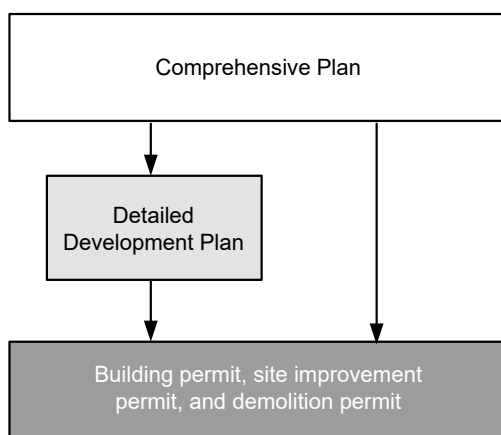


Figure 2: Relationships between the Comprehensive Plan, the Detailed Development Plan, and permit granting processes in the Swedish planning system.

4.1 The comprehensive plan

The Comprehensive Plan is mandatory for the municipality.¹ The plan must be up-to-date and should cover the entire municipality. The Comprehensive Plan must present:

- the basic characteristics of the intended use of land and water areas

¹ The content, purpose and planning procedure for the Comprehensive Plan is governed by the Planning and Building Act, Chapt. 3.

- how the built environment is to be used, developed and preserved
- what consideration is to be given to public interests
- what the intention is regarding how national interests and environmental quality standards are to be served

The Comprehensive Plan constitutes a basis for balancing public and private interests, but includes no description or examination of existing private interests (Didón et al. 2018). Balancing of public and private interests are instead supposed to take place in the Detailed Development Plan and during permit examination processes.

The plan is not legally binding, and does not establish any rights or obligations, neither for authorities nor for property owners. Although the Comprehensive Plan is not legally binding, one may observe that a designation of an intended land use in the plan, which deviates from current land use, obviously has an influence on market values for the affected properties. The market value for agricultural land designated for housing development would naturally increase. A built-up area designated for infrastructure, industry or parkland would on the other hand experience a decrease in market values due to reduced demand. The Comprehensive Plan consequently still has economic effects.

There is no requirement in the Planning and Building Act for the Comprehensive Plan to present considerations regarding necessary measures for implementation and realization of the plan intentions. There is, however, a requirement for clarity, signifying that the plan should be designed in such a way that the implications and consequences are clear (Proposition 1994/95:230 p. 61).

4.2 The detailed development plan

The Detailed Development Plan enables the municipality to regulate the land use and the built environment in a particular area. The amount of regulations needed concerning land use and building development naturally varies from one case to another, but the plan must always include delimitation and use of public spaces (streets, parks, squares, etc.) and building plots (land for housing, offices, shops, industry, etc.).

The Detailed Development Plan is legally binding, the rights and obligations apply both to property owners and to the municipality. A building permit application must, in principle, be granted if it corresponds with the plan regulations.

Furthermore, public spaces can be compulsory purchased by the party responsible for public space – normally the municipality. The initiative for compulsory acquisition and compensation can be taken either by the municipality or by the property owner concerned.

So, in the ideal or conventional planning hierarchy, the major balancing of public and private interests take place during the process of establishing the Detailed Development Plan. Some specific provisions also require that the plan must be designed to avoid significant inconveniences for private interests. Furthermore, the plan design must take reasonable considerations to existing conditions regarding buildings, ownership, and property division.

5. Case study: The ghost town of Folkesta

Folkesta is a small residential area with around 30 single houses and terraced/semi-detached houses, situated on the outskirts of Eskilstuna, a medium-sized town 90 km west of Stockholm. East of the area is an industrial zone with a logistic terminal for transshipment of goods between rail and truck. In the north and south, Folkesta is bounded by a highway and a railroad. To the northwest and west, the landscape consists of open natural areas and agricultural land, see figure 3.

Folkesta has been gradually developed since long time, and there is no Detailed Development Plan, regulating the land use or development. In the previous Comprehensive Plan from 2005, the current land use as a residential area was illustrated, but no further development was indicated (Eskilstuna kommun 2019).

In April 2011, the municipality presented a proposal for a new Comprehensive Plan. According to the proposal, Folkesta was to be investigated as a potential development area for trade and logistics. As a consequence of the proposed development in the Comprehensive Plan, market values in Folkesta virtually collapsed.

Since the properties in Folkesta no longer were saleable in the open market, the owners petitioned the municipality to purchase the properties from the residents that wanted or needed to sell. The municipality undertook to acquire the built-up properties under the condition that the seller accepted the valuation principles, based on an estimation of the market value before the latest expansion of the logistic terminal started. The undertaking had a time limit, which after some extensions was set to the end of 2014 (Eskilstuna kommun 2012).



Figure 3: Location of Folkesta between a railroad, a highway and an industrial area, on the outskirts of Eskilstuna.

The new Comprehensive Plan was adopted by the municipality in 2013, where Folkesta was identified and designated as suitable for forthcoming expansion of surrounding industrial, trade and logistic activities. In the plan documentation, the municipality declared:

“The Folkesta industrial area is of national interest for communication and infrastructure due to its strategic importance to the transport industry. This interest relates to the need of being able to carry large amounts of long-haul goods on energy-efficient railroad and to transship to/from trucks the short distance to/from the local company. According to the plan proposal, the area for logistics at Folkesta Terminal can be extended to the northwest, so that the residential area situated there is transformed and incorporated into the logistics area [authors’ translation].” (Eskilstuna kommun 2013)

The Comprehensive Plan was appealed to the Administrative Court by seven of the property owners in Folkesta. The appellants claimed that the intervention of the rights of the residents consisted of three parts:

- To live in uncertainty for a long time, not knowing whether it is possible to reside in their homes
- That it is useless to maintain, renovate or improve their properties
- That it is uncertain whether they will be able to sell their properties at a reasonable price after 2014

The Administrative Court found, however, that the claimants had not evidenced that the municipality had violated any legal provisions by adopting the new Comprehensive Plan (Administrative Court Verdict 2014-11-26). The verdict by the Administrative Court was further appealed to the Administrative Court of Appeal and to the Supreme Administrative Court. Since the higher courts did not grant review permits, no further judgement was declared. The new Comprehensive Plan finally came into legal force in 2016.

During this period the municipality’s offer to purchase the built-up properties had been accepted by most of the owners. At present, the municipality is the owner of 26 properties in Folkesta, while three properties are still privately owned.

The properties and buildings under municipal ownership are now vacated and empty, and the deterioration in the abandoned residential area has increased with the passage of time. Signs with the message “Unauthorized entry not allowed” have been put up on buildings and constructions in order to avoid damage, intrusion, municipal liability, etc. Over the years the environment in the area has turned into something that is popularly called “the ghost town” (Eskilstuna-Kuriren 2016)

During 2018, the municipality took a decision to tear down and demolish the empty buildings in Folkesta. The idea is to complete the demolition, and to initiate the drafting of a new Detailed Development Plan for the area, during 2019. At present, no formal decision for preparation of a Detailed Development Plan over Folkesta has yet been taken.



Figure 4: Images of deserted residential properties in Folkesta.

Epilogue

At the end of 2018, the owners of two properties sued the municipality in the Civil Court. The claimed compensation for the way the municipality has handled the matter and argued that the process has violated their property rights.

However, in September 2019 the property owners and the municipality settled an agreement on compensation. Furthermore, the agreement means that the properties are sold to the municipality and that the legal process ends. During a transitional period of two years, the owners will be allowed to stay in the area in order to arrange for new accommodation.

6. Analysis and discussion

For a property owner in a residential area, designated for industrial purposes in the Comprehensive Plan, the primary effects are economic, since the Comprehensive Plan is not legally binding. Eventually, however, the property owners have good reasons to believe that the plan will be realized, and that they will have to leave the area.

This is a special case of planning blight (Hagman 1972, Purdue 2006), where harmful effects of uncertainty and reduction of property values in a particular area result from possible future development or restriction of development. The special characteristics of planning blight stems from the fact that the Comprehensive Plan is not legally binding. In other words, there are no legal provisions concerning how to handle the negative influences affecting individual property owners. These negative outcomes may include difficulties concerning a sustainable maintenance of the properties or in selling the properties, reduction of the properties' market values due to negative expectation values, etc.

The Planning and Building Act comprises no provisions for redemption or compensation to the property owners for the negative impact created by a Comprehensive Plan. As previously noted in section 4, the Swedish planning system instead requires adoption of a Detailed Development Plan, in order to realize the intentions of the Comprehensive Plan. But taking into account the specific legal stipulations and requirements, mentioned above in section 4.2 – e.g. that the Detailed Development Plan must be designed in order to avoid significant inconveniences for private interests, and to take reasonable considerations to

existing conditions regarding buildings, ownership, and property division – it may be unfeasible to adopt a Detailed Development Plan combining the existing land use (residential) with industrial and logistics activities.

It is obvious that the property owners do not have incentives or resources to realize the plan intentions on their own, redeveloping and transforming the land use from residential to industry and logistics. On the contrary, the properties must somehow be acquired by the municipality in order for the Comprehensive Plan to be realized. From the municipal perspective, two alternative strategies can be employed for acquiring the properties in Folkesta:

- (1) The municipality purchases the properties by voluntary negotiations.
- (2) The municipality applies for an expropriation permit, according to the Expropriation Act, and commences negotiations for redemption and compensation within the framework of the expropriation process.

6.1 Purchases by voluntary negotiations

In Folkesta, the municipality has chosen the first strategy, which may be reasonable if the number of properties concerned is low. As the number of properties increase, this strategy becomes more hazardous. When the number is high, as in Folkesta with around 30 properties, it is less probable that the municipality is successful in reaching agreements with all the property owners. Furthermore, the process can easily extend over a long time. Altogether, this means that realizing the Comprehensive Plan within reasonable time becomes more or less impossible.

For the property owners, the result is naturally a long period of uncertainty and potential legal and economic losses. There is no compensation for the expenditure of time, and there are no legal means for the property owners to influence and reduce the duration. The uncertainty will intuitively affect the bargaining position of the property owners, and may result in a lower selling price than under different circumstances.

The situation in Folkesta – regarding time, impediments to maintenance and disposal, negative value effects, and lack of legal remedies – therefore resembles and can be correlated to the characteristics in the Sporrang-Lönnroth case (section 2) and in the planning processes for national roads and railroads before the 2012 amendments (section 3).

6.2 Application for expropriation permit

To ensure a prompter realization of the Comprehensive Plan regarding Folkesta, the municipality could have applied to the Government for an expropriation permit, according to the stipulations in the Expropriation Act.

The examination process for an expropriation permit by the Government involves a balancing of the public and private interests concerned. In this case that balancing would comprise an evaluation of the designated land use in the Comprehensive Plan, in relation to the private interests in Folkesta. If the transformation from residential use to industry and

logistics had been deemed reasonable, an expropriation permit would have been granted. Otherwise, the denial of an expropriation permit would have implied a revision of the Comprehensive Plan.

Although expropriation in our time is neither commonplace nor popular as a means for land acquisition, it is a regulated process featured by a high degree of legal security and ensures equal treatment of all property owners involved. The expropriation process also provides an opportunity for property owners to receive compensation for legal counselling and the investigations that may be needed in order to counter the municipal expertise.

7. Concluding remarks

In sections 2 and 3, we have recapitulated some instances where the former Swedish legislation's conformity with the European Convention for the Protection of Human Rights and Fundamental Freedoms on good grounds could be questioned. After examination of the context and details of the Folkesta case, the many similarities raises the suspicion that the consistency with Sweden's commitments under the Convention again may be doubtful. The case study of Folkesta is, in that light, merely an illustrative example of a more generic dilemma where comprehensive planning at the municipal level may result in negative value effects at the local level.

In the case of Folkesta, the property owners have been exposed to a situation of planning blight. The Comprehensive Plan has created uncertainty regarding the timing and duration of the transformation process, from residential use to logistics and industry, with the observed consequences for property values etc. As has been pointed out, the Planning and Building Act does not include any provisions for property owners to initiate a process for redemption and compensation based on the Comprehensive Plan, which would reduce both the time-period and the uncertainty.

This means that property owners – such as in the Folkesta area – have no legal means to influence the municipality's choice of strategy concerning land acquisition and compensation matters, needed for realization of the Comprehensive Plan. In other words, in the current system property owners lack legal powers to initiate an examination and assessment of:

- If there are legal grounds for acquisition
- When the acquisition will take place
- How the compensation should be determined

The uncertainty regarding the time-frame and the compensation, as well as the lack of legal powers to take initiative, parallels both the Sporröng-Lönnroth case and the previous situation regarding planning processes for national roads and railroads. In the Sporröng-Lönnroth case, the European Court of Human Rights established that Sweden had violated the Convention's requirements both regarding the protection of property and the right to a fair trial.

In order to ameliorate the situation, in the context of municipal planning for the built environment, two types of actions can be identified. Firstly, one might consider to introduce

legal possibilities for property owners to take initiative for realizing the intentions of the Comprehensive Plan in this type of situation, where rather extensive acquisition of properties are required.

Secondly, when the intentions of the Comprehensive Plan requires far-reaching interventions in existing use of land and buildings, which from a public viewpoint may be urgent, the plan documentation should also include an explicit description of the legal measures necessary for implementation and realization of the plan.

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Remote Sensing Techniques for Monitoring Land Use and Land Development

An overview and two case studies in urban environments

1. Introduction

Urban Green is an essential part of an enjoyable, healthy and biologically multifold city. It is part of the basic communal infrastructure (BMUB 2015). Urban Green is a synonym for recreation areas, for biotopes of fauna and flora, for horticultures, but also for nature. There is a growing interest in the impacts of urban land cover and use on the local climate. One of the key climatic effects is an enhanced intra-urban heating in comparison to the surrounding rural areas (Zhang and Sun 2019).

Urban areas are characterised by a growing population with needs for living space and by an increasing sealing of soil. With 55 percent of the world's people living in urban areas (up from 30 percent in 1950), urbanisation determines the spatial distribution of the world's population and is one of the four demographic mega-trends, with the growth of the global population, population ageing, and international migration. By mid-century, roughly two thirds (68 percent) of the world's population is estimated to be living in urban areas (UN 2018). Politicians, planners and developers have to minimize the land take and secure adequate areas of urban green. To meet these challenges, they need knowledge about quantity and quality of green areas. In addition, they need target indicators to describe an adequate green infrastructure.

Many stakeholders and institutions recognise the need of actual land cover and land use planning. Data acquired by remote sensing and processed by GIS (Geographical Information System) techniques are supporting the decision makers. Many existing land cover and land use products derived from remotely sensed images such as GlobCover, OpenStreetMap or the CORINE Land Cover Programme offer data not only for planning purposes (see Büttner 2014, Kuntz et al. 2014, Luo et al. 2019, Mora et al. 2014). In addition, GNSS receivers, e.g. from smartphones, or digitizing objects from aerial images are used to gather data for the above-mentioned products and to meet the challenges of the limited spatial resolution (Steensen and Schaffert 2018, Mobasheri et al. 2018).

Especially in dynamic urban environments up-to-date geodata are needed. Remotely sensed images and image processing techniques can help to derive up-to-date information needed

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by planners or by other institutions. The importance of urban remote sensing is documented by an increasing number of publications on this topic (Jürgens et al. 2019, Wellmann et al. 2018, Taubenbeck et al. 2017, Ucar et al. 2016).

The target groups for the article are politicians, planners, land management experts, and developers. The article is not a scientific paper, as detailed technical descriptions are avoided. The article aims to give the readers an overview about current remote sensing technologies and about potential applications of remote sensing in land management. Two case studies elaborated by the authors are presented as examples for remote sensing applications in urban areas.

2. Remote sensing technologies applied for monitoring of land

2.1 Platforms and sensors

Remote sensing systems in general rely on an energy source, energy reflected or emitted by an object – in cases of earth observations by the Earth's surface. A sensor is recording the energy. In case of passive systems, for earth observation normally the sun is used as energy source. The energy reflected by the Earth's surface is sensed or some sensors also enable the recording of the energy emitted by the Earth itself. Active systems supply their own source of energy and have the advantage to ignore the atmosphere. Hence, they are more often used in general.

Remote sensing data can be acquired from space (using satellite platforms), from the air (using aircraft or Unmanned Aerial Vehicles (UAV)), but also from the ground (e.g. sensors mounted on a crane). Toth and Jozkow (2015) give a good overview about the different platforms and various sensors.

The “four resolutions” are the key parameters to describe the characteristics of remotely sensed imagery:

- spatial resolution,
- spectral resolution,
- radiometric resolution, and
- temporal resolution.

Spatial resolution describes the detail of geometric information obtained by the sensor (Figure 1). Thus, it relates to the smallest object that can be detected by a sensor. It is expressed by the size of the pixel on the ground (ground sample resolution).

Satellite images can be classified in three groups: high, medium and low spatial resolution. High-resolution satellite systems, such as WorldView-4 or Pléiades, provide panchromatic images (black and white) with spatial resolutions between 0.3 m and 0.7 m as well as multispectral images between 1.2 m and 3 m. Medium-resolution sensors (e.g. Sentinel-2 or

Landsat) operate in a range between 10 m and 30 m, and low spatial resolution sensors usually have a ground sample resolution of 50 m and more.

Spectral resolution refers to the bands (channels) of the electromagnetic spectrum, which are recorded by a sensor at the same time. Usually, aerial cameras record the visible part of the electromagnetic spectrum (blue, green, red) and the adjacent near infrared (NIR). In addition, sensors mounted on satellites provide short wave infrared (SWIR) and thermal infrared bands (TIR). Usually, the spectral resolution is increasing with the pixel size. MODIS satellite images for example acquires data in 36 spectral bands ranging in wavelengths from 0.4 μm to 14.4 μm . This sensor has a spatial resolution between 250 m and 1 km. On the other hand, Sentinel-2 has 12 spectral bands ranging from the visible light to the short wave infrared with a spatial resolution from 10 m (panchromatic) to 20 m (multispectral).

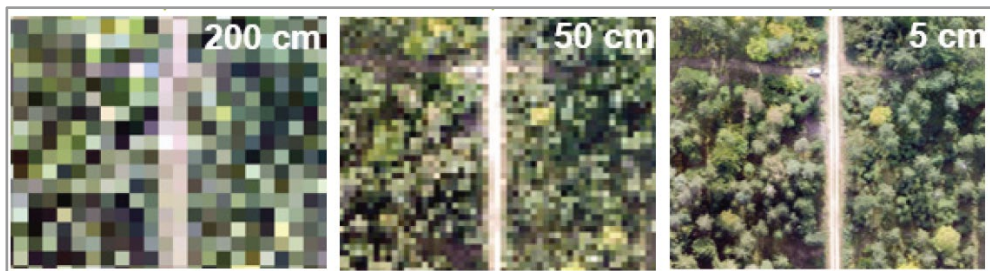


Figure 1: Examples for spatial resolution of sensors (ground sample distance).

Radiometric resolution is defined by the capacity of the sensor to distinguish differences in light intensity or reflectance.

Temporal resolution specifies the revisit time of the sensor. It is the time interval between taking an image of the same area. A high temporal resolution can be achieved with a sensor mounted on a UAV, as the flight can be repeated very often. The temporal resolution of satellite sensors depends on the orbit, the possibility to work off-nadir and the number of identical satellites. For example, the Sentinel-2 system with two satellites provides images every 5 days. Geostationary satellites, e.g. MeteoSat, are even able to provide images in an interval of 15 minutes.

Dependent on the purpose of application, the appropriate platform and sensor has to be selected. In addition to spatial, spectral, radiometric and temporal resolution, the size of the study area covered and the costs have to be taken into consideration when planning the project.

Table 1 documents the characteristics of selected remote sensing products and estimates their strengths and weaknesses concerning urban land use and land cover monitoring. The assessment is based on the experiences of the authors gained in several outlined projects.

It is an orientation guide for standard products and does not claim to be complete or to be applicable for all kind of projects within an urban environment.

Table 1: Characteristics of remote sensing images for urban monitoring (own experiences)

Product	Availability	Level of details	Spectral range	Coverage
Aerial photographs (UAV)	+++	+++	-/+	-
Aerial photographs (airplane)	+	+++	-/+	+
Very high spatial resolution satellite images (e.g. SPOT)	-/+	++	+	-/+
Medium spatial resolution satellite images (e.g. Sentinel 2)	++	+	++	++
Low spatial resolution satellite images (e.g. MODIS)	+++	-	+++	+++

The criteria “Availability” is highly correlating with the temporal resolution. The “Level of details” is describing the spatial resolution. “Spectral range” gives evidence about the broadness of the electromagnetic spectrum recorded by the sensor. The criteria “Coverage” estimates the potential of the specific product for recording larger areas.

2.2 Potential applications for monitoring of land

The following paragraphs documents a bundle of potential applications for monitoring land. The list does not claim to be complete. For each of the outlined methods an application is cited.

A key application of remotely sensed images is the monitoring of land cover and land use, which is an essential input for many management and planning activities (Banko et al. 2014). Beyond that, actual information about land cover and land use is a prerequisite for many other disciplines, e.g. flood risk management. In the context, an important factor of monitoring processes is “time”. Multi-temporal or -seasonal remote sensing images, gained by UAV or satellite images with high revisit time, enable a better distinction of specific land cover classes (e.g. between grassland and cropland). In addition, such images can be used for change detection analysis (Hui et al. 2018)

In agriculture, remote sensing is applied for crop type identification and the analysis of the vitality of the plants. Drought stress monitoring is an important application in that field (Chrisgone et al. 2019). Again, multitemporal images are an important source for this analysis. The vitality of plants can be observed over a longer period and results of the analysis can be used for yield prediction.

Remote sensing data provide up-to-date information for the management of forests and for the monitoring of deforestation and protected areas. Remote sensing data can be used for mapping tree species, for monitoring of damages of forest, and they are a useful supplement to in-situ forest inventories (Immitzer et al. 2018).

Many sensors operate in different spectral parts of the electromagnetic spectrum. Spectral bands are used to derive various indices, such as the vegetation index (VI; e.g. derived from red and near infrared channel), soil index (SI; green and infrared) or water index (WI; e.g. green and near infrared channel). All these indices are valuable inputs for subsequent analysis using image processing software and/or GIS (Geographic Information Systems).

In case of natural disasters, remote sensing is often the primary source of information. Actual images are available within days, which documents damages, e.g. caused by floods, hurricanes, avalanches, wild fires or earthquakes (Enekel et al. 2018). In addition, remote sensing data enable the production of up-to-date maps, which can be provided to rescue teams.

For topographic modelling – as for example in the field of hydrology –, different products derived from remotely sensed data are applied. Airborne laser scanning is a proper technology for an accurate mapping of the Earth's topography (digital terrain models – DTM and digital surface models – DSM) (Schwarz et al. 2019). Another option for deriving DSMs is photogrammetry using overlapping images, e.g. aerial photographs, UAV photographs or some satellite images. DTMs and DSMs can be used for improving the classification results for land cover maps, but they are also an essential input for flood risk management.

In many countries, topographic and cadastral mapping is based on remote sensing images.

As mentioned at the beginning of this chapter, the authors only highlighted only key applications of remote sensing data. The documented examples make no claim to be complete.

In the following chapters, two case studies – the first one elaborated by the Austrian authors and the second one by Russian author team – focus on the application of remote sensing methods for urban planning purposes.

3. Case Study 1: Assessment of indicators for urban greens

3.1 Objectives, partners, and frame conditions

In 2015, the RaumUmwelt®Planungs-GmbH in Vienna invited the Institute of Geomatics of the University of Natural Resources and Life Sciences Vienna (BOKU) to become partner in the project “Action Goals for Urban Greens and their Empirical Evidence”. The Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) of the German Federal Office for Building and Regional Planning (BBR) was contracting entity and donor of this project.

The main objective of the project was to identify indicators for describing urban greens. As a result, 16 key indicators with in total 66 sub-variables were recommended to describe

amount (size, volume), accessibility, condition, biodiversity, development as well as economic values of urban green (BBSR 2018).

The specific task of the Institute of Geomatics was to investigate to which extend remote sensing, image processing and GIS tools (e.g. segmentation, classification, aggregation, buffering) could contribute to acquire and/or derive these measures. In contrast to other detection methods, which require direct access to the object, the use of remote sensing methods enables contactless exploration of urban areas.

In addition, the method has to fulfil the following requirements formulated by the BBSR:

- The proposed procedure delivers reliable, nationwide homogeneous and traceable results;
- The image data used are country-wide available with an acceptable topicality;
- The software applied for the analysis has to be free of charge (open source software) or at least with low costs;
- The processes have a high degree of automation;
- The processes for deriving the indicators have to be the same or similar for images with different resolutions and different colour bands; and finally;
- The outlined green areas are object-based (and not pixel-based).

3.2 Site, applied methods and used data

Investigations were outlined for the whole area of the City of Vienna (~415 km²) as well as for five selected areas representing different urban typologies with a size of 2 km².

The analysis was based on following input data sets covering the required variety of geometrical and spectral characteristics:

- Sentinel-2 satellite images (spatial resolution of 10 m; four spectral bands: red, green, blue and near infrared, see Figure 2);
- Orthophotos (OPs) rectified from aerial photographs (spatial resolution of 15 cm, 50 cm and 1 m; four bands: red, green, blue and near infrared);
- Digital Terrain Model (DTM) and Digital Surface model (DSM) – both with grid size of 1 m; and
- Administrative Boundaries of Vienna (vector data containing the city boundaries, and district boundaries) including demographic information (inhabitants per unit).

For validation processes an up-to-date and very detailed land use map (called “Mehrzweckkarte”/MZK) produced by the surveying department of the City of Vienna was used.

Remote sensing data with different spatial resolutions and with different spectral properties were checked for their suitability with regard to green space detection in urban areas.

The extraction of vegetated areas in urban regions is in general not a difficult task. The Normalized Difference Vegetation Index (NDVI), which relates the values of the near infrared band to the red band), enables a proper differentiation between vegetation, sealed areas and water. Nevertheless, differences in the radiometry of images taken at different times (daily and seasonal), have to be considered.

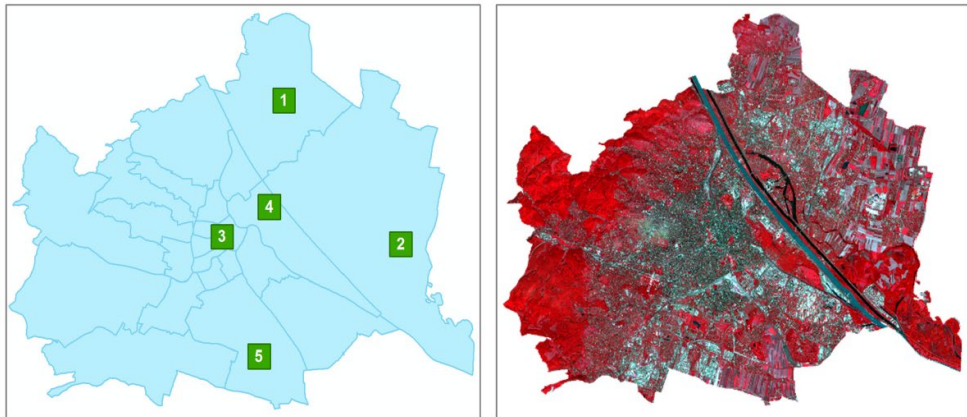


Figure 2: Left: Areas of investigation; Right: Sentinel-2 image (colour-infrared, CIR).

In the study, various classification approaches (pixel-based, object-based, supervised, unsupervised) were applied to elaborate a proper procedure for assessing the urban green areas. Test series were outlined by using the satellite image as well as orthophotos with different ground sample sizes. In addition, the number of predefined land cover classes, which were aggregated to the three (vegetation, sealed areas, water) respectively four main classes (including bare soil).

For getting information about the volume of the urban greens, a normalized DSM was calculated by a simple subtraction of the DTM from the DSM.

3.3 Results and discussion

From the 16 in the study identified indicators (see chapter 3.1), 8 can be derived by applying remote sensing data and analysis tools (classification, buffer, geostatistics – or related to the sub-level: 22 out of 66 parameters).

Due to the lower spatial resolution, not all parameters (according to Table 3) can be determined from Sentinel-2 satellite image data.

Some of the indicators (green space per inhabitant, degree of supply of the inhabitants, average distance for the population to the nearest public green space) require knowledge of

population statistics. The degree of aggregation of this data is the limiting factor for the spatial resolution of the indicators.

In general, it was considered that all recommended work steps can be carried out with “open source software packages”. In the study, “QGIS” was applied for GIS functions and the statistical software “R” for data preparation and classification.

For the citywide acquisition of urban greens, a supervised and pixel-based classification using Sentinel 2 image data with five bands (red, green, blue, near infrared and calculated NDVI) crystallized as the optimal method. Four land cover classes were differentiated (vegetation, sealed areas, water and bare soil/agricultural land) by applying a random forest classification algorithm (see Figure 3 and Table 2).

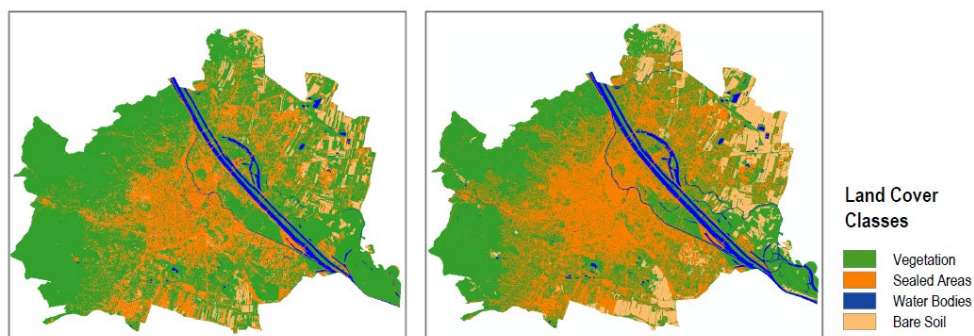


Figure 3: Land cover map of the City of Vienna.
Left: classification results, Right: Mehrzweckkarte (MZK).

Table 2: Results of land cover classification using Sentinel-2 image data and Land Cover according to land use map (Mehrzweckkarte/MZK) of the Viennese surveying department

Class	Sentinel 2 (in %)	MZK (in %)	S2 aggr. (in %)	MZK aggr. (in %)
Water	2.7	4.0	2.7	4.0
Sealed Areas	33.8	35.4	33.8	35.4
Vegetation	57.4	55.3	63.5	60.6
Bare Soil/Agriculture	6.1	5.3		
Total	100.0	100.0	100.0	100.0

The classification of the satellite images underestimates the urban greens in areas with a high density of houses and overestimates the greens in the surrounding of Vienna, characterised by small settlement areas. The bare soil areas are underestimated, as the satellite images were

taken in summer, where most of the agricultural fields were cultivated. The use of time series of satellite images significantly would improve the results.

Figure 4 documents the parameters “climate active areas” as defined by Schmidt et al. (2014) as well as the green area per inhabitant for the Vienna-wide evaluation.

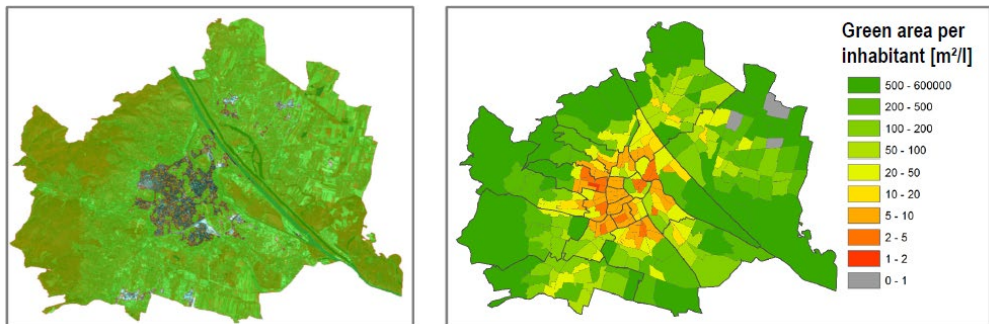


Figure 4: Indicators derived from Sentinel 2 satellite images.

Left: climate active area, Right: green area per inhabitant.

For a detailed acquisition of urban greens, a supervised and pixel-based classification using orthophotos with a ground sample distance of 50 cm and five bands (red, green, blue, near infrared and calculated NDVI) was found as best approach. As an intermediate stage, eight land cover classes were differentiated and finally aggregated to four main land cover classes (vegetation, sealed areas, water and bare soil/agricultural land). Once again, a random forest classification algorithm was applied.

Table 3: Results of the classification for different building structures (Test sites)

Test site/Structure	Water (in %)		Sealed Areas (in %)		Vegetation (in %)		Bare Soil (in%)	
	Class.	MZK	Class.	MZK	Class.	MZK	Class.	MZK
TS 1 mixed	0.2	0.4	51.9	49.2	46.5	49.4	1.4	1.0
TS 2 single, garden	1.0	2.9	21.3	19.7	50.9	49.6	26.7	27.9
TS 3 city centre	0.0	0.1	87.1	89.5	12.8	10.4	0.1	0.0
TS 4 block, water	14.1	14.4	57.8	65.4	27.5	20.2	0.6	0.0
TS 5 single, park	2.0	2.8	35.1	41.1	51.3	52.3	11.6	3.7

Existing vertical layers of land cover in generally cause divergences between the MZK and the classification results using orthophotos. The orthophoto classification is documenting the top layer (see Figure 5 b), whereas the MZK gives evidence about the bottom layer (see Figure 5 c). Weak points of orthophoto classifications are shadows, where the land cover

cannot be recognised correctly, as well as titling effects (see Figure 5 right) with the result of extended object areas.

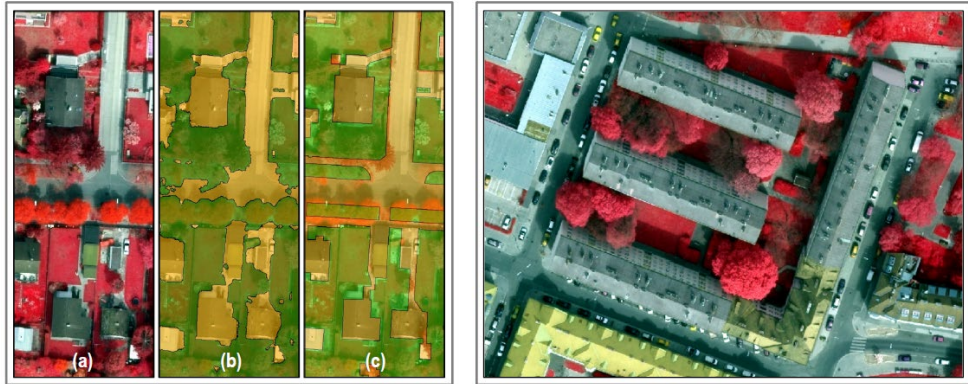


Figure 5: Challenges for classification of urban greens – Left: vertical overlaps (a: OP, b: OP and classification result, c: OP and MZK); Right: titling effects of buildings.

Figure 6 gives evidence about three indicators, which were derived by classification results and buffering algorithms as well as by intersection of classification results with normalized DSM.



Figure 6: Indicators derived from orthophotos – Left: Climate active areas with buffer zone > 0.2 ha, Middle: Accessibility (red: green areas > 0.5 ha, yellow areas: accessibility to green areas less than 300 m), Right: height map of green areas (as basis for calculating green volume – level of darkness is according to the level of height).

4. Case study 2: Monitoring of urban areas

4.1 Background, objective, test site and methodology

One of the important indicators in area development is the environmental factor. A significant deterioration of the environmental situation in cities leads to a number of serious social problems. Various studies (e.g. Scalenghe and Ajmone Marsan 2009; Teh et al. 2011; Fokai-des et al. 2016; Vanderhaegen and Canters 2016) document the phenomenon of “sealed surfaces” in urban areas. These are surfaces of artificial structures, such as roads, sidewalks,

driveways and parking lots that are covered with impenetrable materials such as asphalt, concrete, brick, stone, and rooftops. If cities have more than 40% of sealed surfaces, it is a serious threat to the environment (Arnold and Gibbons 1996). In this case, there can easily develop a chain of environmental processes and events, which significantly change the quality of urban air and water resources (Lu et al. 2002; Brabec et al. 2002; Wu and Murray 2003).

The objective of this case is to quantify the changes in land cover between 2003 and 2011 in the Paper Bridge district of the city of Hanoi, Vietnam. Paper Bridge district is located in the western part of Hanoi. The district area is 12.04 km². The site is characterised by an increasing urbanisation with a growing number of industrial estates (parks) with the settlement of enterprises providing various services and by the development of new urban areas with related infrastructure.

For this purpose, an object-oriented classification of multi-temporal satellite images and an automated spatial analysis of satellite images based on the registration of variability of strokes and lineaments systems on the earth's surface was applied to detect faults in the landscape. The research was performed on satellite images obtained from the SPOT-5 and Landsat 8 systems using the software programs "eCognition" and LESSA (Lineament Extraction and Statistical Analysis).

The process of object-oriented classification of multispectral satellite images was carried out in three stages: multiscale image segmentation, classification of image segments based on spectral, spatial and other characteristics of the study object and on-site field classifications (Gao et al. 2006; Nguyen 2017; Malinnikov and Nguyen 2017).

The technology of lineament extraction for detecting faults in the landscape includes the following main stages: pre-processing of satellite images; deviation and formation of strokes with different lengths using the radiometric information of the satellite images and detection of lineaments (rectilinear extended strokes). One of the most stable and frequently used algorithms for constructing the strokes is the algorithm described in the work of Zlatopolsky (1991) and implemented in the LESSA (Lineament Extraction and Statistical Analysis) computer program Zlatopolsky (Zlatopolsky 2011). This algorithm was applied for detecting the strokes on the digital image.

Lineaments are integrated into lineament systems for which interpretation schemes can be developed in the course of further analysis. Urban planning and urbanism specialists can apply the schemes for identifying characteristic features of urban structures.

4.2 Results and discussion

Based on the various indices calculated from SPOT-5 satellite image data from 2003, 2007, and 2011, a time series of three land cover maps with five land cover classes were produced (Figure 7). The results are documented in Table 4.

The results document significant land cover changes in the period from 2003 to 2011. The dominant transition from vegetation cover to sealed areas is visible. The results document a gradual increase of the sealed areas from 6125.1 ha up to 10,525.2 ha in 2011. In the same period, the area of vegetation and mixed vegetation decreased. The figures document the urbanisation process in the Hanoi megalopolis caused by a land-use planning policy enabling a conversion from agricultural land to building land.

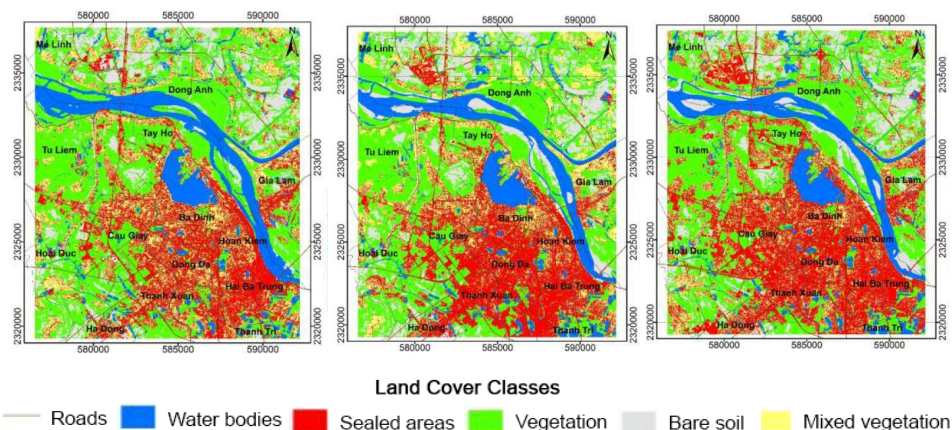


Figure 7: Land cover map of the city of Hanoi – Left: 2003, Middle: 2007, Right: 2011.

Table 4: Land cover classes obtained from SPOT-5 satellite images for the period from 2003 to 2011

Land Cover Class	2003		2007		2011	
	ha	%	ha	%	ha	%
Water bodies	3899.8	13.6	3529.1	12.3	3465.9	12.1
Sealed areas	6125.1	21.3	8426.9	29.3	10,525.2	36.6
Vegetation	10,658.7	37.1	10,157.4	35.3	9301.2	32.3
Bare soil	3312.4	11.5	3762.4	13.1	3499.7	12.2
Mixed vegetation	4760.5	16.5	2880.6	10.0	1964.3	6.8
Total	28,756.5	100.0	28,756.4	100.0	28,756.3	100.0

Figure 8 shows a lineament field calculated from a Landsat 8 panchromatic satellite image of the territory of the Hanoi megalopolis. Both, short and long lineaments can be seen in the study area, shaped by elements of the natural and anthropogenic landscape. The major lineaments are representing the Chan River, the Red River, and the Lo River in the satellite image (Kao 2006; Ha 2007). Vinh Ninh fault is located to the north-east of the Chay river fault in the Central part of Northern Vietnam and passes through the Dong Anh and

Thuong Tin counties. The manifestation of tectonic movements along this fault is observed on the land surface in the community of Vong Ghla (Dong Anh County). The result of these movements are landslides on the Red River left bank. In addition, a number of other faults are visible. Thus, based on the above, it can be concluded that the territory of the Hanoi megalopolis is characterised by an intense manifestation of hazardous engineering-geological processes of natural and man-made nature, which affects the megalopolis infrastructure and results in deformations of residential houses, public buildings and objects, including architectural monuments.

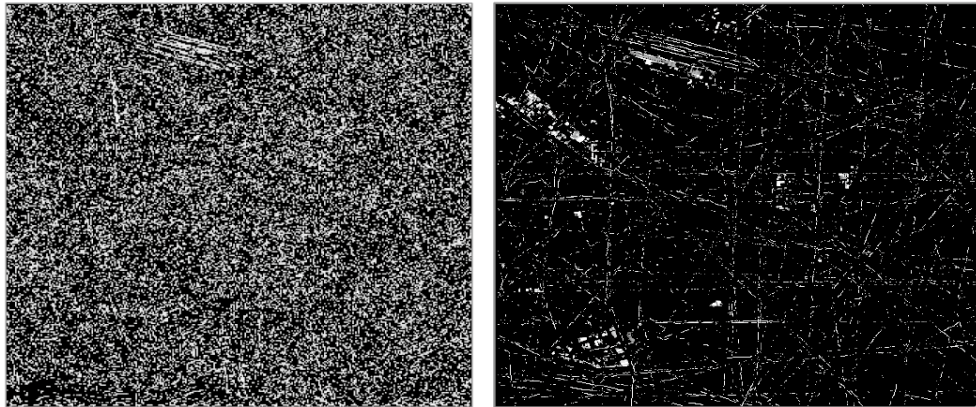


Figure 8: Strokes (left) and lineament fields derived from satellite images of the study area.

5. Summary and conclusions

Land is an essential asset that requires proper management. Especially in fast changing urban environments, periodical monitoring of land cover and land use is an essential prerequisite for the sustainable development of the resource land.

Remotely sensed data provide up-to-date information for supporting planners, politicians, and other stakeholders involved in land management for their decision making. Information gained by remote sensing and GIS technologies also document the implementation of land management processes as well as changes over time.

Today, a large number of platforms and sensors is available, delivering images with different spatial, spectral, radiometric and temporal resolutions. The spectrum of coverage is varying from local sites to global scale. Some of the remote sensing images are offered free of charge.

Image processing methods combined with GIS technology enable the extraction of parameters, which describe the amount, distribution, and condition of natural and human-made resources.

As highlighted in the two case studies, the extraction of information can be carried out with a high degree of automation, leading to near real-time, homogenous and reliable results. In

addition, the processing is traceable and can be applied for time series and future analysis, which guarantees comparable datasets for documenting changes.

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Qualitative GIS to Support Sustainable Regional Branding and Transition in Northern Germany

Abstract

A mixed methods approach using GIS was applied to identify places relevant for regional branding and to support co-creation in a transdisciplinary process in Northern Germany. For this purpose, local stakeholders mapped characteristic landscape features, places of leisure activities and places where they feel happy. In addition, public authorities' geodata were processed to identify landscape classes and elements, which are characteristic from a quantitative point of view.

The results indicate a cross-thematic, cross-methodological and cross-regional significance of water landscapes. However, their relationship to other landscape elements and further topics differs significantly in the two study regions presented here, leading to different starting points for place branding.

The use of maps as a basis for discussion helps bringing together stakeholders with different experiences and involving them in brand building. In this way, the chosen approach supports inter- and transdisciplinary changes towards a sustainable regional development and acts as a bridge between brand building and its implementation on site.

1. Introduction

Place branding is based on the assumption that places such as cities or regions can be regarded as brands¹, but are constituted in other ways than consumer products (Kalandides 2011: 285). On the one hand, they “form a ‘unique selling proposition’ that will secure visibility to the outside”, while, on the other hand, they “reinforce ‘local identity’ to the inside” (Colomb and Kalandides 2010: 175).

Effective place brands take into account the residents' perspectives, are rooted in the involvement of stakeholders and are built on co-creation (Ruiz et al. 2019: 1; Karavatzis 2012: 7; Hatch and Schultz 2010). Accordingly, a participatory and involvement-oriented approach to place branding has been proposed (Kavaratzis and Kalandides 2015: 7). This understanding has recently gained momentum leading to a “participatory turn gradually moving from the margins

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¹ A “brand is defined as a name, term, sign, symbol, design, or a combination of them, intended to identify the goods or services of one seller or group of sellers and to differentiate them from those of competitors” (Kotler 2000: 404).

towards the core of the discipline” (Karavatzis et al. 2017: 177). The participatory turn calls for new directions in place branding research where methods of stakeholder involvement are of particular importance (Kavaratzis 2012: 16; Acharya and Rahman 2016: 309).

The discipline of place branding has been evolving from touristic promotion to supporting a territory’s development “by integral management from the perspective of the creation of strategic plans” (de San Eugenio et al. 2019: 3). This shift goes in hand with increasing interest in the disciplines interface with spatial planning (Oliveira 2015; 2016) and sustainable development (Maheshwari et al. 2011; Taecharungroj et al. 2019). To utilise place branding as a tool in strategic spatial planning, more spatial awareness has been proposed, leading to “a more realistic view over spatial realities, where identities, assets, qualities and landscape are paramount for spatial development” (Oliveira 2016: 61). Emphasising space might also contribute to bringing place branding closer to sustainable transition research where Levin-Keitel et al. (2018: 12) recently argued for a “spatial turn”.

Against this background “mixed methods participatory GIS²” (Brown et al. 2017) have been applied to promote participation and spatial awareness in two study regions in Northern Germany. Sketch mapping (cf. Boschmann and Cubbon 2014) with various stakeholders is at the centre of the chosen approach leading to localised information about landscape specifics, leisure activities and places of happiness. Calculating the predominant landscape classes on the basis of geodata from official bodies and using the results as a proxy for what might be specific for a region’s landscape complemented the participatory part of our study. GIS software was used to process both the geodata collected in mapping workshops and the geodata from the authorities.

Our approach belongs to a field of research known as qualitative GIS (Cope and Elwood 2009; cf. Mugerauer 2000) in which GIS software is used to integrate qualitative and quantitative spatial data using mixed-methods approaches. The results from qualitative and quantitative data analyses are considered together or against each other, but not separately (Jung and Elwood 2010). “Spatial turn in social sciences and humanities made qualitative GIS an actively sought methodology that combines representation of place, qualitative inquiry, and information technology” (Pavlovskaya 2017). To the best of our knowledge, however, there is no evidence yet of an explicit scientific use of qualitative GIS in the relatively young discipline of place branding.

2. Study regions and methodology

2.1 Study regions

Lübeck-Nordwestmecklenburg (LNWM) lies in the morainic uplands of Ostholstein and Nordwestmecklenburg, bordering the Baltic Sea to the north. The study region comprises

² Geographic Informations Systems (GIS) are “a powerful set of tools for collecting, storing, retrieving at will, transforming, and displaying spatial data from the real world for a particular set of purposes” (Burrough 1986: 6).

areas of the federal states of Schleswig-Holstein and Mecklenburg-Western Pomerania (Figure 1). The area consists of the city of Lübeck (~210,000 inhabitants) in Schleswig-Holstein in the west and the adjacent villages of Kalkhorst, Dassow, Lüdersdorf and Selmsdorf (in Mecklenburg-Western Pomerania) with ~1800 and ~5000 inhabitants in the east. In recent history, the area was divided in a north-south direction by the former inner German border, which, to this day, reinforces differences between Lübeck and the city's rural neighbours.

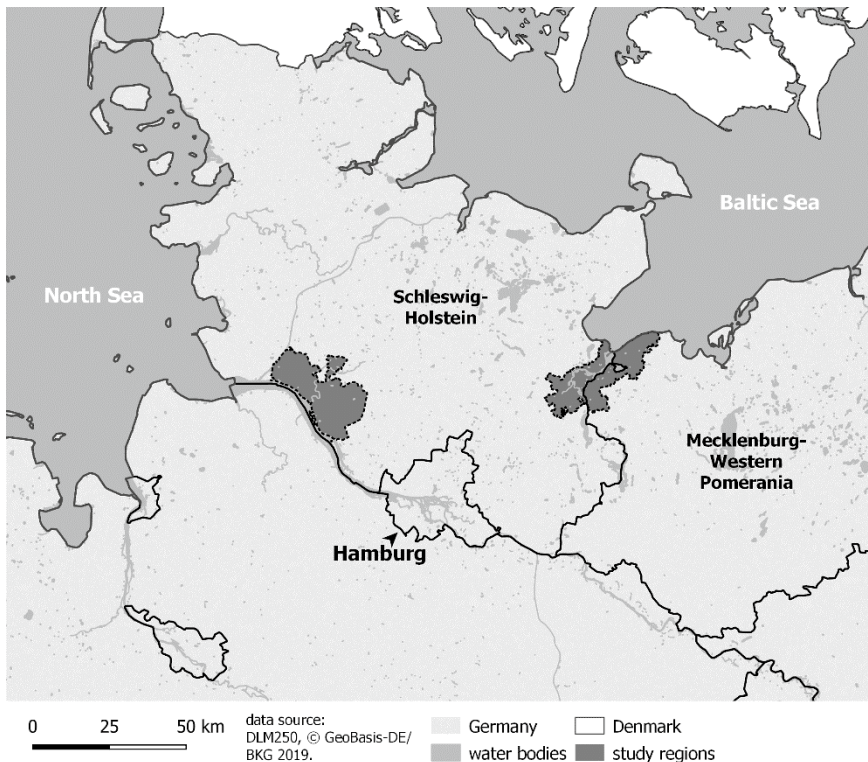


Figure 1: The study regions in Northern Germany (SEM to the west, LNWM to the east). Due to scale, smaller water bodies like SEM's dense system of canals are not displayed (see Figure 7).

The "Steinburger Elbmarschen" (SEM) form the southern part of the district of Steinburg in Schleswig-Holstein. This region is characterised by marshland of the same name stretching from the Elbe in the southwest to the Geest³ in the north. It has been shaped by extensive acts of land reclamation since the Middle Ages, with terrain heights partly below sea level. The two largest cities in the region are Itzehoe (~32,000 inhabitants) and Glückstadt (~11,000 inhabitants).

³ Geest is a landform of glacial origin that lies slightly higher than the adjacent marshes, which consist of Holocene marine sediments. In Germany, the term 'marsh' refers to a range of coastal lowlands including SEM's artificial polder system.

Both regions are part of the Hamburg metropolitan region. Whereas LNWM is characterised by the contrast between a major city and the abrupt transition to more rural municipalities, the entire SEM is classified as a rural area.⁴

2.2 Regiobranding

The Regiobranding⁵ project aims at developing a comprehensive understanding of landscapes in the Hamburg metropolitan region and to use this knowledge for regional branding (cf. Kempa and Herrmann 2014). The project follows a transdisciplinary approach and sees itself as a process that supports sustainable regional development.

In the German-speaking countries, transdisciplinarity (“Transdisziplinarität”) is understood as an integrated research approach that combines practical and scientific knowledge (cf. Bergmann & Schramm 2008).⁶ Transdisciplinarity research is carried out in mutual learning and research processes with representatives of society and science (Scholz and Steiner 2015: 523). It is developed not only from scientific but also from socially relevant questions. One such question in Regiobranding is *what is characteristic of a certain landscape and how to use the characteristic for a regional brand*.

During Regiobranding’s five-year period, representatives from eight institutions⁷ met regularly to guide brand management. This committee received information by the scientific work carried out throughout the entire project. Especially during the first 18 months, the initial phase of the project, quantitative landscape analyses were performed using public authorities’ geodata⁸ to determine spatial and temporal characteristics.

2.3 Mapping workshops

Following the project’s first phase, mapping workshops were organised in the regions, in which stakeholders from administration and politics, associations, the private sector and the local public participated. In the first workshops, we asked the participants to map the places of their frequent leisure activities as well as landscape components that they consider most specific to their region, following the sequence shown in Figure 2.

⁴ BMEL Interaktive Karte „Willkommen im ländlichen Raum“, https://www.bmel.de/DE/Laendliche-Raeume/Infografiken/_node.html, visited 2018/11/03.

⁵ “Regiobranding – Branding von Stadt-Land-Regionen durch Kulturlandschaftscharakteristika” (FKZ 033L121AN) was funded by the German Federal Ministry of Education and Research (BMBF).

⁶ This differs from its international understanding where the concept is commonly understood more widely as a principle of universal knowledge beyond scientific disciplines (cf. Niculescu 2002).

⁷ 1. Leibniz Universität Hannover (Geodätisches Institut, Institut für Umweltplanung), 2. Universität Greifswald (Institut für Geographie und Geologie), 3. Universität Hamburg (Archäologisches Institut), 4. mensch und region (Planungsbüro), 5. Hansestadt Lübeck, 6. Kreis Steinburg, 7. Archäologisches Landesamt Schleswig-Holstein, 8. Landschaftspflegeverein Dummersdorfer Ufer e.V.

⁸ The data set primarily used was the ATKIS Basis-DLM, a digital landscape model with a homogeneous (core) data schema in all German federal states and LBM-DE2012, a land cover model derived from the DLM. To quantify and compare recent land cover changes in an international context, European CORINE Land Cover data (starting 1990) were used. For long-term change detection in SEM, various historical and topographic maps were applied, starting with the Preußische Landesaufnahme (Prussian Land Survey) of the 1870s.

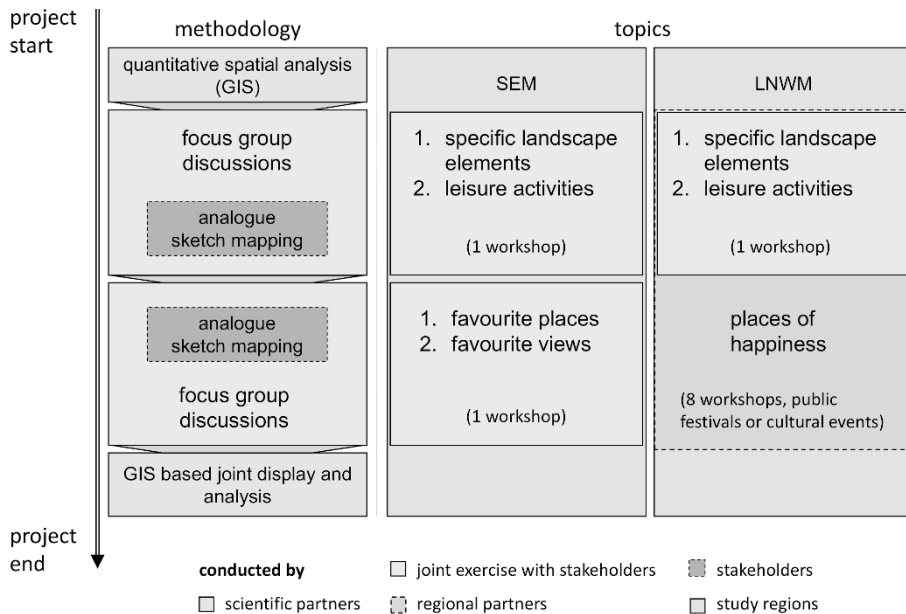


Figure 2: The mapping workshops' workflow (showing methodology and topics). In LNWM, the mapping approach for "places of happiness" was designed and implemented by the project's regional partners.

We introduced the concept by presenting posters showing spatial-temporal landscape patterns of the region and potentially characteristic landscape elements to the stakeholders. What was considered "characteristic" stemmed from the GIS-based quantitative landscape analyses in the earlier stage of Regiobranding. These analyses included calculations of area sizes, length, density of landscape elements, landscape diversity and land cover change. The idea was that landscape components with relatively high results in these calculations could also be an indication of being characteristic or specific to the region. In addition, those landscape classes were identified, which are rare throughout Germany, but which occur above average in the respective study area.⁹

However, studies that focus primarily on the physical composition of the landscape might lead to findings that are not shared by landscape users. It is conceivable that landscape elements, that numerically appear to be characteristic, are taken for granted by locals. Conversely, landscape elements can be perceived as special by the inhabitants, even if this cannot be deduced from calculations (Stemmer and Bruns 2017).

Therefore, the workshop participants were asked to list both, landscape elements they perceive as specific, and leisure activities they perform frequently, and to locate these on an

⁹ In this approach, landscape classes that occupy less than 3% of Germany's total area were classified as "rare". The results of these investigation were published in Wenger (2016), while the paper presented here focuses on the participatory mapping.

analogue base map. Several groups of four to seven people mapped for about 15 minutes. The mapping process formed the key part of focus group discussions. Two scientists moderated the discussion to gain additional information on the objects mapped.

Supplementary workshops then aimed at identifying places with positive connotations. These workshops differed in design in both regions. The one in SEM asked for favourite places and favourite scenic views. As in the previous workshops, these places were mapped and explanatory attributes were listed. In LNWM, in contrast, the mapping took place at eight different occasions, including workshops, festivals and cultural events. This approach was primarily designed with practical interests in mind, including low thresholds for participation. Attendees were asked to locate places where they feel happy ("places of happiness"). The acquisition of semantic attributes was less relevant for the local partners in LNWM who took the initiative and designed the mapping exercises. Their primary goal was to create a map ("Glückskarte") for communication and planning and to make Regiobranding more visible in the region. The high number of mapped points still leads to branding-relevant indications.

The user-generated content from the workshops was subsequently digitized with QGIS 2.16 and jointly examined with the results of the quantitative spatial analyses.

3. Results

3.1 Sketch mapping

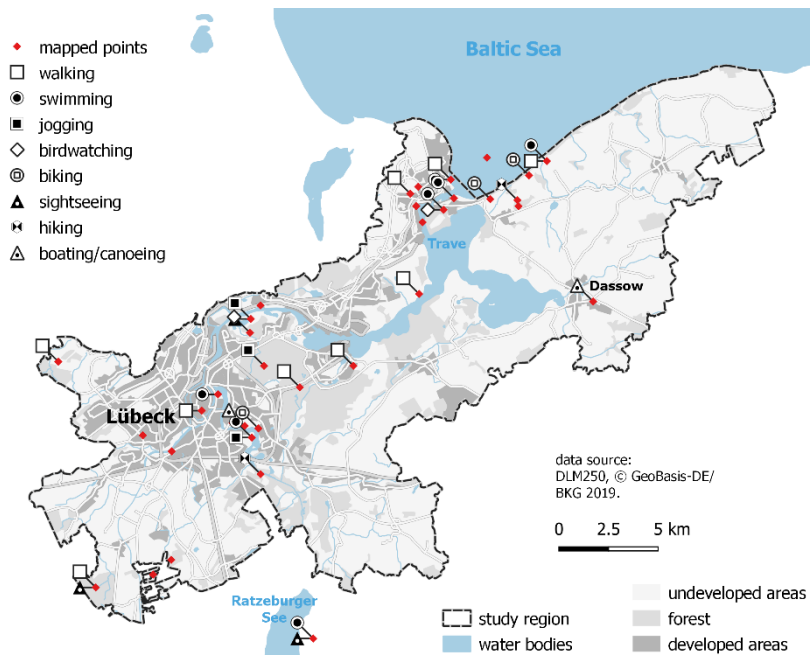
Leisure activities

A total of 56 leisure activities in SEM and 35 in LNWM were mapped. With 30 in SEM and eleven in LNWM, many activities (e.g. swimming, fishing, sailing, boating, canoeing or kayaking) require natural or artificial waters as a prerequisite. Looking at the map (Figure 3), it becomes clear that even more activities are connected to water: People in the regions often walk, cycle, jog or inline skate along the waterside. Walking was mentioned 15 times in the SEM and seven times in LNWM, making it the most common leisure activity in both regions. With a few exceptions, this refers to walks close to water bodies.

Specific landscape elements and favourite places

The range of specific landscape elements mapped in both regions is wide. Most elements were mentioned only once with some being mapped twice and the old town of Lübeck, the Altenmoor and the lowest point of Germany even three times (the latter two are located in the SEM).

In SEM, 20 of 55 specific landscape elements are directly related to water. However, natural water bodies were recorded only three times while the other 17 objects mapped refer to historical structures of the marsh landscape (e.g. locks, dykes or water mills) and the way the population utilises the waters (e.g. river ferries, tour boats). In addition, 14 moors were mapped, making them the most recorded landscape class.



This representation was chosen because some sites are used for more than one activity by one person. For example, activities that belong to the categories “sightseeing” and “swimming” were recorded by the same person at Lake Ratzeburg (“Ratzeburger See”) by mapping one place, but tagging two activities in the corresponding table.

Figure 3: Leisure activities mapped by local stakeholders in LNWM. The red dots show the location of the activity. Additional signatures indicate the type of activity.

This is different in LNWM, where natural water bodies were most frequently mapped. Together with the artificial Elbe-Lübeck canal, that was captured once, water bodies were mapped a total of 15 times. 24 of all 44 objects in LNWM are either water bodies or have a relation to them, such as topographical features of river shores and the coastline (e.g. the Brodtener cliff, the Dummersdorf bank) or wetlands (e.g. the Dovensee lowland).

In SEM, a total of 51 favourite places were mapped with several being mentioned more than once. Of all these places, 34 are linked to water bodies by a semantic relation or by spatial proximity (e.g. dykes at the rivers Elbe, Stör and Wilster Au, harbours in Glückstadt or Kollmar, locks in Kasenort or at the Stör estuary, Figure 4). Another 17 favourite places connect the region’s topography, history and community, such as cycling tour stopovers on the Geest, historical buildings in town centres, farmhouses or farmer markets (cf. Becker et al. 2018).

In addition, the participants mapped 45 favourite views; some of them several times, such as Glückstadt harbour (viewing direction to the Elbe), the lock in Kasenort and the Herrenmoor. There are three broader categories comprising most favourite views: a) views of larger (mapped 13 times) and smaller rivers (9), both with corresponding viewpoints often

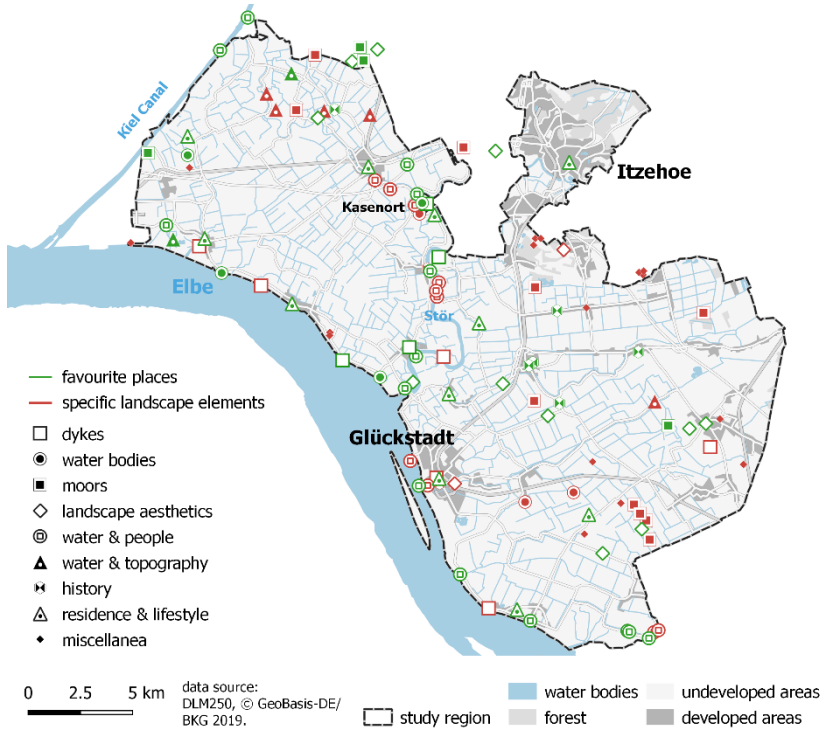


Figure 4: Joint map of specific landscape elements and favourite places in SEM.

located on dykes looking onto the rivers' waterscapes, b) views of moors¹⁰ or from the Geest down to the adjacent lowlands (8), c) views of marshlands and meadows (7). Contrary to favourite places the views appear to mostly omit the region's towns and settlements. Only two favourite views point in the direction of Glückstadt harbour and its old town or the "Marschhufendorf" of Neuenbrook, a traditional linear settlement found in the marshes of Northern Germany.

Both favourite places and views in SEM exclude large, contiguous areas in the centre of the region around the towns of Nortorf, Hochfeld, Herzhorn and Grevenkop, being characterised by low elevation, pastures, farmland, wind energy sites, overhead power lines and in part the motorway A5 (Figure 8).

The "places of happiness" in LNWM are made up of 1068 points. For the purpose of illustration, Figure 5 only shows the northern part of the region. Many points are located along the coastline in the north as well as at the lake "Hemmelsdorfer See" in the west and "Das-sower See" or "Pötenitzer Wiek" further east. This also applies to shorelines along the rivers Trave or Wakenitz and the Elbe-Lübeck canal in those parts of the study area that are not shown in this figure.

¹⁰ This applies to present-day moors as well as to areas of historical moors now diminished by land reclamation and peat extraction (cf. Schaffert et al. 2020).

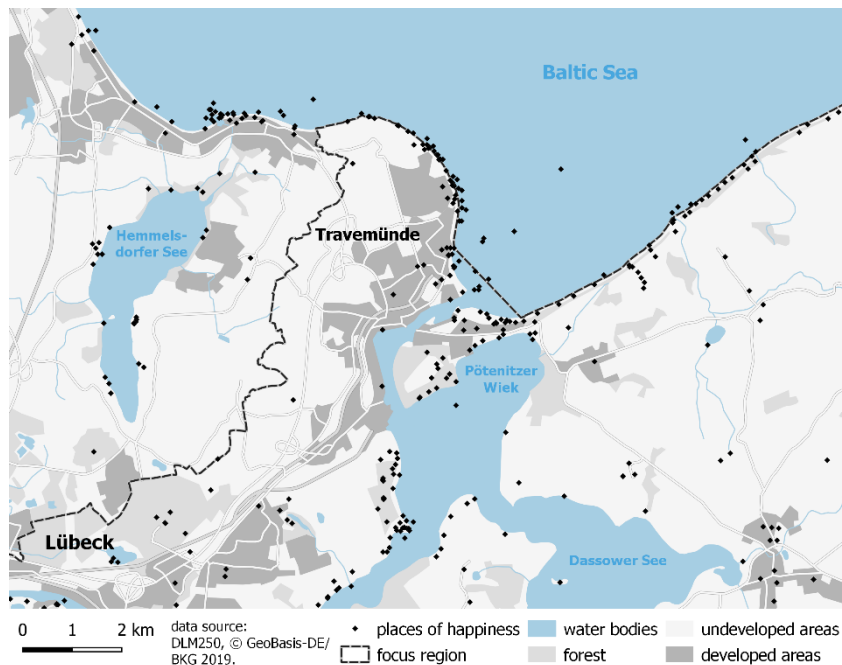


Figure 5: “Places of happiness” in the northern part of LNWM.

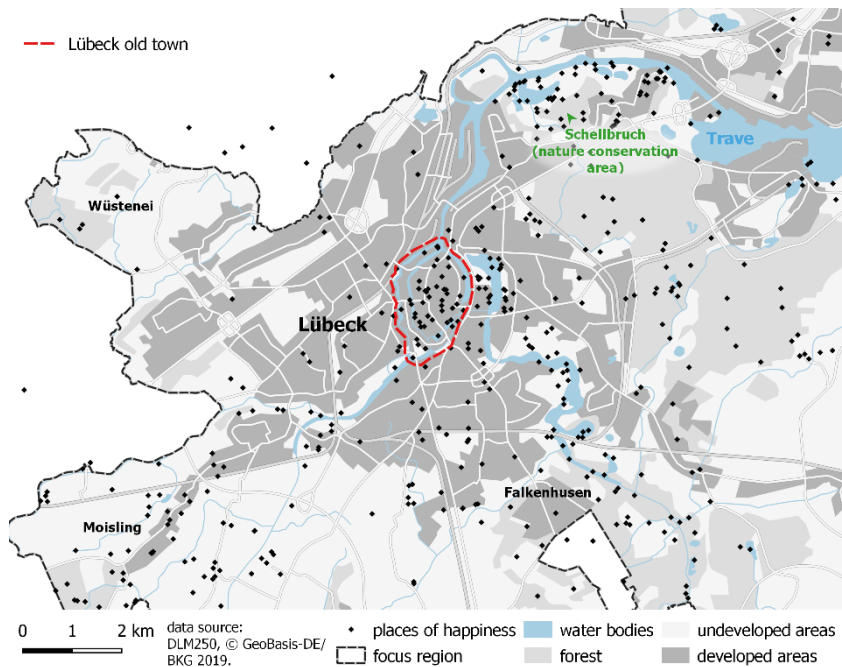


Figure 6: “Places of happiness” in the city of Lübeck.

The highest density of “places of happiness”, however, occurs in the old town of Lübeck (Figure 6). The historic old town is a UNESCO cultural heritage site with numerous restaurants, shops, museums and social meeting points. The rivers Trave, Wakenitz and the Elbe-Lübeck canal also converge here.

3.2 Mixed method GIS in the context of Regiobranding

The statistical comparison of land cover classes in the initial phase of Regiobranding revealed that most of SEM is covered with pastures and meadows, while urban areas are relatively widespread in LNWM. However, pastures and meadows were not prominently represented in the participatory mapping in SEM. Still, they should not be neglected when building a brand to draw an objective picture of the regions landscape. In this context, quantitative landscape analyses helped to adequately evaluate the results of the qualitative exercises and to integrate them reasonably into the branding.

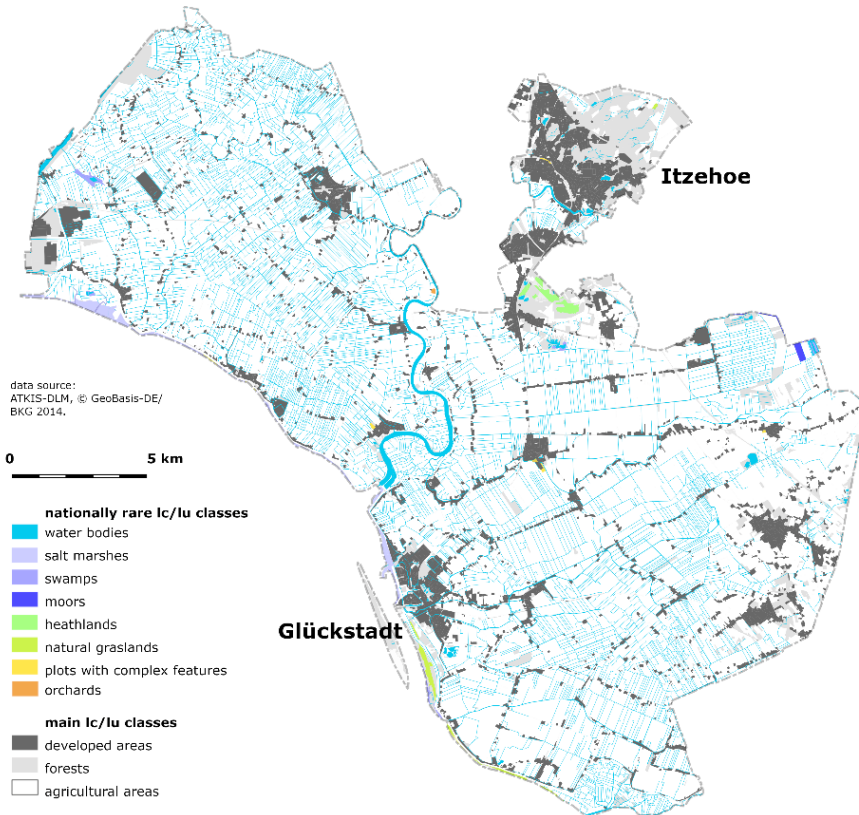


Figure 7: Land cover/land use classes in SEM being rare in Germany – shown together with predominant classes (“main lc/lu classes”). Settlement patterns and density of canals differ between the region’s western and eastern part, which is due to the elevation and land reclamation history.

Another finding is that, of those land cover classes that are rare in Germany (according to Wenger 2016: 18; Figure 7), the share of water bodies is more than twice as high in both study regions.¹¹ Herein, qualitative and quantitative analyses complement each other and indicate a cross-thematic, cross-methodological and cross-regional significance of water landscapes, through which the regional water landscapes gain weight in the branding process as a topic to be considered (cf. Schaffert et al. 2020). Evidence that water landscapes can be used for regional branding has been presented by de San Eugenio et al. (2019) for Pla de L'Estany in Catalonia. However, the way in which they can be addressed and utilized for branding is likely to differ considerably from region to region. In LNWM, the way the Baltic Sea and inland waters, such as the rivers Trave and Wakenitz and the Elbe-Lübeck canal, interact might play a major role. In SEM, on the other hand, the hydraulic engineering elements of the marsh landscapes – the numerous ditches and other cultural-historical elements of the marsh drainage – could be key bearers of a brand.

The sketch mapping was supplemented by discussions, which enabled further information to be generated. Only then did ambivalences in the individual landscape assessment become apparent. For example, one participant explained that she had mapped the widespread rape-seed fields along LNWM's coast as a specific element. This led to discussions with other participants who pointed out that rapeseed has only spread significantly in recent years due to agricultural subsidies – a well-known phenomenon far beyond the region's borders. Furthermore, the focus groups' verbal discourse helped to avoid misinterpretations. In LNWM for example, participants mapped features such as the "Moislinger Baum" or the "Brandenbaum". "Baum" is the German word for tree. Consequently, these supposed trees would probably have been classified as botanical landscape elements by the non-local scientists. Fortunately, discussion clarified that these are not plants but historic toll bars ("Schlagbaum") of Lübeck's fortification.

4. Discussion: Qualitative GIS for Place Branding in the context of sustainable regional development

As mentioned above, participation, co-creation and stakeholder involvement are ingredients of an effective place brand. Not only do they put the brand on a broader basis and promote its acceptance, they also bring place branding closer to sustainability transition research at the methodological level. The latter goes even further by distinctly pursuing inter- and trans-disciplinary approaches (cf. Levin-Keitel et al. 2018: 1).

According to Levin-Keitel et al. (2018), the explicit consideration of space offers added value for sustainability transition research in inter- and transdisciplinary modes by utilising space as a "bridging concept", as a "normative concept", and as an "approach to action". This added value can be utilised in place branding through qualitative GIS, as experience from Regiobranding shows. To illustrate this, the identified advantages are assigned to the three previously mentioned conceptual perspectives of space.

¹¹ Statements of this kind were made possible by comparative analyses on the basis of a Germany-wide study, which was carried out largely in parallel with the studies in regiobranding by Hermes et al. (2018).

4.1 Space as a “bridging concept”

Space can be seen as a “bridging concept” as it allows “collecting different perspectives in order to come to a joint understanding” (Levin-Keitel et al. 2018: 8). This is particularly important for inter- and transdisciplinary studies.

In Regiobranding, finding a common language had been challenging. This was true for the partners from different scientific disciplines as well as for their exchange with practice. In our opinion, this challenge was much smaller for those who actively worked with GIS during the initial phase of the project. The focus in the areas of collection, management, analysis and presentation of spatial data differed considerably between the scientists from archaeology, geodesy and landscape planning. Nevertheless, the common way of thinking in spatial contexts and the work with partly the same geodata facilitated professional exchange and mutual understanding. In addition, some of the local partners involved in Regiobranding, e.g. experts in spatial planning, were used to work with maps and other geodata in their daily work. In this way, GIS promoted a joint understanding of partners from science and practice.

“Space” also made it possible to build a bridge between differing time concepts of partners from science and practise: Local partners pushed for early results of scientific analyses to promote further support for Regiobranding in the regions. Also, local press coverage of Regiobranding had increased interest and built momentum, which required continuous input to avoid a slowdown. The scientists, in contrast, had concerns to disclose preliminary research without validation. These different approaches were identified as a major challenge for collaboration. The mapping workshops, which allowed for low-threshold information transfer, enabled us to emphasize the provisional character of the quantitative results. Our request for comments and additions through participatory mapping further highlighted that the scientific investigations were work in progress.

The workshops also fostered joint insights and knowledge development within the focus groups. At the end of every mapping session, the moderators drew attention to the jointly produced sketch map and asked whether anyone recognises spatial patterns. An exemplary answer from a participant in Lübeck was as follows: “They [the points representing specific elements and leisure activities] always accumulate where there is water”. In this way, the potential importance of water landscapes was collaboratively identified in the workshops. It turned out that other participants shared this opinion and provided further details. Such common insights can help building brand ownership, which is a key element of any brand (Aitken and Campelo 2011: 1). We can also confirm the finding of Boschmann and Cubbon (2014: 204) that working with an analogue map helps participants feeling comfortable in a discussion group while they became “eager to discuss and show their experiences in the context of a familiar map”.

4.2 Normative concept

“Space as a normative concept” shows what a desired development in a certain area looks like, taking into account diverging sectoral interests and transition perspectives. Spatial planning can serve as an example that draws upon the normative dimension of space to foster a

territory's sustainable development (Levin-Keitel et al. 2018: 9). However, there is room for improvement to exploit this potential. It has been argued, for instance, that spatial planning in Germany should go beyond the static protection of cultural landscapes to focus more on their future development and on new opportunities for regional development resulting therefrom (Kühn and Danielzyk 2006: 292). In this context, participatory branding using qualitative GIS can make a significant contribution, as illustrated by the following examples.

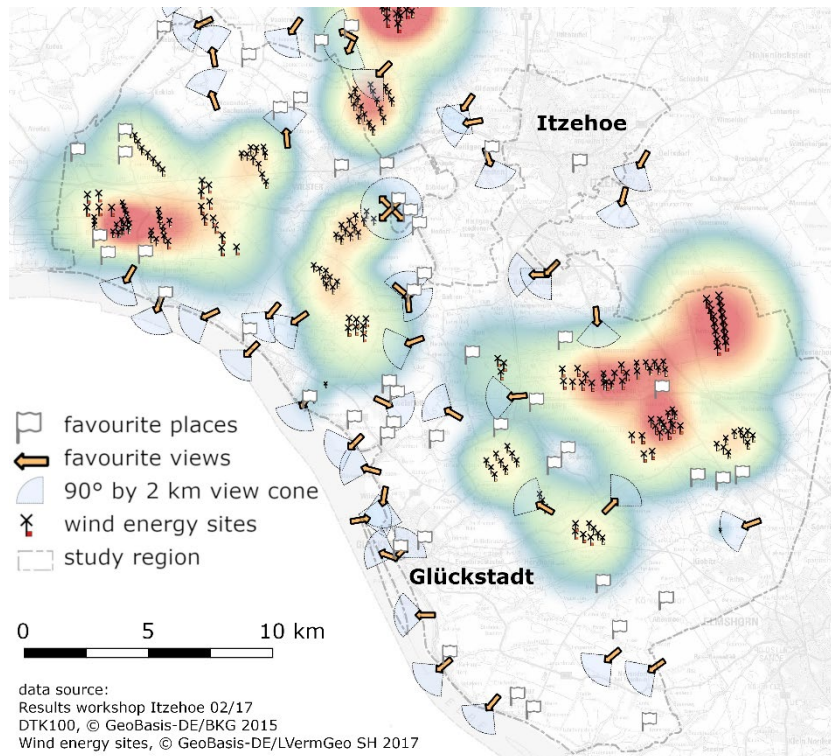


Figure 8: Wind energy sites in SEM and favourite viewpoints. The heat map displays the density of wind energy sites in relation to their height.

Figure 8 shows favourite viewpoints in SEM and corresponding directions of sights that were mapped by local stakeholders according to their preferences. These data were later displayed jointly with other geodata such as locations for wind energy plants. At first glance, this example suggests a possible causal relationship between the two factors, since most of the viewpoints are not directed towards wind energy sites. Whether this is coincidence or a causal link and if so, how, in which order and by what principle, requires further analysis. The expansion of renewable energies, however, is controversially discussed among the region's population (Knaps 2019) and it is conceivable that addressees of the brand have negative attitudes towards the landscape-altering expansion of wind turbines. One consequence could be to explicitly consider favourite views when planning future wind turbine

sites and to protect these views permanently. Viewshed analyses are off-the-shelf GIS functions that are established in spatial planning for this purpose (e.g. Kidner 1999). If focusing on the region's future development, energy transition could also be actively addressed by including SEM's distinctive energy landscape in its brands. The marsh landscape, which has been reclaimed through human intervention, in which human activity has always been present, could provide an authentic backdrop for such an approach. Conflicting aspects that contribute to sustainable development – such as the production of renewable energies versus a visually appealing and accessible landscape (cf. Taecharungroj et al. 2018) – could be balanced in this way.

No viewshed analyses have been performed in our case making the results of this investigation vulnerable. Nevertheless, the example demonstrates the potential of qualitative GIS to uncover hidden perspectives, provide a common starting point for further discussion and suggest directions for additional research.

Landscape and landscape-related experiences can be utilised as key components in branding places (de San Eugenio et al. 2017; Vuorinen and Vos 2013: 156). In the regions of our study, however, the proportion of unbuilt landscape has been declining for a long time (Figure 9, cf. Schaffert et al. 2016; Becker et al. 2018).

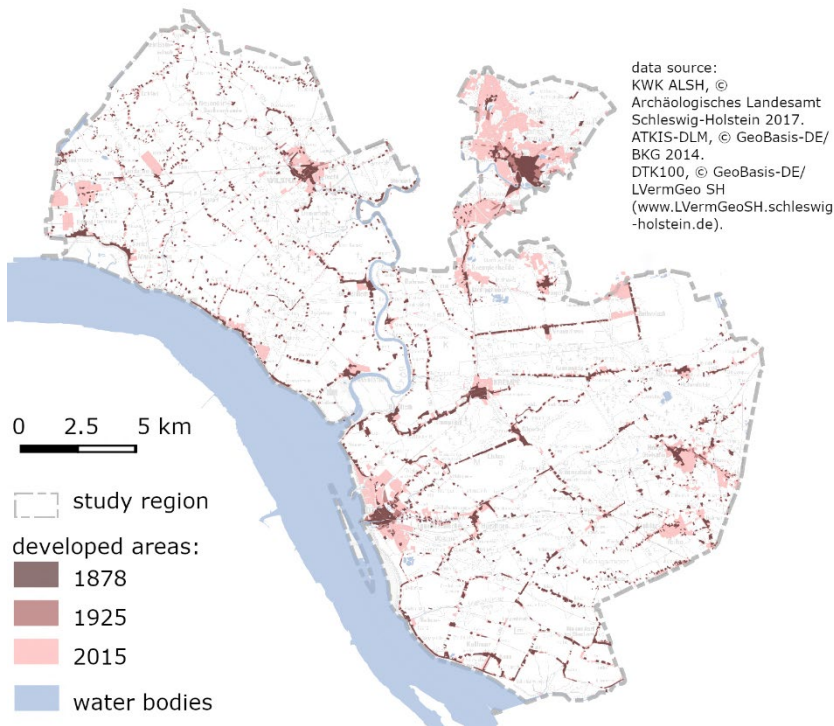


Figure 9: The figure shows land cover changes since the 1870s in SEM based on historical maps starting with the Preußische Landesaufnahme (Prussian Land Survey). The settlement area has grown significantly since.

As a consequence, elements that are important for the identity of a region might get lost. A case in point are prehistoric relics such as burial mounds or megalithic tombs in LNWM, which are rarely preserved, despite their historically numerous presence in the developed areas (cf. Jędrzejewski and Fehring 1988). Today, archaeological relics of this kind are under protection. Still, we do not know, which landscape elements will be classified as worthy of protection by future generations. In order not to impair the chances of future generations to identify with the region, it seems appropriate to make such considerations. Against this backdrop, an GIS-based instrument displaying long-term landscape change has been developed in Regiobranding under the direction of the State Office for the Preservation of Historical Monuments of Schleswig-Holstein – the so-called “Kulturlandschaftswandelkarte” (KWK, cf. Ickerodt et al. 2018). Utilising vectorised historical maps, it highlights individual aspects of landscape change, like urban sprawl, archaeological sites or wind energy usage. The joint presentation with numerous other land cover changes helps to identify areas that have not changed significantly over time. Some of these areas are currently not under protection. Nevertheless, their conservation for future generations may be justified. The KWK has been fed into the GIS of the district of Steinburg and is available to the planning departments of affiliated municipalities. It can be displayed jointly with the municipalities’ preparatory or binding land-use plans (and even with favourite places and views). Thus, the KWK provides planners with a basis to take unprotected landscape relic zones into account when considering future urban expansion.

4.3 Approach to action

Space can also be seen as an “approach to action” supporting people in transforming a territory towards sustainable development (cf. Levin-Keitel 2018: 10). Landscape may serve as a means for utilising this potential in place branding. In this context, de San Eugenio et al. (2019) recommend a sustainable brand renewal for Pla de L’Estany in Catalonia by taking into greater account its landscape and culture.

Here, too, water was found to be the “most genuine, characteristic and identifying element in the region” (de San Eugenio et al. 2019: 12). However, in order to develop its unique selling proposition, the authors do not focus on just one aspect but recommend a combination of “sustainable natural landscape” – essentially composed of the region’s water landscape and its topography – and local cultural traditions. Interviews with stakeholders emphasized the significance of lakes, rivers, mountains or local food for the Catalan region. However, without a hands-on follow-up such recommendations would be prone to remain on a conceptual level. Qualitative GIS can help here, as they support the transfer from concept to practice: Likewise, and in addition to water landscapes, topographic elements were frequently mapped in LNWM (Figure 10). In several cases, stakeholders made additional comments linking these two landscape components (e.g. “coastline – far view on the sea”). Such information provides the responsible authorities with an approach to action by proposing specific sites to anchor the place brand in the real world.

Against this background, signposts could be installed at locations with popular views towards the water landscape. Map-based information panels could refer to the sketch mapping on-site, explaining a viewpoint's context. As a consequence, the site's authenticity might increase when non-local visitors learn that locals identified and recommended a spot due to its "far view on the sea" etc. Additionally, recognising citizen's input in a viewpoint's location or information panels may establish local ownership with the brand.

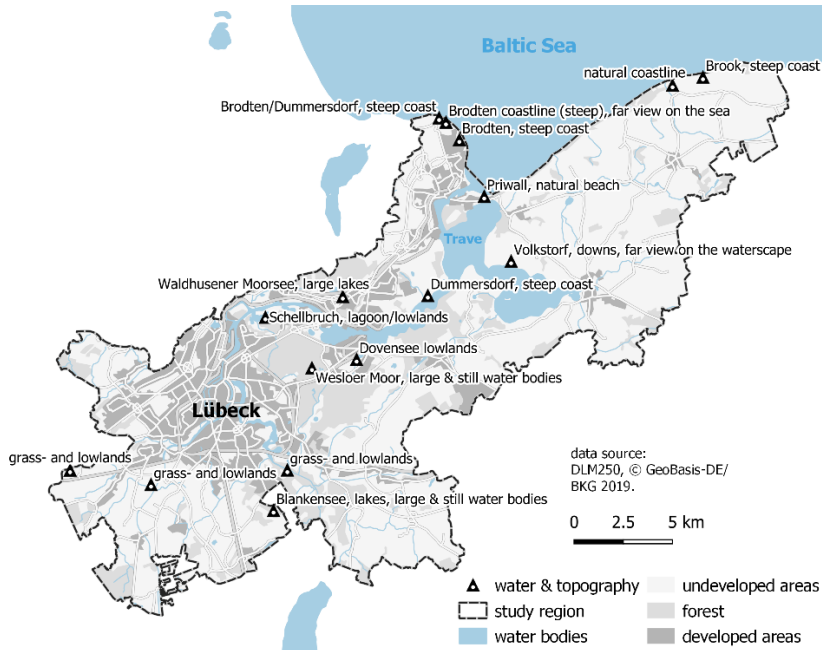


Figure 10: Topographic elements and corresponding comments mapped in LNWM.

If the normative concept permits, information panels set up at suitable viewpoints could also cover energy transition and its implementation in the region. The functional parallels of today's wind energy plants to the historic wind-powered mills and pumping stations in SEM could serve to illustrate the region's energy transformation as a part of a longer development rooted in the region. Sites with a view towards wind turbines could then be linked by thematic routes¹² with historic structures of the marsh landscape and places representing cultural traditions, e.g. inns serving regional dishes.¹³ Mapped leisure activities in turn could support the decision whether such routes should be developed as walking, hiking or cycling paths.

¹² The routing itself could take advantage of sophisticated GIS-algorithms for tour planning (e.g. Abubakar et al. 2017) or on-site navigation (e.g. Anam and Yunus 2019).

¹³ The Catalan study identified cultural tradition as the second keyframe alongside the regions "sustainable natural landscape" (de San Eugenio et al. 2019: 12). In our case, traditional cheese and fish dishes were often mentioned in accompanying studies focusing on cultural markers (Knaps and Hermann 2018).

5. Conclusion

Using qualitative GIS, we identified places relevant for the branding of two regions in Northern Germany. To this purpose, we asked local stakeholders to map specific landscape features, places where they feel happy and places for leisure activities. In addition, analyses based on official geodata were carried out. Subsequently, the findings of both approaches were examined together.

A central finding is the key meaning of water landscapes in all the aforementioned research in both study regions. Yet, the way in which water landscapes might be combined with other landscape elements or topics and incorporated in a place brand differs in both regions. In SEM, the landscape-forming consequences of the marshes' historical land reclamation present a central element of its water landscape. The marshes' flat topography requires constant drainage, leading to a large number of artificial canals which have been constructed more densely the lower the terrain is. In LNWM, in contrast, the Baltic Sea coast, the river landscape of the Trave and Wakenitz, and the Elbe-Lübeck canal form a structural pillar of a landscape based brand.

Participatory mapping and focus group discussions provided further information, such as the importance of a region's topography and its topological connection with the water landscape. These aspects added value to our quantitative findings by identifying individual landscape elements and locations, which provide starting points for anchoring a brand on site.

Working and thinking spatially allowed stakeholders with different experiences and backgrounds to be involved in brand building. In this way, the chosen approach supports inter- and transdisciplinary exchange for sustainable regional development and acts as a bridge between brand building and a brand's practical implementation.

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Modelling Real Property Rights

A brief review and some extensions

Abstract

Over time, different models for representing legal features of real property rights have been developed as analytical tools. The purpose of this paper is to review and evaluate some of the existing models, and to develop certain extensions for representations and analyses of dynamic real property rights transformations.

The Core Entities Model – which emphasizes relationships between subject (person), right, and object (land) – proves to be significant for analysing transformations of owner/right holder and territorial division, but has shortcomings in representing transformations of the rights' content and extent, e.g. the granting of a building permit. By combining the static Core Entities Model with features from dynamic models, these difficulties can be overcome to some degree.

1. Introduction

The use and employment of models for representing legal features of real property rights – e.g. ownership, territorial boundaries, transfer of rights etc. – has expanded and intensified as analytical tools during the last decades.

The drivers during the early phases were mainly technical developments within the IT sector, where digital land registers and cadastral data began replacing the traditional analogue records and maps (Burrough 1986; Larsson 1991). More recent examples can be found in the annual FIG-conferences on cadastral data modelling, and international workshops on three-dimensional (3D) cadastres (van Oosterom 2018).

Somewhat later in time, trends of internationalization and globalization became a parallel driving force, creating needs for transparency, communication and exchange of legal, economic, organizational and other information related to real property rights regulated in different national legal systems. The EULIS (European Land Information Service) project aimed at providing easy worldwide access to European land and property information in order to support a single European property market (Ploeger and van Loenen 2004).

The European Cooperation in the field of Scientific and Technical Research (COST) involved a specific project with the main objective to establish a method for modelling real property transactions, in order to make those transactions more transparent, and allow for true comparisons of the processes and related costs between European countries (Zevenbergen et al. 2007).

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Further examples include guidelines on real property units and identifiers, developed by UNECE (United Nations 2004), the directive on Infrastructure for Spatial Information in the European Union Community (INSPIRE 2007), and the development of the Land Administration Domain Model (LADM) into an international standard (Paulsson and Paasch 2015).

2. Purpose and structure of the article

The different models developed in connection to real property rights have a wide diversity regarding targets and areas for application. The purpose of this paper is to briefly review and evaluate a limited sample of the existing models that highlights the legal dimensions of real property. Focus is particularly on the models as analytical tools for representing transformations of three basic elements of real property rights: The holder of the right, the content of the property right, and the territory where the right can be exercised. Since the content and limitations of the property right dimension is insufficiently captured by the reviewed models, a more extensive analysis is undertaken of the ownership concept in order to develop tools for extensions of the existing models.

In the following section 3, some examples of different real property rights models are presented and commented. Strengths and weaknesses for different classes of models are assessed in section 4, where after an analysis of the ownership concept in section 5 is used as a basis for some suggestions, presented in section 6, in order to supplement existing models with some extensions for representations and analyses of dynamic real property rights transformations.

3. A brief review of some real property rights models

Given the multitude of designs and applications of existing real property rights models, it is in the present context not possible to commence a complete review of all models, or even most of them. Instead, the approach here is to use representative examples of different types of models. One fundamental difference in characteristics, which can be used as a structuring principle, is between static and dynamic models.

While static models have the objective to represent or illustrate real property rights in a national system or for a specific property unit at a certain point in time, dynamic models are structured and designed in order to represent legal processes, transformations and transactions, i.e. changes over time.

Static models

Static models of real property rights typically represent a snapshot depiction of relationships that answers the question of who (a person or a group) holds how (the type of property right) and where (which property). One early model presented by Henssen (1995) was developed in order to combine and capture the basic features regarding static dimensions of land registers (information on who and how) and cadastres (information on where and how much) into what could be named a land recording system, see figure 1. Although the model was developed for registration purposes, it can also be used for representations of a specific property.

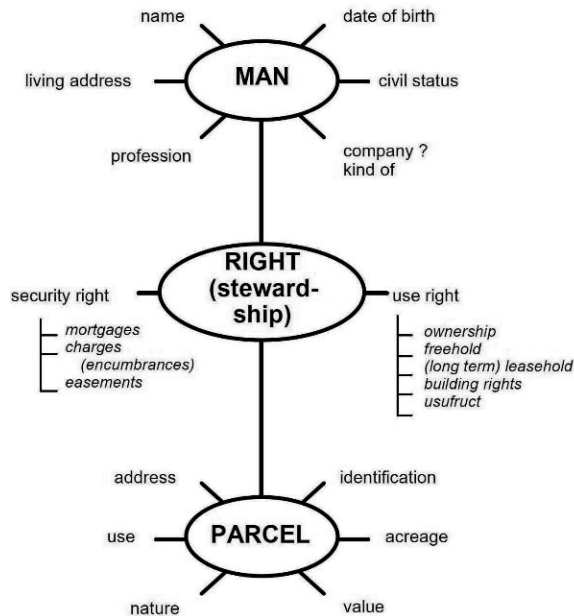


Figure 1: Henssen's (1995) model of the information content in a land recording system.

The basic features of this general model has been refined and expanded for different purposes and in different directions. One example is the *Core Cadastral Domain Model* (CCDM), which involves an extensive expansion of the different classes and categories derived from the relationship between objects and persons via rights. The purpose of the CCDM was twofold; to form a basis for cadastral system developments as well as to standardize information and communication within the land administration domain internationally (van Oosterom et al. 2006). The CCDM was later further refined and developed into the *Land Administration Domain Model* (LADM), which became an international standard in 2012 (Lemmen et al. 2015).

A parallel development by Paasch (2012) involves a model with a more concentrated focus on legal rights and public regulations in land on a conceptual level; the *Legal Cadastral Domain Model* (LCDM), see figure 2. The aim for LCDM is to enable comparisons of rights and regulations independently of the legal system they are created in, thus being a framework for international exchange of information regarding real property rights and public regulations. The model is descriptive and provides a formal and standardized language for describing rights and regulations, influencing the landowners' right to use and manage real property. The conceptual base of the model is that real property rights and public regulations are being either limiting or beneficial to real property ownership, which is regarded as a fundamental right in the model, being part of the underlying Person – Ownership right – Land relation.

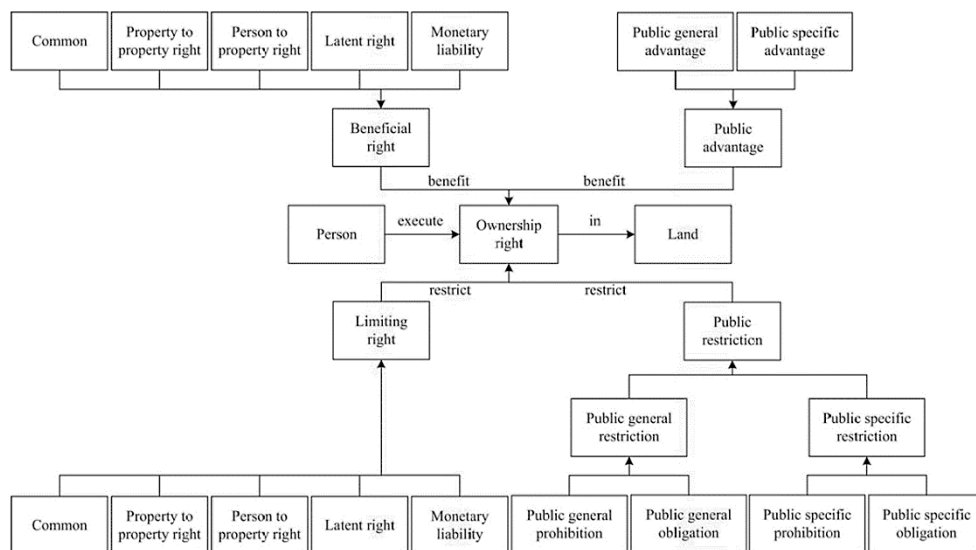


Figure 2: *The Legal Cadastral Domain Modell* (Paasch 2012 p. 26).

All of the above presented static models can be used for detailed snapshot representations and comparisons between different legal systems since they are built on the concept of standardization of legal classes or categories. However, static models are not well fitted for representations of dynamic processes such as transformations or transactions of rights. Another weakness is that the formalized models do not succeed in communicating the legal substance of the different rights and regulations. For example, an ownership right may contain very dissimilar rights and responsibilities depending on the details of the national legislation.

Dynamic models

As opposed to static models, dynamic real property rights models can be designed in order to capture processes or transformations of the different elements and relationships between persons, rights and parcels.

As a part of the European Cooperation in the field of Scientific and Technical Research (COST), the COST Action G9 – Modelling Real Property Transactions – had the objective to establish a method for modelling real property transactions, which would increase transparency and allow for better comparisons of the processes and related costs between European countries. These models – having the form of flow charts or activity diagrams – mainly focus on procedural elements and processes of real property transfers and real property formation, as being significant to many transaction processes (Ferlan et al. 2007). Main focus is on activities and actors (public and private).

The same type of flow chart models was later applied in other comparative research studies, e.g. regarding real property law in the Nordic countries (Mattsson et al. 2006) or real property processes in Slovenia, Sweden and Belarus (Vaskovich 2012), see figure 3.

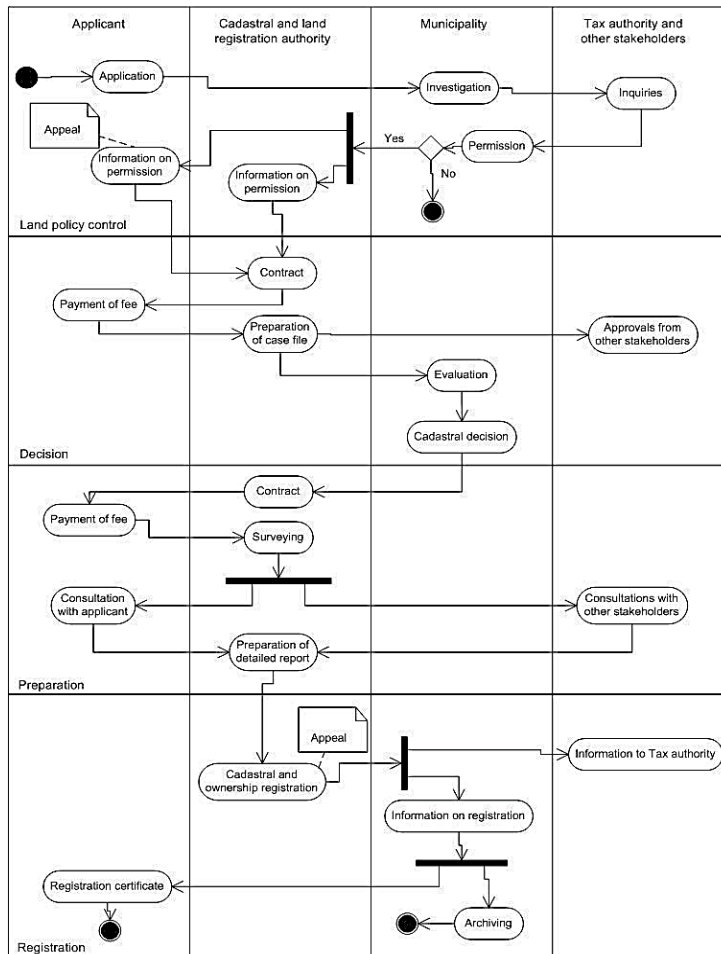


Figure 3: Flow chart representation of property formation process for subdivision of a building plot within a detailed plan area in Belarus (Vaskovich 2012 p. 136).

The emphasis in these flow charts or activity diagrams is on procedural elements in different dynamic processes, such as purchase/sale, land acquisitions, and property formation. The drawback is the inability to capture material aspects of the property rights in the processes. Focus is mainly on activities and actors, rather than the attributes and features of the legal transformation in itself.

Attempts to integrate static models with dynamic aspects

The above straightforward model by Henssen (1995) was later further simplified into a more generic static model by Zevenbergen (2002), see figure 4 (left hand side). Applying a systems approach to land registration and cadastral development, Zevenbergen also supplemented the static model with dynamic features, which represent the need to update any land registration system due to subsequent modifications in the core entities (owner, right and parcel).

Apart from the process of adjudication – the first registration or land titling – the dynamic aspects are mainly focused on two dynamic functions (Zevenbergen 2002 pp. 107–108): Transfers of ownership and changes in the boundaries of the property unit (property formation), see figure 4 (right hand side).

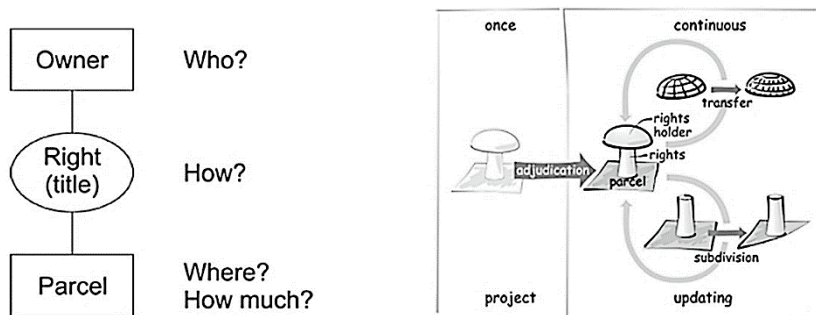


Figure 4: A generic static model by Zevenbergen (2002 p. 104), supplemented with dynamic aspects (p. 107).

The so called *Mushroom Model*, in its dynamic dimension, has features strongly related to registration purposes. The right/title-entity is therefore limited to the process of adjudication (first registration of title). As a result, transformations of the property rights in themselves are not treated as a dynamic aspect in the model, with the exception of vesting of limited rights such as a long lease (p. 109).

A further step in the development and application in this direction was taken by Mattsson (2004b), who illustrated how dynamic modelling can incorporate considerations of person, property rights and land at the same time. The refined model can be labelled the *Core Entities Model* since it upholds the relationship Right holder (subject) – Property right – Land (object), and elaborates on the dynamic aspects of all three dimensions.

The static version of the model corresponds to Henssen (1995) and Zevenbergen (2002) as depicted in figure 5. In the dynamic mode, the model of the legal relationships can be combined with graphical representations of spatial alterations on the land. An example of the advantages for representing legal features of dynamic transformations is shown in figure 6, which illustrates a sale of a partial area of a property unit in Sweden.

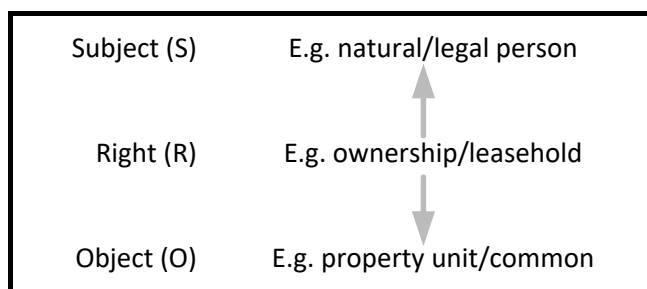


Figure 5: Static relationship between subject, right and object. Based on Mattsson (2004a).

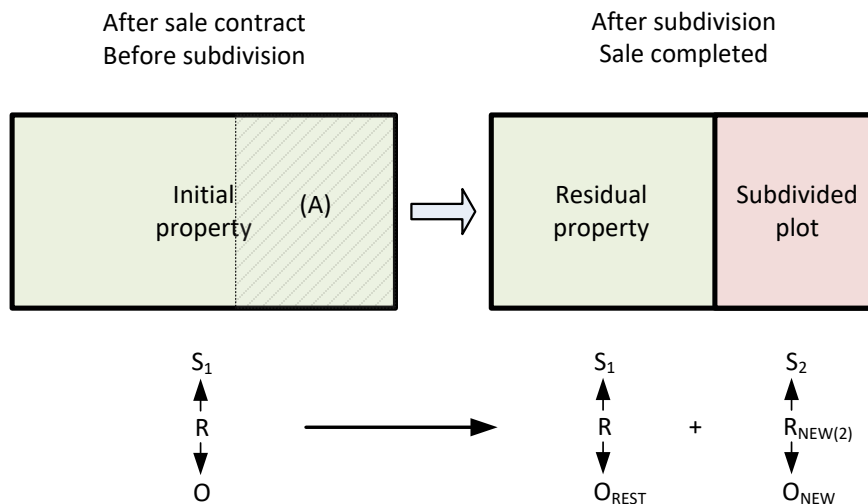


Figure 6: Transformation of subject, rights and object after purchase of a partial area (A) of a property unit with subsequent subdivision. Based on Mattsson (2004b).

According to provisions in the Swedish Land Code, transfer of ownership rights to a partial areal of a property unit must be followed by property formation in order to be valid. The general principle is that ownership in land and property division must be congruent. Property formation in this case would normally be undertaken as subdivision, where the parties start with a preliminary purchase contract, conditional upon the subdivision being carried out in accordance with the contract. The signing of the preliminary contract is usually done together with a down payment, where after the contract is submitted together with an application for subdivision at the Cadastral Authority.

During this period the purchase is dependent on the condition that the subdivision can be carried out in accordance with the preliminary contract. After completion of the subdivision, the condition is met, after which the remaining purchase sum is paid and a final deed of purchase is signed. The buyer can then obtain registration of ownership of the newly formed property unit.

The example with purchase and subdivision can be contrasted to the situation depicted in figure 7, which concerns property reallocation where a partial area is transmitted from one property unit to another. The property reallocation involves no transformation of subjects (S) or rights (R). However, the transmission of a partial area (A) from one property to another causes ownership rights to automatically adjust to the new territories of the involved properties. In property unit 1, ownership rights will “float out” in the extended area, while ownership rights in property unit 2 will “shrink” to the reduced spatial size after reallocation. These examples illustrate the capacity of the Core Entities Model to capture both static and dynamic aspects of the legal relationships.

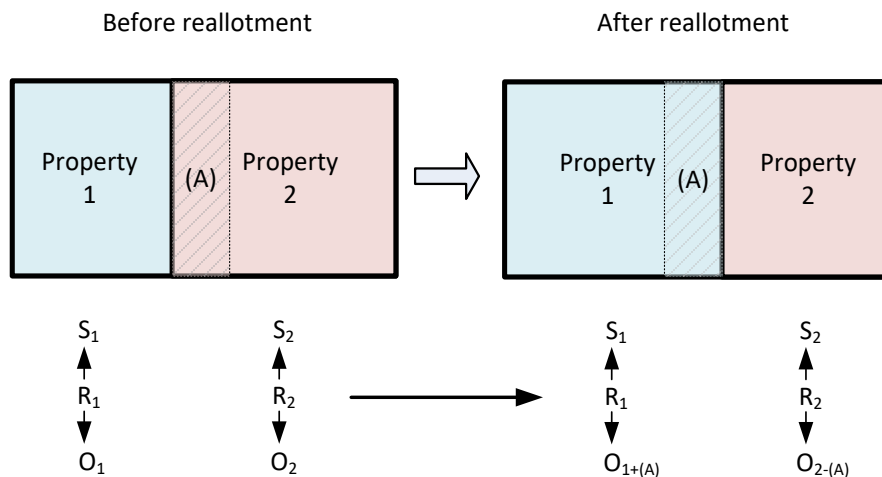


Figure 7: Transformation of subjects, rights and objects after transmission of an area (A) from one property (2) to another property (1), by property reallocation. Based on Mattsson (2004b).

4. Some strengths and weaknesses in the models

Based on the brief overview of different real property rights models in the previous section, some general characteristics can be outlined for the different types of models. Static models have potentials to communicate more or less detailed descriptions of the property rights situation at different levels, from the legal system down to a specific property unit. One limitation connected with static models is the inability to illustrate or represent dynamic processes. Another weakness is that the substance (content and limitations) of ownership and other property rights remains undetermined, as these dimensions are not captured in the models.

Dynamic models, in the form of flow charts or activity diagrams, have a strong potential to capture dynamic processes and procedures, highlighting activities and actors. An important limitation is that flow charts do not separate the three core entities, and as a consequence cannot illustrate transformations in the property rights dimension.

These shortcomings are seemingly better resolved in the Core Entities Model, which separates the three core entities in order to represent alterations in each of the functions separately, as well as possible interdependencies between the core entities in dynamic processes.

However, the Core Entities Model have the same kind of deficiencies as both static and dynamic models when it comes to capturing the content and limitations of ownership and other property rights. The model is not well suited for representations of single transformations of the property rights dimension, e.g. when a property owner is granted a building permit by the authorities.

The rights dimension (R) is in most practical situations directly correlated to the power to control the utilization of the property for different land uses, and also to alter the current land management. In a judicial sense, land use alterations can be of two different types (cf. Mattsson and Mansberger 2017). The first type relates to alterations within the bounds of current land rights and permitted land use (e.g. crop rotations or generally permitted building improvements). The other type is directly connected to the rights dimension, and involves alterations requiring special permits or dispensations which imply an extension of the ownership rights.

Since both the physical and legal type of land use alterations are closely related to the content and limits of ownership, a closer investigation of the ownership concept is needed to advance in the analysis of the property rights dimension.

5. The legal structure of ownership to real property

Property rights can comprise a large subset of different legal conceptions, e.g. easements, leaseholds, mortgages etc. However, since R in the model in most instances will represent ownership as the fundamental property right in land, the following description and analysis will be limited to ownership rights exclusively.

So, what does ownership in land comprise, in a generic sense? In a property rights perspective, the ownership concept is not indivisible. On the contrary, it can be described as a bundle of various rights and obligations which the law, at any given point in time, confers on the owner of a property unit in relation to other individuals (Anderson and McChesney 2003).

Ownership is a legal institution whose content at any point in time is defined by legislation. Ownership of real property in Sweden is negatively determined, i.e. comprises all powers not circumscribed by law and other regulations, which correlates with most other European legal systems (cf. Hurndall 1998). One such *general restriction* may e.g. be an overall requirement for building permit in order to erect new buildings. The content of ownership may also decrease due to *specific restrictions* in planning regulations (e.g. detailed development plans, nature reserves etc.) regarding permitted land use for specific areas. Vesting of *limited rights* – e.g. easements or leaseholds – may further reduce ownership substance.

As legislation is reformed, plans and regulations are modified, and limited rights are vested/revoked, likewise will the content of ownership to a certain property unit exhibit a corresponding elasticity over time.

A simple model of real property ownership

Based on the description above, the powers of an owner can be characterized as a number of interconnected property right functions or categories (cf. Eggertsson 1990 pp. 34–35). These real property functions can e.g. include:

- The right to utilize the property for different purposes/land uses
- The right to exclude others from using the property
- The right to transfer ownership and vest limited rights
- The right to the value and yields from the property

The real property functions can furthermore be utilized to varying extents or degrees, e.g. with different exploitation rates when used for housing developments. Graphically, the legal structure of real property ownership can be related to real property functions and utilization degree according to figure 8.

Beginning in the right hand side, the real property functions that cannot be utilized to any degree are represented. These functions may be prohibited or require a special permit in order to be utilized. Some examples in the Swedish context include building permit for erection of new buildings, permission for environmentally hazardous activities in order to construct a sewage infiltration, or exemptions from shoreline protection in order to construct a jetty.¹

A step to the left in the model, we have functions that only above a certain scale or degree require permission or in other ways are regulated. These may comprise constructions or building works that exceed a specified size or scope, where external impacts occur. They can also be represented by different types of disturbances, such as smoke from fireplaces, noise and vibrations, disruptive illuminations, domestic animals and pets, etc. (cf. Ekbäck 2011).

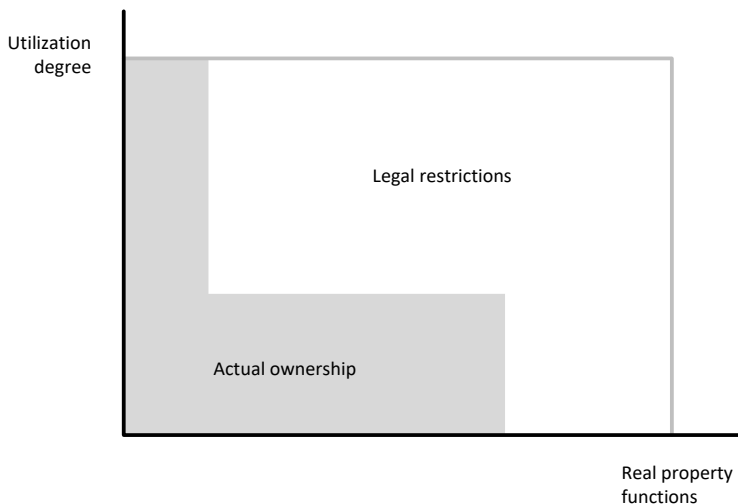


Figure 8: A simple model of real property ownership rights in the Swedish system. Based on Ekbäck (2000).

¹ According to provisions in the Planning and Building Act and the Environmental Code, respectively.

At the far left of figure 8, real property functions at the owner's disposal without any limitations are found. For an owner of a residential property, these "unlimited" functions e.g. include the right to reside in buildings and on the land belonging to the "residential private zone" (as well as the right to exclude others from these spaces), the right to erect and build constructions and facilities that do not require permissions of any kind. Examples from Swedish real property law are flagpole, patio deck, gardening, household pool, household well, household parking lot, etc. For an owner of an agricultural property, these functions also comprise e.g. selection of crops and crop sequences, erection of farming buildings (animal housing, machinery halls, forage barns), tile drainage, etc.

Altogether, the unlimited real property ownership functions can be said to encompass a right to current land use as well as any additional measures and activities that are within the natural framework of the property's land use management and production orientation (the latter relating to agricultural properties).

Expansions and reductions of ownership

When the above description of the ownership structure is reconnected to the former Core Entities Model; Subject (S) – Right (R) – Object (O), the general scope or content of real property ownership can be designated R_{OWN} . As mentioned earlier, R_{OWN} is not fixed but will change in case of legal reforms that affect ownership of land – in an expanding or reducing direction.²

Authorized permission for individual properties/measures

A frequent form of legal restriction is where a permission, approval, dispensation or similar is required before a measure, activity or land use change can be implemented. As mentioned previously, building permit (for buildings), permission for environmentally hazardous activities (for sewage infiltration) and exemptions from shoreline protection (for jetty) are examples of this.

For the individual property owner's part, such an authorization entails an expansion of the real property functions in relation to the general delimitation, which may be denoted $R_{OWN} + RBP$, in case the expansion concerns a building permit (see figure 9).

Local area plans and regulations

Municipalities, government agencies and other authorities can also adopt plans and regulations for specific areas, e.g. detailed development plans or area regulations, nature reserves, or public road plans.³

² For example, a Swedish reform from 2008 – when the maximum building area for free supplementary sheds was increased from 10 to 15 square meters – brought about an extension of R_{OWN} , while instead the introduction of so-called free lure fishing 1985 in private waters along the coasts of Sweden resulted in a reduction of R_{OWN} , since this right after the amendment no longer was exclusive to the property owner.

³ According to provisions in the Planning and Building Act, the Environmental Code, and the Public Roads Act, respectively.

A detailed development plan may entail both extended rights (in terms of building rights) as well as constraints (in terms of protection for valuable buildings, extended requirements for building permits, land reserves for infrastructure, etc.). Regarding nature reserves and public road plans, the regulations normally only entail reductions of the property owners' rights. For instance, in the case of a nature reserve, the provisions often limit the possibilities for different forestry measures (e.g. fertilization, calcification, clearing or disforestation), which can be denoted $R_{OWN} - R_{NATRES}$ (see figure 9).

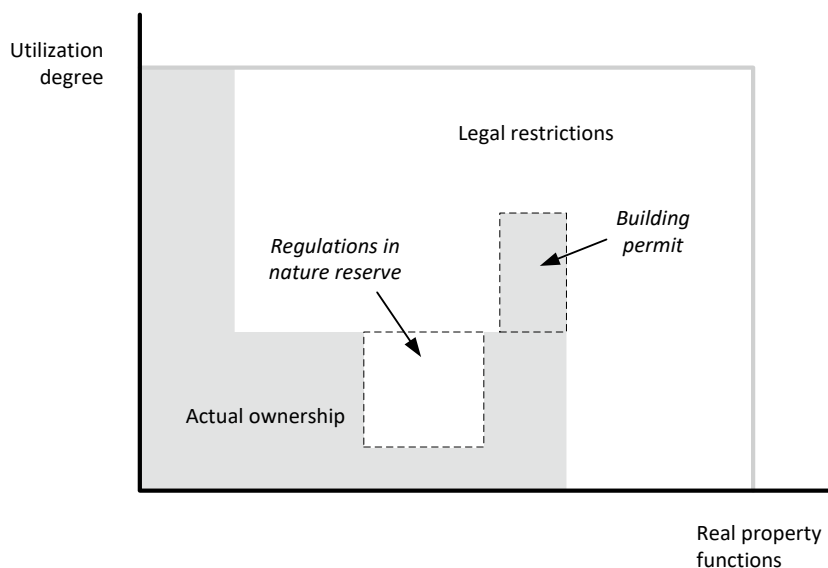


Figure 9: *Reductions and expansions of actual ownership in a conceivable property unit, due to nature reserve provisions and an authorized building permit (cf. figure 8).*

5.1 Public access right as a legal restriction

A significant general restriction of property owners' right to exclude others from enjoying certain real property functions is the so-called public access right, which in the Swedish context comprises a right for the public to walk, bike, paddle etc. and to take some natural products (mushrooms, flowers and berries) on others' properties.⁴

The public access right applies without the consent of the property owner – however the right may not be exercised in a way that causes inconvenience or damage to the property owner. The right of privacy in the vicinity of residential homes (residential private zone) and the financial interests of the property owner must not be violated.

The scope and content of public access right in Sweden is not defined in legislation, but must instead be interpreted on basis of certain provisions in the Swedish Penal Code,

⁴ Public access rights do exist in many European countries, particularly in the northern parts. The specific scope and content of the rights do however vary (Peter Scott Planning Services 1991).

e.g. on breach of domiciliary peace, unlawful intrusion, trespass, and inflicting damage (Bengtsson 2004).

From the perspective of the owner, the public access right thus constitutes a legal restriction on the general content of ownership – the property owner cannot exclude the public from these real property functions, even though berries, mushrooms and other natural products belong to the property until someone takes possession of them under the public access right.

Since the public access right apply to all land in Sweden (with the exception of residential private zones, protection and security areas, etc.) and therefore is not included in real property ownership, these real property functions can be classified as open access resources.⁵ To continue with the previous annotations, public access right could then be formalized to R_{OA} .

5.2 The rights dimension (R) and permitted land use

Based on previous subsections, it is possible to identify or classify four generic levels or extents regarding the right to undertake different actions, measures and activities on land at a certain point in time (permitted land use):

- (1) R_{OA} : Activities permissible under the public access right. These functions are not related to ownership or property division, but are available for everyone (open access).
- (2) R_{OWN} : Land uses generally permitted, where employment is exclusive to the owner or to the owner's consent.
- (3) $R_{OWN} \pm R_{PLAN}$: Local area plans or regulations that can either entail expansions (e.g. building rights in detailed development plans) or reductions (e.g. provisions in nature reserves) of the general ownership rights.
- (4) $R_{OWN} + R_{PERMIT}$: A right to undertake land uses requiring authorized permission of some kind, beyond the real property functions included in the general ownership rights.⁶

6. Extensions, applications and combinations in modelling property rights

The analysis and developed structure of the rights dimension (R) in the previous section can probably be applied in different ways to the annotations and graphic illustrations belonging to the Core Entities Model, depending on what is to be clarified or illuminated. One way of illustrating a solitary transformation of ownership rights, and the legal consequences for

⁵ See Ekbäck (2009) for a discourse on different property rights regimes.

⁶ Note that permits and exemptions have a time dimension – they are normally valid for only a specified time, and if the intended activity or land use has not been started or implemented within the time frame (e.g. two or three years) the approval will expire.

other right holders, is illustrated in figure 10. The situation concerns the effects from authorization and implementation of a building permit on public access rights.

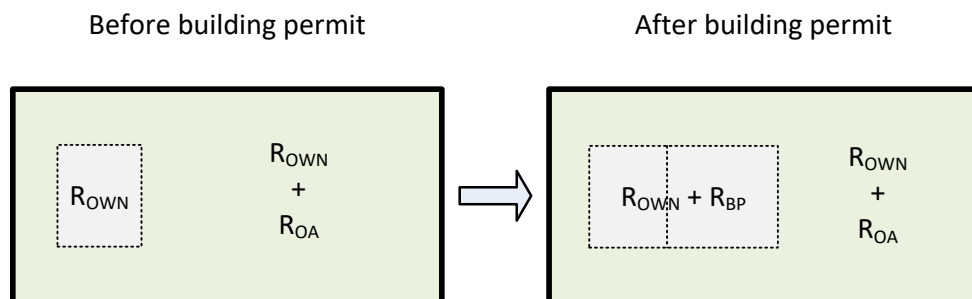


Figure 10: Transformation of rights after authorization and implementation of building permit – public access right expires within the extended residential private zone.

Before the authorization one can imagine a smaller cottage on the property which creates a residential private zone, where generally permitted land uses are exclusive to the owner (R_{OWN}). If the property unit is larger than the residential private zone, the remaining area will also be available to others, under the public access right (R_{OA}).

When the building permit is implemented and a larger extension (or a completely new residential building) has been erected, the residential private zone will be extended ($R_{OWN} + R_{BP}$), which results in expiration of the public access right (R_{OA}) in the corresponding area. A building permit will therefore in this case affect both the rights of the landowner and the public.

Another example of how this approach can be employed is for analyses of how alterations in another dimension may affect the rights dimension. In figure 11, the dynamic transformation is undertaken solely in the object-dimension (O), but results also in legal consequences regarding the rights dimension (R). The scenario is the same as in figure 7, where a partial area is transmitted from one property unit to another by property reallocation, but the Core Entities Model has been supplemented by a spatial representation of the dynamic transformation of R.

If the land transmission involves developed residential properties, the property reallocation may result both in extensions and reductions of the residential private zone, of which figure 11 illustrates the extension case.

If property unit 1 is developed with a single residential house close to the boundaries of the property unit, the residential private zone in that direction is delimited by the boundaries. When the partial area (A) is added to property 1, the residential private zone will automatically expand out to its natural limits (the vicinity of the residential home). This expansion will result in a corresponding reduction of the public access right.

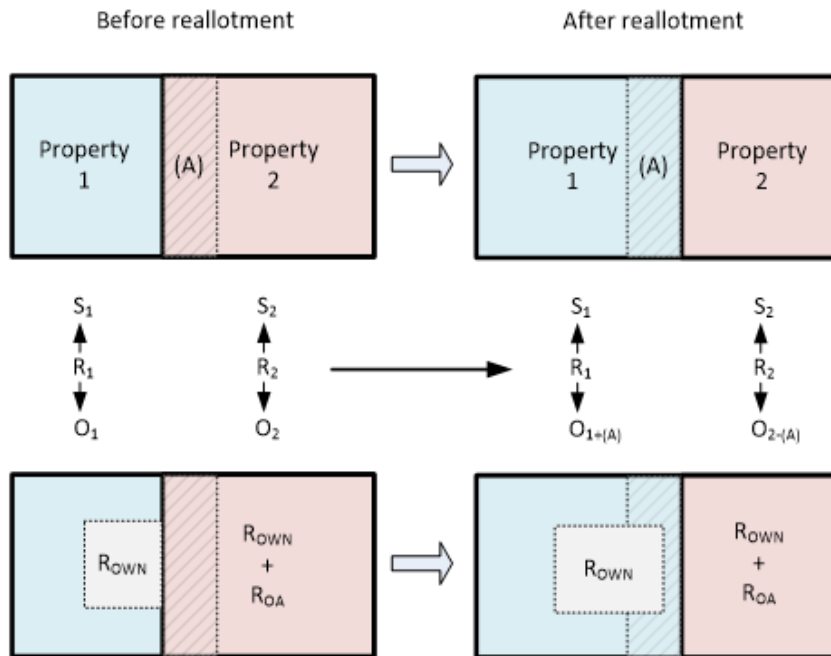


Figure 11: Transformation of rights (residential private zone and public access rights) after transmission of an area (A) from one property (2) to a developed residential property (1), by property reallocation.

In the contrasting case where instead property unit 2 had been developed close to the boundary and property unit 1 had not, the effect in the rights dimension would have been the opposite – the residential private zone would contract while the public access right would expand.⁷

7. Discussion and conclusions

The objective for this article has been to briefly review and evaluate some existing models that highlight the legal dimension of real property, with special focus on models as analytical tools for representing transformations of the three basic elements: Person (subject), right and land (object). The motive behind this is that modelling of real property rights should include the rights dimension, since subject, rights and object often must be considered simultaneously (in order to identify interdependencies).

The overview and analyses in previous sections proved that the rights dimension is more difficult to model and represent in an elucidating way compared to the dimensions of subject

⁷ The task to incorporate the effects from the transformed residential private zone into the annotations of legal relationships, without reducing the simplicity, still remains a challenge for future contributions.

and object. However, the undertaken discourse also implies three different routes for enhancing the examination and representation of the rights dimension.

One strategy is to use some static model – e.g. LCDM – to represent the state of art regarding rights both before and after the transformation to be analysed, which can supplement the dynamic model. The drawback with this method is that it still fails to capture the substance (content and limitations) of ownership and other property rights. It is neither helpful for representing spatial effects (interdependencies).

Another approach is to use the simplified annotations previously developed in sections 5–6, which is more based on the substance of ownership than classification of rights, although in a very reduced and compressed form. However, the simplified approach suggested here has the advantage of being adaptable to graphic illustrations of legal consequences in the spatial dimension. The obvious drawback is that the method fails to capture the detailed substance of R.

A third conceivable alternative is to build further on the simple model of real property ownership (in figure 8) in order to define a number of relevant real property functions in a detailed static model. This more meticulous strategy means that the state of art regarding rights both before and after some transformation could supplement the dynamic model, but at a real property function level (as opposed to standardized categories of rights). The drawbacks with this technique involve the workload of specifying the affected real property functions to the required resolution or scale, and that the spatial effects in multiple dimensions may not be possible to represent in graphics.

To conclude, there may not be one single and supreme resolution to the dilemma of capturing the rights dimension in modelling dynamic transformations of real property rights. Whatever solution is best may instead depend on the circumstances and the field of application in each specific situation. However, if the primary purpose with modelling in these instances is to illustrate, communicate and understand, I still think one basic principle should be to keep the models general and simple, which means that a useful model never should have the intention to cover every detail in each specific case.

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Using Spatial Indicators to Assess the Quality Level of Residential Locations in Cities

Utility Analysis (UA) versus Structural Equation Modelling (SEM)

Abstract

The assessment of residential locations helps to characterise the different levels of quality of sites within the city. Thereby, the housing market becomes more transparent for everyone. Buyers of residential properties and tenants of apartments can better identify suitable locations in the city. For this purpose, different factual spatial indicators are collected and analysed to assess residential locations. The processing of the geodata can proceed in several ways. This paper focuses on the advantages and disadvantages of the utility analysis (UA) – as a qualitative analysis method – and of the structural equation modelling (SEM) – as a quantitative analysis method. The latter method has high innovation potential to assess the quality level of residential locations but, is not yet applied in practice. As a result, the comparison should be of assistance to cities aiming to select the appropriate method for the assessment of residential locations.

Keywords: Assessment of residential locations in Germany, Location quality, Representative list of rents, Standard land value, Structural equation modelling, Utility analysis

1. Introduction: Indicators of residential locations

While the other real estate sub-markets are more dominated by professional stakeholders, the residential sub-market is influenced to a high degree by laypersons. Therefore, the assessment of residential locations is a concern of nearly every city in Germany to assist inhabitants to find an adequate place to live. Residential locations are identified and assessed according to largely objective assessments to make residential locations and their quality transparent for buyers of residential property or tenants of apartments. Both expert knowledge and statistical methods are used for this purpose. The target of such analysis is to identify the strengths and weaknesses of a specific location. With this information, a concrete decision for or against a location can be made.

The concept of location must always be used functionally (Gondring 2013:244). In Germany, residential locations are surveyed for different fields of application: on the one hand, there are visualisations of representative rents (rental location maps) by the municipality or by other professionals, and on the other hand, there are estimations of standard

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land values (standard land value maps) via the expert committees for property values.¹ Especially for quantitative analyses, standard land values are often used (further information is given in Ortner et al. 2018).

In Germany, the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) summarises the representative list of rents as follows. It is an overview of the local standard rents in a city. These are determined from comparable rents that have been agreed in the municipality for housing of comparable type, size, equipment, condition and location over the last four years. The representative list of rents thus creates market transparency. On the one hand, the representative list of rents is a legal justification alternative for adjusting the rent level between tenants, and on the other hand, disputes between tenants due to ignorance of the rent level can be avoided.

In Germany, two types of listings are distinguished – the simple and the qualified representative list of rents. According to Section 558d of the German Civil Code, a qualified representative list of rents must fulfil several requirements: (1) be compiled according to recognised scientific standards, (2) have been approved by the municipality or representatives of the landlords and tenants, and (3) be adapted to market developments at two-year intervals and newly compiled after four years (BBSR 2014:8).

Location is one of the residential characteristics that may be used for the valuation of a representative list of rents. The location (here residential location) is in part controversial due to subjective assessment possibilities. Location quality primarily reflects the conditions of the residential area in which an apartment is located. The residential location is usually specified in three categories: simple, medium, good (BBSR 2014:17). The residential location can be determined within the framework of the representative list of rents survey, through additional investigations or also by including and evaluating the standard land value map (to create market transparency with regard to land values) (BBSR 2014:38). Residential locations are used as a differentiating feature in many representative listings of rents. Data on residential location classification is often available for each address in the city.

Land value is often used to determine the location quality of a property. It is based on an aggregated price of a group of market participants that analyses several purchase prices to estimate the land value. This concept can be understood as an average land price of different purchase cases of similar land in different buyer and seller constellations. In Germany, the land value is measured in euros per square metre of the land plot area and always refers to a specific point in time (valuation date), as it is influenced by the economic situation. Land

¹ The standard land value is the average location value of the land for a majority of properties within a defined area (standard land value zone) which are largely identical in terms of their land characteristics, in particular, the type and degree of usability, and for which essentially the same general value relationships exist. It is based on the square metre of the land area of a plot of land with the property characteristics shown (standard land value plot). Therefore, independent (public) expert committees are formed in Germany to determine property values and for other valuations. One of their tasks is the determination of standard land values (translated from BRW-RL [2011] and BauGB [2017]).

value is also determined by the usability, condition and location of the land. The weight of the three components in determining land value varies depending on the sub-market. Usability and condition are assessed largely using monetary valuation standards. In contrast, the determinants of location are more based on subjective assessment. Nevertheless, land value is one of the most important indicators for the quality of the location.

The independent, autonomous and non-market-bound expert committee² for property values is responsible for creating transparency in the different property markets (Gondring 2013:944). The committee is responsible for the transaction register and evaluates it regularly. Based on this, the standard land values are determined. Standard land values are legally regulated under Section 196 para. 1 Federal Building Code of Germany based on the collection of purchase prices as average location values for the property. For this purpose, areas that largely correspond in terms of type and degree of use are aggregated into standard land value zones. Built-up plots are evaluated under the assumption that they are not built-up. The standard land values are determined and published at least every two years (BauGB 2017).

Besides the derivation of location information from rents and standard land values, there is no conclusive catalogue of indicators for assessing residential locations. In general, each project which needs location information uses specific indicators to identify locational quality. These are mainly micro-location-related indicators. The micro-location is a small-scale limited space, which usually corresponds to the neighbourhood that can be reached on foot (see Table 1). In contrast, the macro-location is a large-scale space that is independent of the individual plot of land and the respective use (Gondring 2013:244).

Table 1: Micro-location indicators (selection)

For the representative list of rents
Surrounding use (residential, commercial), building development, structural condition of a residential setting, streetscape (well-kept, unkempt), stock of green and open spaces, disturbance by noise and smell, traffic connections, infrastructure facilities (shopping, schools, kindergartens, leisure value)
For the standard land value zones (impact on value)
Building land quality, type of building and land use, (functional sub-market), status of recoupment charge for local public infrastructure, type of construction, type and degree of building and land use, parameter of plot like size and slope

Compilation based on BBSR 2014:46, Ortner et al. 2018:88.

Other location indicators concerning the city-district and the site-level are: building construction and floors, plot area, transport connection to the city centre, traffic load, building

² The expert committee includes surveyors, civil engineers, architects, real estate managers, business economists, employees from the financial administration etc.

site and vacancy rate etc. Location indicators can help to change a perhaps subjective perception of an area by a more objective perception (Weitkamp et al. 2017:26).

Residential locations play an important role and should, therefore, be assessed. There are various methods for identifying and assessing residential locations, which follow different concepts. This paper deals with two methods and their operationalisation for the assessment of residential locations and their qualities. The utility analysis – as a qualitative analysis method – is widely used and well-established, while the SEM – as a quantitative analysis method – can be considered as a new and innovative approach. With the description and comparison of both methods, advantages and disadvantages are discussed. For illustration purposes, reference is made to the City of Dresden (Germany).

The target of this research is the identification and implementation of a quantitative method which can assess classical urban data (indicators) mathematically-statistically. Indicators that are already established in the UA and used in practice are transformed into an SEM and analysed and assessed in a largely automated procedure.

To highlight the possibilities and limitations of both methods, the comparison will be made based on the following criteria:

- (1) Complexity of the method,
- (2) Choice of indicators,
- (3) Objectivity,
- (4) Explanation of latent variables and
- (5) Presentation of results to interested persons.

The following section introduces both methods. First, the well-established qualitative approach of utility analysis is presented, which is commonly used in practice. Afterwards, the experimental quantitative method of SEM is described, adapted for the assessment of locations.

2. Utility Analysis – The well-established approach

Utility Analysis (UA) is a qualitative planning method. It was developed from a systematic preparation of decisions in the selection of complex action alternatives. In engineering sciences, it was intended to solve the challenges facing cost-benefit analysis, which is largely oriented towards monetary targets and thus not suitable for planning issues which can often not be captured in monetary terms (Fürst and Scholles 2008:431).

Gilgen (2006) summarises the utility analysis as follows. The UA is based on an assessment matrix, which refers to targets and sub-targets. The sub-targets can be described as criteria that are assessed by scores. Each criterion is weighted to its importance. The sum of all criteria is 100. For the assessment, the scores are multiplied by the respective weighting, which provides a measure of the achievement of the partial target. The higher the sum of

the sub-target fulfilment, the greater the overall target fulfilment. The UA is based on a logical value system. For assessment to be as objective as possible, the target system (catalogue of criteria) and the weighting of the criteria should be determined by an assessment committee who are experts on the assessed criteria. The grading is usually derived analytically and can be carried out by these experts (Gilgen 2006:142). The added value of the UA is its ability to break down a decision-making problem into sub-problems, simplifying evaluation.

The assessment results do not necessarily become more objective as the number of criteria increases. A total of 20–25 sub-criteria has proved by Gilgen (2006) to be a useful maximum. Both the creation of the target system and the setting of the target weights are a matter of assumptions. The utility values must be checked to see whether they appear plausible (Gilgen 2006:146). Using sensitivity analysis, it is possible to check whether the result is robust to changes in subjective components (e.g. weights) or exceptions that may change during project implementation. The results of the calculation simulate a pseudo accuracy which may not be justifiable since the used criteria depend on subjective assessment (Fürst and Scholles 2008:438 ff.). Accuracy of one decimal place is sufficient. It must be made transparent that no matter how carefully a utility analysis is carried out, it can never be completely objective. It is only a method with which to prepare a decision and does not provide an automatic calculation.

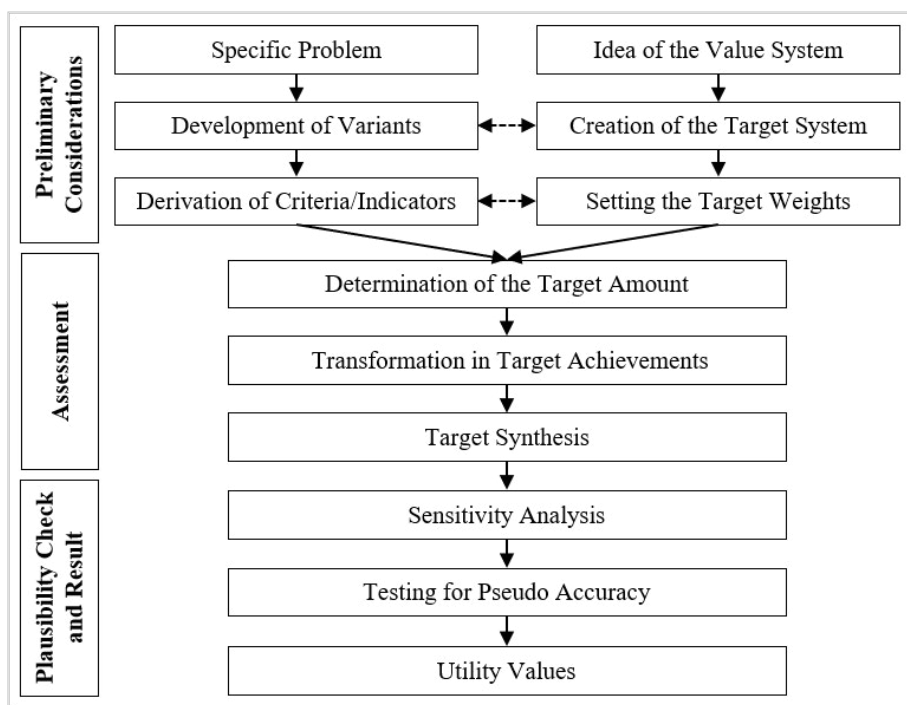


Figure 1: Process of the utility analysis (compilation based on Gilgen 2006; Fürst and Scholles 2008).

The City of Dresden uses the methodology of utility analysis to identify and assess the quality levels (simple, medium, good) of residential locations for the qualified representative list of rents. This is the primary instrument of justification in proceedings for rent increases in Dresden and applies to apartments on the free housing market (LHDD 2018:5 f.). The assessment of the residential location is based on the evaluation of eight targets (see Figure 2), which cover a broad spectrum of residential location characteristics and are supported by sub-targets. Determination of the weights of the individual sub-targets is based on expert knowledge. The summarised categorisation of the residential location into one of the three possible residential location levels (simple, medium, good) is decided for each building by adding seven of the eight values (sum index). Road and rail noise are included separately in the assessment as the eighth criteria, as this represents a degradation of the areas concerned in the city. This degradation manifests as a reduction from a good residential location to a medium one or from a medium to a simple residential location. The methodology thus stipulates that there can be no good residential location impacted by high road and rail noise. The class boundaries for the classification of residential locations have been chosen by the experts to result in a largely uniform distribution of residential areas. Thus, there are about 20–25% simple, 50–60% medium and 20–25% good residential locations in Dresden.

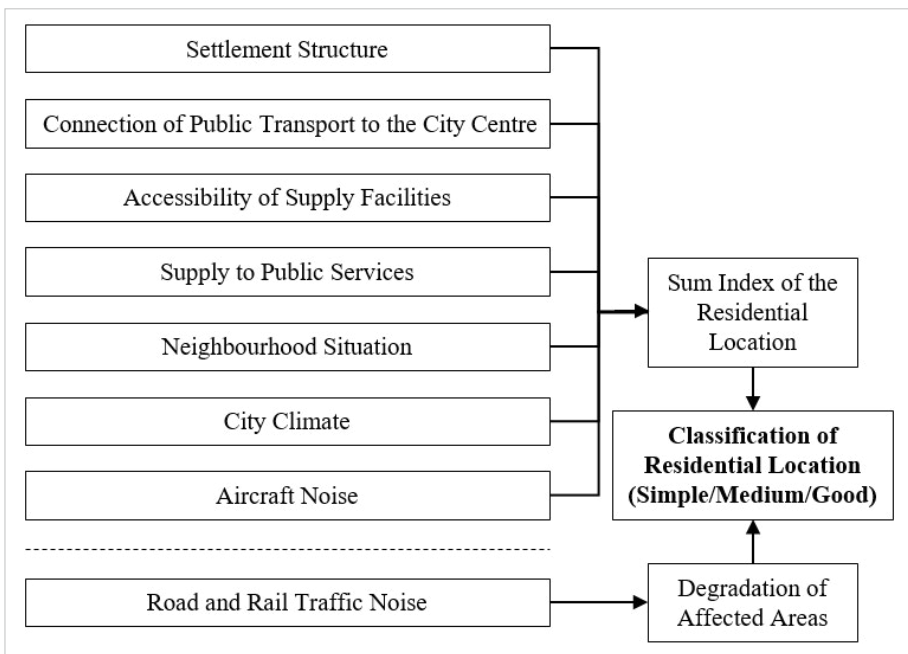


Figure 2: *Assessment of residential location in the City of Dresden (compilation based on LHDD 2018:8).*

In the Dresden representative list of rents, residential location is specified with an exact address and is shown for each residential building. Every citizen can check the residential location through the online portal of the representative list of rents of the city of Dresden,

as well as through the online residential location map in the thematic city map (LHDD 2018:8) The need for a printed residential area map is thus obsolete.

UA is suitable for assessing residential locations. Above all, because the methodology is simple, the selection of important indicators can be controlled, and the results of the assessment are easy to interpret. But the UA proves to be less favourable in this respect, as the subjective influence on the determination of residential locations is high due to the selection of indicators and the setting of weightings. Besides, it remains unknown how well the selected indicators statistically reflect the residential locations (as a latent variable).

3. Structural Equation Modelling – an innovative approach

The multivariate Structural Equation Modelling (SEM) is a statistical model that enables the estimation and testing of correlative relationships between independent and dependent variables and the hidden structures between. The SEM tests structures, and therefore has a confirmatory character. In empirical social research, an SEM is used to check latent variables. These are not directly measurable and are represented by several indicators. Besides, a differentiation is made between independent latent (exogenous) and dependent latent (endogenous) variables. In contrast, manifest variables are directly measurable. These are the input information in an SEM, which are structured mathematically. While the choice of the input variables is subjectively influenced, the aggregation to latent variables and the weighting of the variables result from the SEM.

Backhaus et al. (2015, 2016) summarise SEM as follows. The method was developed to describe complex and real-life phenomena using an explanatory model. The user should have an idea of the interrelationships of the facts under consideration (hypotheses). The idea can be based on a theory or factual logic. The complex models often consist of several dependent variables, i.e. variables that need to be explained and for which causal relationships are assumed. This results in a model with several regression equations (system of multiple equations) where the model check requires the simultaneous testing of all relationships (Backhaus et al. 2016:581).

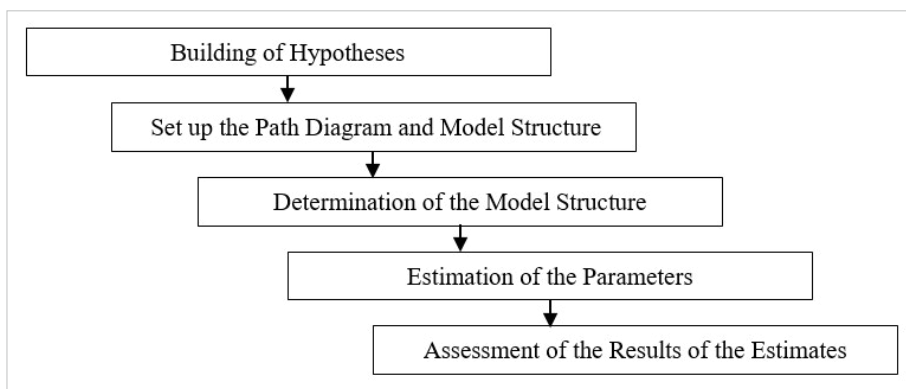


Figure 3: General procedure of a structural equation modelling (compilation based on Backhaus et al. 2015:80).

Step 1 – Building of hypotheses (see Figure 3): The main goal is the verification of a hypothesis system. For this purpose, variables are specifically selected and grouped (determination of the preceding) (Backhaus et al. 2015:80). Indicators are chosen which are assumed to represent the latent variable as comprehensively as possible. It is further assumed that this correlation is caused by the influence of the latent variable so that the structure of the measurement models follows the approach of confirmatory factor analysis (Backhaus et al. 2016:585).

Step 2 – Set up the path diagram and model structure: A path diagram can be used to graphically illustrate the complex relationships. Software solutions support the mapping of the model structure in the form of a diagram. It is not necessary to transfer the relationships into a mathematical system of equations.

Step 3 – Determination of the model structure: It is tested whether the information provided by empirical data is sufficient to estimate the latent variables. This is proved if the resulting system of equations can be solved (Backhaus et al. 2015:80).

Step 4 – Estimation of the parameters: The SEM can be estimated gradually. The factor loading of the exogenous (independent latent variables) and endogenous (dependent latent variables) measurement model is estimated and the factor values are calculated by using factor analysis. Using the factor values, a regression analysis can then be calculated. The regression coefficients support the estimation of the relationships in the structural model. Simultaneous estimation (core of the SEM) of all model parameters is undertaken. The correlations between the variables form the decisive basis for the estimation of the structural model parameters. The parameter estimation is carried out in such a way that the generated model-theoretical correlation matrix provides the best possible reproduction of the empirical correlation matrix (Backhaus et al. 2016:585 f.).

Step 5 – Assessment of the results of the estimates: After estimating the parameters of the model, it is finally possible to test how well the model structure adapts to the empirical data set. Test criteria are determined for this purpose, aiming to test the model structure as a whole and the partial model structures (Backhaus et al. 2015:80).

Using the example of the City of Dresden, a SEM will be conducted by the Chair of Land Management to assess residential locations. The results of the largely automated method shall be compared to the results of the analysis of residential locations from the representative list of rents and the standard land value in further work. The focus of the discussion will be on the classification into different residential location categories. The SEM will include both, “classical indicators” of residential location (see Table 1 and Figure 2) and previously unused indicators such as the distance or accessibility of facilities (see Figure 5). For this purpose, the shortest distance or fastest accessibility to facilities is calculated for each reference point in the city.

The SEM is not based on address data. The reference level for the assessment of residential areas is a grid (11,085 raster cells 100m x 100m), which is overlaid on all standard land value zones of the residential class areas (see Figure 4, left).

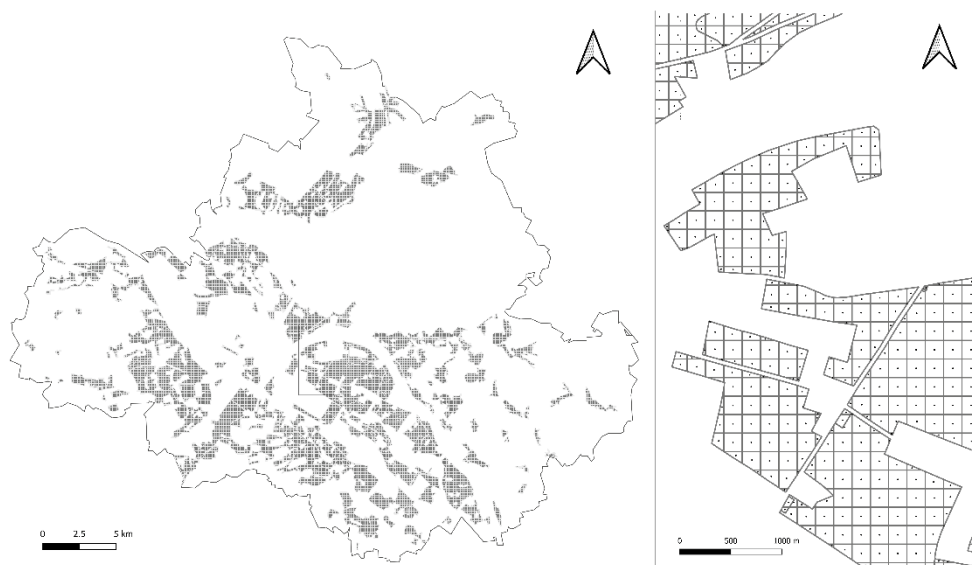


Figure 4: City of Dresden with 11,085 raster cells at residential locations (left), Enlarged section of raster cells (100 m x 100 m) with centre (right).

For each raster cell, a location quality will be calculated and allocated to the coordinate of the centre of the raster cell (see Figure 4, right). This requires the information of all indicators used for the SEM to be converted to the grid structure. Figure 5 shows the example of the uncategorised distance to libraries. The SEM can only be started once the database has been set up. This task is extensive and not yet completed.

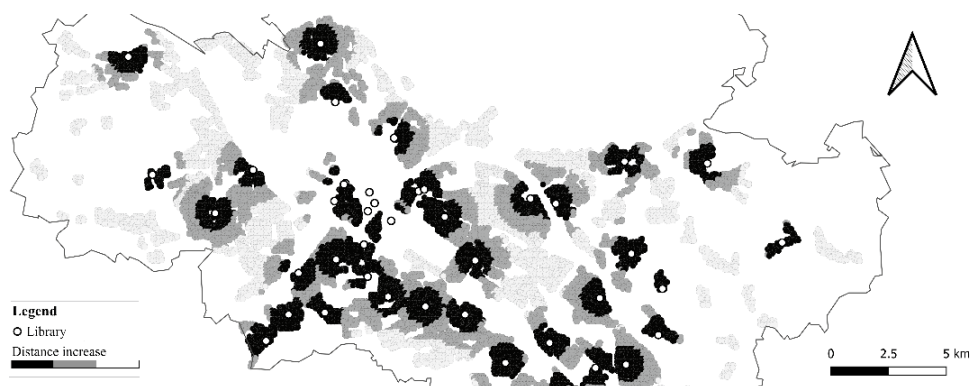


Figure 5: City of Dresden (section) with uncategorised distance to libraries.

The SEM is based on a complex methodology for assessing residential locations. In addition to a high level of mathematical and statistical understanding, the empirical data must be prepared, and it must be ensured that they are complete. If these conditions are met, residential locations can be assessed almost automatically. The methodology is largely objective, as the inclusion of indicators and their weighting is determined by the calculation method.

Also, the influence of the indicators on the residential locations (as a latent variable) can be explained.

4. Comparison – advantages and disadvantages of the UA and SEM

Nevertheless, at this point, a preliminary (theoretical) comparison of the two methods for assessing residential locations can be made. The utility analysis and the structural equation model have both advantages (strengths: (+)) and disadvantages (weaknesses: (–)) (see Table 2). The comparison reveals that SEM has several advantages over the UA. These manifest when the prerequisites for carrying out an SEM are fulfilled.

Table 2: Comparison of residential locations assessment methods: UA and SEM

Criteria	Utility Analysis (UA)	Structural Equation Model (SEM)
Complexity of the method	Simple method – understanding even without statistical skills (+)	Complex method – understanding assumes statistical expertise (–)
Choice of indicators	Free integration of indicators (+) Need for good experts who choose the indicators and their weights in the right way (–)	Exclusion of indicators that do not correlate (+) Complete datasets required and great effort in data preparation (–)
Objectivity	Subjective influence is high (–) Calculation can be influenced by the user (–) Influencing the weighting is possible (–)	Largely objective approach (+) Widely automatable calculation method (+) Suitability of indicators and the weighting is determined by the calculation method (+)
Explanation of latent variables	Latent variables (e.g. image) are not easy to determine (–)	Latent variables can be derived by correlated data (+)
Presentation of results to interested persons	Well established for planning issues (+) High understandability for laypersons (+)	Explanation of the complex relationships requires knowledge of the mathematic approach of the method (–)

In summary, the UA is a simpler method than the SEM in terms of complexity. There are few restrictions for the choice of indicators. The utility analysis is well established for planning issues and a high understandability for laypersons is given. Since the indicators are selected and assessed by experts, there is a high degree of subjective influence. It is possible to influence the weights of the indicators within the calculation.

The SEM can be used to determine residential locations from correlative relationships of indicators using a complex statistical model. The specification of weights by experts is not necessary since the meaning of the indicators is represented by the correlation matrix. Thus,

SEM is a more objective method. The implementation and success of an SEM to determine residential locations depends not only on mathematical-statistical knowledge but also on a well-prepared database. The SEM aims to detect essential statistical connections between the indicators and to identify their respective influence (weighting) on the residential location quality. The target is therefore to achieve an even better structuring of residential locations.

5. Conclusion and outlook

If the described considerations work well in practice, it can be assumed that: with an SEM the residential locations are more objectively assessed and a better structuring of locations and increase of knowledge about spatial distribution can be expected. This also involves a better understanding of locational-influencing indicators and the assessment of causal relations.

The SEM will not replace the residential location assessment for the representative list of rents, nor will it replace assessment via the standard land value if it is (still) successfully implemented. However, the SEM can provide answers to important questions, for example with reference to the weights with which indicators are included in the assessment of residential locations or whether certain indicators are relevant for the evaluation of residential locations at all. Based on a successfully conducted SEM, it is expected that established methods for evaluating residential locations can be further developed. In the best case, the application of the SEM will find approval with the expert committees of the municipality. Furthermore, information from the representative list of rents and the standard land values could be integrated into one SEM. This would make more detailed analyses of the residential locations possible.

After establishing that the SEM is a suitable method for assessing the situation, the methodology will be adapted in further steps using the example of the city of Dresden. Preparatory work has been undertaken to prepare the indicators. With the preparation of the grid (see Figure 4), the creation of the dataset and the integration of distances (see Figure 5) and accessibility of facilities, the requirements for the first step of the SEM procedure are fulfilled. The next step is the modelling: the path diagram has to be created from previous knowledge – with the latent and manifest variables. The first concrete calculations will then be initiated so that the SEM can be carried out.

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Land Models for Affordable Housing

Drivers in the housing and planning systems in Sweden

1. Introduction

Housing shortage, especially in the affordable segment, is attracting increasing political attention in Sweden. Previously, municipal housing policy focused on facilitating the construction of large volumes of housing, in the hope that a larger supply and vacancy chains would decrease the housing shortage. Municipal interest, good market terms and low interest rates have induced both municipal and private developers to construct relatively large amounts of new housing mainly in the upper market segments. However, the ability of such policy to cater for mid and lower income households is limited in the Swedish institutional setting (Granath Hansson 2017) and the effectiveness of vacancy chains is unclear (Rasmussen et al. 2018). Municipalities are now looking into various measures that could stimulate housing production in the lower market segments. However, there is no consensus on what measures could be effective and how they could be implemented.

Against this backdrop, Stockholm, Gothenburg and Örebro municipalities are now testing land models to incentivise private housing developers to construct apartments with lower rents. In this paper, the pilot projects are analysed in relation to the Swedish housing and planning systems to identify the drivers behind the various set-ups and their practical implementation. The aim of the paper is to understand decisive links between the institutional setting and affordable housing land models. The comparative case study builds on municipal documents related to the projects, interviews and discussions with representatives of municipal development departments and involved project developers, as well as a previous research project on land models (Granath Hansson 2019).

The paper is structured as follows: After this introduction, the Swedish housing and planning systems and their relevance for affordable housing land policy are described in chapter two. In the third chapter, policy of the three Swedish municipalities and current projects are outlined. Thereafter, in chapter four, the links between projects and the housing and planning systems are analysed and discussed. Last conclusions are drawn.

2. Land models for affordable housing and its connections to the housing and planning systems

Calavita and Mallach (2010) and de Kam et al. (2014) propose a link between changes in housing and planning systems and the emergence of land models for affordable housing provided by private developers. This proposition is deemed relevant for Sweden, as Swedish

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housing development has undergone a distinct change from public led and highly regulated development to more market oriented development. Below, the Swedish housing, planning and land allocation systems are described and related to municipal processes of implementing affordable housing land models.

2.1 The Swedish housing system

In the post war period, Sweden has pursued a unitary or mass housing system (Harloe 1995; Kemeny 2001), under which no housing is reserved for lower income groups. There is no social housing or other long-term housing to which access is means tested (Bengtsson et al. 2013). Social housing is by many regarded as a low quality, stigmatised tenure, which should be avoided. However, in recent years, comparisons with social housing systems in Europe have diversified the debate. Further, rents are determined according to a user-value system in negotiations between the Tenants' Union and property owners. Discrepancies between rents and prices of apartments in various locations indicate that the system has the same effect as rent regulation (Donner et al. 2017). In new buildings, a cost-based rent setting system might be applied for the first 15 years, after which rents should be incorporated into the user-value system. Cost-based rents are often significantly higher than rents applied under the user-value system. Tenants that find that their rent is not in line with the system can complain to the Rent Tribunal. In cities and some larger municipalities, the main mode of rental housing allocation is through central waiting lists. The average queue time in Stockholm was ten years in 2018. In 2019, the time to get an apartment in the least attractive areas in Gothenburg was five to six years and in Örebro four years (based on the municipal housing company queue). However, some private property owners determine the rent on their own and do not use the central waiting lists. Setting their own rents carries the risk of being tried by the Rent Tribunal and forced to reduce the rent. Moreover, if the rent is lower than the user-value rent, this rent effects the evaluations of user-rents in the surroundings and rents might have to be decreased in the whole area.

Swedish municipalities are responsible for creating prerequisites for all inhabitants to live in good housing and to support suitable action to prepare and implement the provision of housing (Housing Provision Act, §1). The law does not stipulate what 'good housing' means or how municipalities shall act to fulfil the law. Hence, it is up to each municipality to define its own housing policy. Municipal housing companies traditionally play a relatively large role on the Swedish housing market. Since a change of law in 2011, they have to act 'in a business-like manner'. The meaning of 'business-like' has been interpreted in various ways by different companies (Grander 2018). In all the herein studied municipalities, there are large and financially stable municipal housing companies. Although some of the companies attempt to achieve lower rents, they produce only marginal amounts of new rental housing accessible to medium and low income households. Municipalities have the goal that private developers should contribute to affordable housing supply in newbuild.

2.2 The Swedish planning and land allocation systems in relation to affordable housing land models

Swedish municipalities have extensive power related to planning, sometimes referred to as a 'planning monopoly'. Further, large municipal land ownership is a special trait of the Swedish housing market (Caesar 2016) and provides the municipality with a powerful tool to steer city and especially housing development. Land leases and sales are conditioned to fulfil municipal interests. Affordable housing demands are realized through municipal land allocation. Land allocation is an exclusive right of a developer to negotiate a land lease or a land sale for a certain amount of time (Caesar 2016). The land lease contract is thus a time-limited contract between the municipality and the developer and a decisive part of the structuring of the development project.

When an affordable housing land allocation has been made, the development plan is prepared (if there is not an existing one). Other project specifics, such as project design and cost division between the developer and the municipality related to technical infrastructure, are negotiated and an implementation agreement is drafted. Demands on lower rents are regulated in the land sales or land lease agreement or in the implementation agreement. There is no formal link between the affordable housing requirement and the development plan, but the process by which planning and planning implementation is carried out gives the municipality the upper hand in negotiating planning conditions to meet its interests. If municipalities and winners of land allocations do not find an acceptable compromise between their interests at the end of the time limit in the land allocation contract, the municipality has the possibility to prolong the negotiation term or to terminate the contract with the effect that the land is not leased or sold to the developer. When the municipality and the developer find a compromise between their interests and the development plan has been adopted, the land lease or land sales agreement is signed and the land is transferred to the developer. Additionally, the implementation agreement is signed, which regulates all other economic and legal aspects of the project.

Municipalities are uncertain as to how low rents can be effectively regulated over time in line with the Swedish rent setting system. If initial rents are lower than user-value rents, property owners might increase rents rapidly after completion. To prevent this, different models are being tested in the different projects with connections either to the implementation or the land lease contracts. This might constitute an institutional uncertainty, which could have implications for the scope of affordable housing models and their implementation.

One important issue in international land policies for affordable housing seems to be the allocation of apartments to households on lower incomes. As de Kam et al. (2014) point out: 'Another important condition for the acceptance and societal support for IH [inclusive housing] is usually the capacity of the housing system to retain the benefits of IH for eligible households exclusively, for a reasonable number of years'. This issue is a hot topic

in Sweden, as such targeting is not in line with the Swedish unitary housing system. Currently, no model exists which has the effect that lower income groups get priority in allocation of lower rent apartments that result from land policy models. Ways to accommodate such allocation in new land policy models are however under discussion.

3. Three Swedish municipalities testing different set-ups

As mentioned above, the municipalities of Stockholm, Gothenburg and Örebro are testing land models to incentivise private housing developers to construct apartments with lower rents. Below, the pilot projects are described.

3.1 Gothenburg

For a number of years, the municipality of Gothenburg has developed former harbour areas into new housing districts. These areas are located by the waterfront in central locations and the municipality has planned and implemented attractive urban design. As rents and prices are high, affluent households dominate the new housing districts. The municipality intended to work against this concentration of higher income households and decided to steer towards inclusion of affordable housing in one of the new areas under the slogan 'Everybody should be able to live in Älvstranden'.

In 2011, the municipality of Gothenburg decided to test a new land allocation model and announced a competition. In total, 1100 rental and 500 tenant-ownership apartments¹ were to be constructed. Fifty percent of rental apartments should have lower rents for 15 years. Rents were set at 1000, 1450, 1850 and unlimited SEK/m² (approximately 8, 11 and 15 EUR/m² and month), where 1000 and 1450 SEK/m² are considered affordable, while 1850 at the time was a standard newbuild rent level. Rents were foreseen to be regulated through the project implementation contract between the municipality and developers. Developers were given incentives to participate in the project in the form of a right to build fifty percent tenant-ownership apartments, to get priority in the urban planning process, a promise to take part in later stages of the development of the area and possibilities to influence project design such that affordability targets could be reached. Land prices were fixed at certain levels, with the price of land for rental being significantly lower than the price for tenant-ownership.

Four developers, three private developers and the municipal housing company, presented different ideas how to reach the affordability targets. The private developers described various ways to reach the lower rent levels within the Swedish rent-setting system and ways to allocate apartments to low income households (Granath Hansson 2019). Already at that stage, the project caused a debate between interest organisations and later also politicians.

¹ In Sweden, direct ownership of an apartment is possible since 2009. The dominant forms of tenure in multi-family housing are rental and tenant-ownership. Tenant-ownership apartments were cooperative housing until 1968, but prices were then deregulated. Tenant-owners hold shares in the association that owns the building(s) and has a right of use to the apartment they live in.

The Tenants' Union feared the introduction of social housing into the Swedish unitary or mass housing system, as the low rent apartments were supposed to be allocated to households on lower incomes and not through the central housing waiting list. The Federation of Property Owners were strongly against new forms of regulation of property development.

The principles for distribution of lower rent flats is still unclear, but there is a civil-servant proposal. According to the proposal, a certain share of apartments would be allocated through the central waiting list and one share to the social authorities. An analysis of the Gothenburg system of allocating apartments according to waiting list gave evidence that households high-ranked in the queue are older and more affluent. These households have a similar profile to those living in market housing in the area. Therefore, allocation by waiting lists would not result in the targeted social mix. The wish to allocate apartments to social authorities can be understood against the backdrop of Gothenburg municipality having several hundred homeless families with children (mainly immigrants that have not been able to set foot on the Swedish employment and housing markets). Such a combination would result in the richest and the poorest living in the same buildings.

Further, tests to distribute 25% of apartments to households that have proven a lower income from employment will be made in the houses of private developers only. The municipal housing company will not do this, as it is seen as a break with Swedish unitary or mass housing system.

At present, the project has been put on hold, as a new development plan has to be elaborated. However, the cause of the delay pertains to a number of various technical problems and not only to the affordable housing model. Parallel to this, the previously very bright housing market has transformed into an uncertain market situation for both rental and tenant-ownership. Further, a new political majority took over after the elections in 2018 and it is unclear how it will act on the affordable housing issue.

Parallel to the high-profile project in Älvstranden, the municipality tested a similar setup in a less attractive area. The land allocation process resulted in a compromise, where tenants were given rent reductions for a certain period of time in order to reach affordability goals.

3.2 Örebro

In 2015, the developer BoTrygg, that also participated in the Gothenburg project, approached the municipality of Örebro and suggested that the model should be tested also in Örebro. As the rate of housing construction in Örebro at the time was high, but the municipality had noted that rents were higher than most households could afford, the municipality agreed to discuss how the model might be applied in their jurisdiction.

BoTrygg presented a project consisting of 100 rental and 30 tenant-ownership apartments. All apartments have a similar standard as a serial housing concept is applied and the developer uses its in-house construction team. However, the tenant-ownership apartments are built in a more attractive micro location with a lower density. 20% of the rental apartments have a lower rent. For example, the rent of a three-room apartment of 65 m² is planned to

be 6700 SEK/month (1237 SEK/m² and year, 10 EUR/m² and month), which can be compared to the average rent of 1074 SEK (9 EUR) in housing owned by the municipal housing company (Öbo 2018).

Instead of selling the land to the developer, which would be the standard procedure, the municipality has conceded to lease the land under a long-term contract. The lower rents are regulated through the land lease contract, under which rent increases cannot be higher than those made by the municipal housing company. If rents are increased more than those of the municipal housing company, the owner has to pay a very high fee. Örebro is planning to set up a municipal housing queue, but it is uncertain when. After completion, the affordable apartments in the BoTrygg project are planned to be allocated through the housing queue, but only to households with incomes below a predefined level.

The incentives of the developer to participate in the project are the permission to build tenant-ownership and a number of rental apartments, as well as the allocation of a larger lot of municipal land than usual and the land lease. Should the model be deemed a success, a good relation with the municipality and priority in municipal procedures might also be positive results for the developer.

In 2019, the municipality decided to approve the project. The completion of construction is planned for the summer of 2020. Would the model prove to be successful, the municipality wish to test it in more locations and also export it to other municipalities. At present, discussions are on-going with another developer that wish to develop a similar concept in another location in Örebro. After years of intense housing construction in Örebro, the market situation for both rental and tenant-ownership is now uncertain. It is probable that this will influence the possibility to expand the model at present.

3.3 Stockholm

The City of Stockholm has included housing affordability targets in newbuild since 2017. In the budget of 2019, 400 apartments were planned to have lower rents than other newbuild, which should be compared to a total of 4394 production started apartments in the city that year (Stockholm 2019). To reach targets, various types of projects have been forwarded, including the low-cost concept of municipal housing companies, as well as initiatives of private developers receiving state investment subsidy. To receive the state investment subsidy in the Stockholm region, rents must not exceed 1550 SEK/m² and year (12 EUR/m² and month).

In city policy, land leases are seen as the major tool to achieve lower rents. When municipal land is allocated, attempts have been made to include the criteria of lower rents into the evaluation process of potential project developers. For example, in one of the larger development areas called Skärholmen, land was allocated based on a number of criteria. 'Reasonably priced housing' was assessed with 7 out of 54 possible points and demands on low rents were not regulated in the development contract (Traneborn 2019). Concerns were raised how to implement follow-up of contracts under a robust juridical process in case developers

did not deliver according to the contract. Further, possible processes for rent raises were discussed (ibid). However, the liberal-green political majority, in power since 2018, has continued to investigate land policy as a tool to reach affordability targets.

In 2019, project developers were invited to bid for a municipal land allocation for 100 rental apartments. The main criteria in the bid was the lowest rent. The city received 16 proposals with rents spanning between 1440 and 2400 SEK/m² and year (11–19 EUR/m² and month). In mid-December 2019, the winning developer was awarded a land allocation based on a norm rent of 1440 SEK/11 EUR for the whole project. The land allocation reserves the right of the winner to negotiate the terms of the land lease, the development plan and other project related contracts with the municipality for a time period of two years. The project is located in a large housing development area in the southern part of Stockholm and the apartments will be built in wood. High environmental standards, good architectural quality and social sustainability are underlined in city planning. The intention of the city is to connect an area, which is struggling with its social cohesion, to more established parts of the city. A new underground line is planned to improve local transportation in the area.

The low rents will be achieved through a combination of conscious project design, state investment subsidies and city land leases. The winning project developer also raises the possibility to lower project cost by decreasing the garage area and replace it with transport sharing services. All apartments are to be allocated through the central waiting list of the municipality and no income testing is to be made (the average time in queue before getting an apartment was 10 years in 2018). Although the housing market in Stockholm has cold down during the last year, demand for new rental housing at the level proposed here is deemed to be high, as it is half of rent level in the most attractive new housing developments in the city.

4. Analysis and discussion

Table 1 provides a summary of similarities and differences between the herein presented models.

As seen above, the three municipalities have the same basic tools to implement affordable housing land models, mainly the planning monopoly and municipal land allocation. These two instruments in combination provide the municipality with an extensive power to implement such models, if they wish to do so. However, municipalities hesitate to implement such models although there is an affordable housing shortage in many Swedish municipalities (National Board of Housing, Building and Planning 2019) and private housing development has been extensive in the upper market segments in recent years. One reason might be that the price of land when such development restrictions are implemented is substantially lower than prices for market housing development. Reductions in land prices have implications for municipal budgets and possibilities to finance their part of technical and social infrastructure related to the project. However, when land leases are applied, leases for affordable housing projects are usually not different compared to other rental. Hence, in

Table 1: Comparison of the three different municipal models

	Gothenburg	Örebro	Stockholm
Location	New attractive and central development area on the waterfront	New attractive but less central location	New green suburban location close to a less attractive area
Rent model	Four levels – very low to ‘unlimited’	Fixed low level for 20% of apartments	Lowest bid for 100% of apartments
Allocation of apartments	Housing queue + vulnerable households?	Housing queue + income threshold?	Housing queue?
Land ownership	Municipal	Municipal	Municipal
Regulating contract	Development contract	Land lease contract	Land lease contract
Developer(s)	Municipal and private	Private	Private
Stage of realization	Negotiation	Construction	Negotiation

Stockholm and Örebro there are no direct implications for municipal budgets as long as they wish to realize rental housing. It should be noted that public value capture, as realized in models used on private land in other countries, is not on the agenda in Swedish models. On the contrary, in Sweden the municipality bears the cost of making land available at a lower cost to the developer compared to the most profitable type of land use.

Another reason for not implementing land models might be that institutional uncertainties related to such models are considered as too large. First, it is uncertain how rents can be regulated for a certain period of time in line with the Swedish rent setting system. Second, an efficient allocation of the resulting affordable housing might not cope well with the Swedish unitary housing system. Further, political attention has been channelled mainly towards the construction of larger volumes of housing in recent years. Supply of new affordable housing has come up for discussion only in the last couple of years. This can also be noted in the production of municipal housing companies, which have not prioritized affordable housing to any larger extent (partly related to a change of law according to which they have to act ‘in a business-like manner’, which has created uncertainty as to their scope of action). Hence, it is not surprising that policy is hesitant. Moreover, the attempt of Gothenburg to

implement their model has attracted massive attention from interest organisations and politicians mainly focusing on the difficulties to implement such policy in the Swedish setting. This prolonged and heated debate might have increased hesitance in other municipalities.

The three pilot projects described in this paper point to both possibilities and difficulties in implementing affordable housing land models in Sweden. Formal land allocation procedures and regulation through land lease agreements are currently tested in Örebro and Stockholm. Legal structures need to be stress tested in practise to see if they hold or need to be developed.

In relation to the Swedish housing system, the allocation of affordable apartments is a central and still outstanding question. Shall affordable apartments be allocated to lower income households only or also to a wider range of the population irrespective of income level? The answer has implications for the efficiency of the models. In all three projects, allocation of apartments is planned to be made fully or partly through central waiting lists of municipalities. Stockholm channels all affordable housing units through the central waiting list. In Örebro there is no such list at present, but there are plans to create one. In addition to using the central queue, there are discussions on demanding that households to which the 20% affordable apartments are allocated should have an income below a certain threshold. In Gothenburg the larger share of apartments are planned to be allocated through the waiting list and a smaller part by the municipality in coordination with the social authority in the city. Also in Gothenburg there has been a discussion on using income thresholds.

According to de Kam et al. (2014), it might have implications for the legitimacy of the models that affordable apartments are reserved for lower income groups for a certain period of time. However, in the Swedish setting, based on the unitary housing model, politicians might prioritise that the whole electorate should be able to benefit from the affordable housing policy. The waiting list system has a long standing and is by many considered to be a fair and transparent system. Hence, Swedish politicians may not see it as problematic that an uncertain number of affordable apartments will be allocated to households that are not in need of a lower rent. Accordingly, allocation of apartments to households under a certain income limit has been shunned, as it is viewed as part of a social housing policy, which would not be compatible with a unitary housing system. However, studies of the queue in Gothenburg have shown that households at the top of the list are older and more affluent than average households, which implies that such allocation will not contribute to social mix or lessen the housing shortage of households with lesser means or shorter time on the list. All in all, land models might be seen as a complicated way to increase affordable housing supply, with small effects on the housing shortage as allocation is not effective.

However, the unitary housing system is under pressure. Some municipalities ask private developers to introduce income limits in their projects, as municipal housing companies are not willing to do so. Further, the increasing homelessness is becoming a burden to some municipalities. The suggestion to give homeless families priority in the Gothenburg project is one of many initiatives to try to handle the situation. The state has also taken a small step away from the unitary housing model as state investment subsidies require that 12.5% of

apartments are allocated to households under the age of 31 or to the municipality to be used as social contracts for the vulnerable from February 2020. Previously, such steering has been avoided. Only time can tell whether the tension between the unitary housing system and the increasing pressure on the affordable housing segment will lead to a critical juncture (Bengtsson and Ruonavaara 2010) and larger change in Swedish housing policy.

Further, it is interesting to note that the three municipalities have adopted different strategies for the number of apartments within the project that are to be affordable and where projects are situated. In Stockholm, the project is situated in a new suburban location adjacent to a socially difficult area and affordability demands are related to the project as a whole. In Gothenburg, development was planned in one of the most attractive newbuild areas in the city but has been put on hold, while a compromise model could be realized in a somewhat less attractive area. Rents are divided into four levels, from very low to unlimited. In Örebro, the project is situated in a new attractive but less central location. 20% of the apartments are affordable. The motives for choosing to place a pilot project in a specific area might be manifold, but it is noted that most projects are not placed in the most attractive areas. The variety of shares of affordable housing in the three projects will make them interesting to evaluate after completion.

To summarize, many Swedish municipalities have a unique possibility to realize affordable housing land models through their planning monopoly and extensive land ownership, but to date attempts have been hesitant. This might relate to that the wish to stem affordable housing shortage through land models has not been strong enough, based on both political and institutional reasons. It remains to be seen how the pilot projects will evolve, which results will be achieved and to what extent the pilot projects will inspire further similar projects.

5. Conclusions and future research

In Sweden, political attention to affordable housing shortage has emerged relatively recently and the use of land policy to stimulate affordable rental housing development is somewhat hesitant. There is also an uncertainty related to housing policy and practicable methods to implement affordable housing land models. The first pilot projects are still under development. All in all, this might point to that land models for affordable housing is too large an effort in Sweden for a relatively poor result. Alternatively, these pilot projects could be viewed as the beginning of a longer policy development process.

Future research relevant for practise could investigate developer incentives. The structure of the webs of incentives used in different cities, why different actors react to them as they do, and relations to goals and efficiency would be of interest to investigate further in order to better understand and develop present models.

A theoretical contribution could be made through an analysis of similarities and differences between the Swedish models and inclusionary housing. Further comparative studies with models applied in other European countries could also elucidate municipal strategies and various uses of municipal tools to steer housing development.

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Buyers' Price Perception in Residential Real Estate Transactions

Literature gap and future research

Abstract

Over and over again, it becomes clear that there are differences between the value and the actual price to be paid for a property. Different stakeholders on the market have different opinions about the value of a property. Systematic literature research shows that in the international context research has been carried out in the area of decision making and factors that positively or negatively influence property prices, as well as willingness to pay and valuations from the perspective of owners and experts. So far, relatively little is known about the factors influencing value from the perspective of buyers and sellers.

1. What is value-relevant for sellers and buyers?

Why do we pay a certain price for a property? And how does this fit in with the question of the amount for which property is actually valued? There are different stakeholders in the residential property market who have different perspectives on the value of a property. How much is a certain residential property worth from the owner's or buyer's point of view? How does the bank, the appraiser or the tax office estimate the property value?

The actual price to be paid does not necessarily reflect the value of a property. The market value of a property is an objectively determined value of a house or apartment. Appraisers determine the market value based on data concerning the age, building materials and location of the property. In contrast, the purchase price is the price that buyers are willing to pay on the open market (Kleiber 2014). The fact that, in addition to experts (such as the ones in the appraisal committees), laypersons (such as buyers and sellers) are also present on the market means that particularly large fluctuations between price and value can arise in this area.

Residential markets in particular are highly influenced by laypersons. There are different functional sub-markets and objects for sale, e.g. owner-occupied flats, single/two-family houses or terraced houses. The properties vary in construction, equipment and quality. They all have different locations and thus different spatial sub-markets (Rottke et al. 2017).

Real estate valuation is based (inter-)nationally on three main methods. The comparison approach is the most favoured method because it compares transactions normally with hedonic models. The cost approach and the income approach are often used if there are not

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enough purchase prices available that correspond sufficiently to the valuation object, or if the valuation objects are commercial or rented properties. The basic idea of these approaches is to derive the market value from the building costs or by capitalizing the rents over the lifetime of the building. This makes the comparison approach the most important valuation method and it is normally viewed as making the property market more transparent (Kleiber 2014).

However, the first step is to describe the building and the type of property to be valued and to check the availability of property and market data so that a suitable valuation method can be selected. Valuation procedures based on sufficient market data ensure that the value of a property will be determined according to uniform criteria (Kleiber 2014, Ziegenbein 2010). But do these assumed parameters for determining the value of a property also reflect the price perception of buyers and sellers (with their understanding of value relevance)?

Ziegenbein (2010) shows for the German property market that there are deviations in property prices. Coefficients of variation give evidence that land and property prices are subjects to fluctuations (Table 1). The coefficient of variation is a relative measure of dispersion and results from the relation of standard deviation and arithmetic mean (hence, it expresses the standard deviation as a percentage of the arithmetic mean).

Table 1: Coefficient of Variation (based on Ziegenbein 2010)

Land Type	Coefficient of Variation
Condominiums	0.10
One- and Two-family Houses and Multiple Family Dwelling	0.10–0.15
Plots/Building Land	0.20
Agricultural Land	0.25

What causes these different coefficients of variation and what do the deviations mean? The categorization according to Petersen (2005) makes clear that the deviations in the functional sub-markets of one- and two-family houses and multiple-family dwellings can be classified as “still respectable”.¹ Condominiums with a coefficient of valuation 0.10 are in the “good” category. This is due to the fact that there are more comparable properties in the condominium segment, which means that the market can be better appraised thanks to transparency (Weigt 2016). The consideration of the valuation coefficient of Ziegenbein and the classification according to Petersen suggests that a clarification of the deviation of the mean values is necessary.

¹ Interpretation of the coefficient of variation according to Petersen (2005): $0.00 \leq 0.05$ excellent – very good; $0.05 \leq 0.10$ very good – good; $0.10 \leq 0.15$ good – still respectable; $0.15 \leq 0.20$ still respectable – problematic; $0.20 \leq 0.30$ problematic – questionable; > 0.30 questionable – to be evaluated critically.

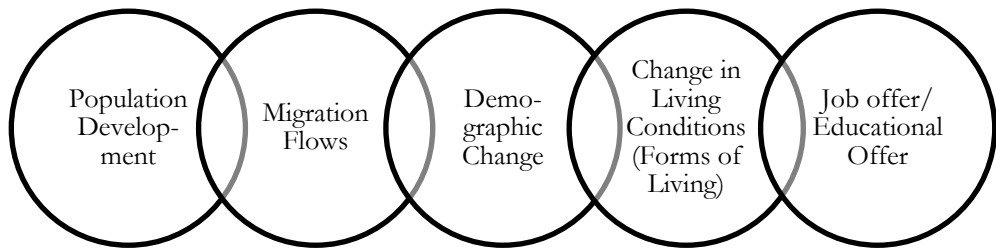


Figure 1: Temporal Fluctuations in Housing Market (based on Schürt 2017).

The residential property market is especially subject to temporal fluctuations. Some examples that influence the temporal fluctuations are shown in Figure 1 (Schürt 2017). Furthermore, the mobility of stakeholders contrasts with the immobility of residential buildings (or buildings in general). This results in a tension between the life span of real estate and the short-term changes in the market. The numerous stakeholders have already been mentioned. Further aspects in relation to the stakeholders are different personal preferences, demands, and life situations. It is assumed that people of different age and relationship status have different needs and make different demands on a property. A field of tension on the housing market arises, inter alia, due to lack of knowledge, the numerous stakeholders in the market and the different socio-economic characteristics of the market participants (Schürt 2017, Bach et al. 2005).

To answer the question of what is value-relevant for buyers, a review of existing research must be undertaken and any research gaps identified. Thus, the aim of this paper is to present current research topics in the field of residential real estate and value-driven parameters. A systematic literature search is used to identify the main topics. Based on this, research gaps will be presented and initial research questions for further work for the German property market on the topic of residential property transactions and value-influencing parameters from the perspective of buyers and sellers will be derived.

2. Research method

A systematic literature search was used for the literature review. Figure 2 shows the main steps of the literature search. In the following, the individual steps will be explained in more detail and related to the topic of residential real estate transactions. Within the literature search, the PICO method has been used, which is described in detail in Step 2.

The first step is to identify the research principle and to make a decision between sensitive or precise research. A sensitive search provides a larger number of search results and a more comprehensive overview. But in this procedure the amount of irrelevant literature is higher, and therefore more time has to be spent on filtering and screening the relevant publications (Nordhausen and Hirt 2018). The precision and completeness of a literature search are important quality criteria. The sensitive method is not restricted to relevant publications and is therefore not “precise”, but the probability is higher that it is “complete”. Therefore, the sensitive research principle (Boeker 2014) was chosen.

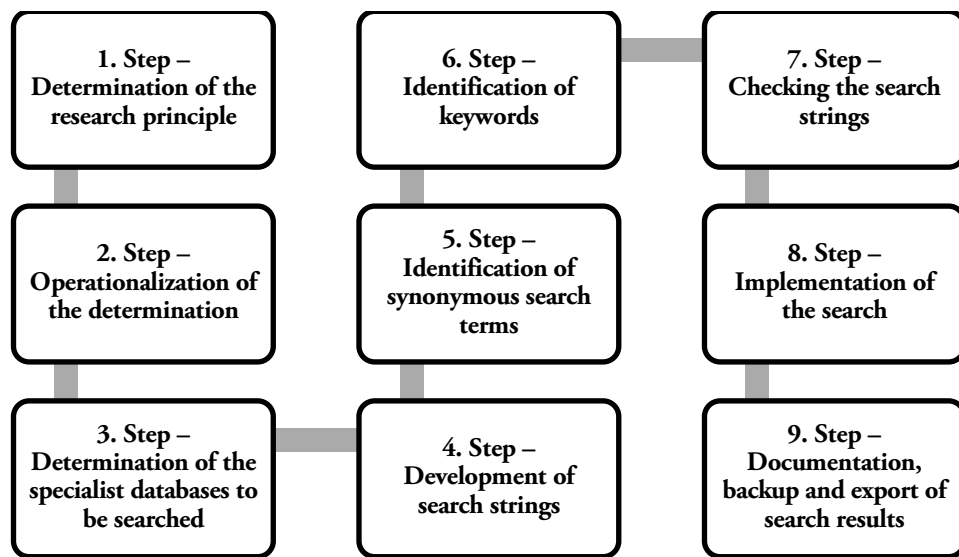


Figure 2: *Steps of Literature Review (based on Nordhausen and Hirt 2018).*

The second step includes the operationalization of determination. The operationalization is carried out according to the PICO method. PICO is a special research method, which originates from the field of medicine. In this search method, a question is divided into individual subcomponents in order to get closer to the finding of a solution. Given the medical context, PICO stands for Patient, Intervention, Comparison, and Outcome (Methley et al. 2014), and is here adapted to the field of real estate and value-driven parameters. The question is thus: which parameters influence the value of residential real estate from the perspective of the buyer/seller in comparison to the parameters of the standardized valuation procedure for determining the value of the real estate?

The next two steps include the selection of data platforms and the identification of keywords. DBIS is a database-information system and contains a register with scientific databases (Nordhausen and Hirt 2018). The platforms should provide an international overview and include freely available publications on real estate. The authors of this article limited the number of platforms to be searched to three (Scopus, Web of Science, ResearchGate). Keywords are used to search on the selected platforms in order to evaluate whether publications on the topic are available. The keywords later can be used to check for the review and evaluation of relevant publications. The keywords are derived on the basis of initial literature research and previous knowledge (Nordhausen and Hirt 2018).

The next step is the development of synonymous terms for the search (cf. Table 2) (Nordhausen and Hirt 2018). Synonyms in English and German are developed with the use of the search components of the PICO question and the keywords. Since the information is very varied, the terms are classified in separate groups. The classification of the synonyms should simplify follow-up work in Step 6 of the literature research.

Table 2: Identification of synonymous search terms (own systematization)

Group	Topic	Synonyms¹
I	Market	Wohnungsmarkt, Wohnimmobilie, Residential, Housing
II	Stakeholder	Verkäufer, Käufer, Seller, Buyer
III	Real estate use	Eigentum, Eigennutzung, Freehold, Property, Ownership
IV	Financial measurable impact	Wert, Wertermittlung, Wertermittlungsverfahren, Price, Value
V	Personal emotional impact	Verhalten, Einfluss, Parameter, Influence, Behaviour/Behavior

The synonyms of the individual groups are combined with operators to create the search strings, one in German and one in English. The Boolean Operators “AND” and “OR” are used (Nordhausen and Hirt 2018). The English example is: Residential OR Housing AND Stakeholder OR Seller OR Buyer AND Property OR Ownership AND Price OR Value AND Influence OR Behaviour. Step 7 involves testing the search string in a database. As the search strings resulted in a large number of publications, even after screening and filtering relevant publications, no adjustments were necessary.

Next, the same indicators are defined for all databases. The search is carried out for literature published between 2010 and 2019. The terms of the search strings should be found in titles or abstracts or keywords and all document types should be searched. The same search strings are entered in all databases and the indicators are selected. In Step 9 of the literature search, the search results are checked and the relevant results saved in a separate file (Nordhausen and Hirt 2018). Relevance is measured by the content regarding consumer behaviour in the real estate market and value-driven parameters.

The summary of the contents is the result of the research and based on the structured literature search. The search is not conclusive and not all relevant publications are found because not all platforms/media were searched. However, within the platforms, the search period is extended to check for completeness. No other relevant publications were found. For further searches, the snowball principle is applied and the search is refined to Germany.

¹ Translation of German terms: Wohnungsmarkt – housing market, Wohnimmobilie – residential property, Verkäufer – seller, Käufer – buyer, Eigentum – property, Eigennutzung – owner occupation, Wert – value, Wertermittlung – valuation, Wertermittlungsverfahren – valuation procedure, Verhalten – behaviour, Einfluss – influence.

3. State of the art – real estate transactions

The English search string delivered a total of 78 search results in the online platforms. The review and selection identified 23 relevant publications, and some of the results of the structured literature review are highlighted in this chapter. The aim is to present the state of research and what conclusions can be drawn regarding research needs. A detailed description of the research methods in the highlighted studies is not given, as the individual findings of the studies are not intended to be applied to the German housing market. In the international context, there are two main fields of research:

- (1) Research on behavioural factors influencing decision making and
- (2) Factors that influence the price.

The subchapters focus on research of the factors, which influence the decision to purchase (see 3.1), of factors that influence the value and price of the property (see 3.2) and on the comparison of how owners and experts assess the value of a property (see 3.3).

3.1 Factors influencing residential property purchases

Mydhili and Dadhabai (2019) deal with the identification of rational and behavioural factors that influence buyers' decision making. The results are derived from a survey in Guntur (India). The survey covers a total of a hundred people who had previously bought at least one house, a flat or vacant land. Among the rational factors, "location and environmental factors" and "peaceful and protective environment" are particularly important. Behavioural factors suggest that buyers save a portion of their income to buy a property and prioritize their individual needs. In a very few cases, their decision depends on other people. The analysis of rational factors and behavioural factors shows that the influence of rational factors on the decision is comparatively high.

Mohd Thas Thaker and Chandra Sakaran (2016) analyse key attributes that influence the decision to buy a residential property. The results come from surveys (eighty participants) in Kuala Lumpur and Selangor (Malaysia). The demographic profiles of the participants are divided into categories such as gender, age, family status, education, type of buyer and income level. The study identifies that price criteria are the most important factors influencing the purchase of a residential property for buyers. Also important are: community amenities, location, financing, structural factors, home amenities and property developers.

The study by Wijayanigtyas, Sipan and Wai (2015) deals specifically with purchasing behaviour factors for green residential property² in Indonesia. Factors are determined through a literature review of earlier studies. The research identifies the following factors: attitude towards purchasing green residential property (environmental awareness), subjective norms (reference groups/families), benefits (costs/health/resale value/environmental), internal

² Green residential property: "Green" is the term used to describe concepts for sustainable development in the property market. Concepts contain goals and practices to reduce negative environmental impacts (Wijayanigtyas et al. 2015).

factors (involvement/feelings/experience/knowledge/motivation/personality), lifestyle self-concept and socio-demographic factors. The factors are tested and used as variables to measure the purchasing behaviour of home buyers.

Zróbek et al. (2015) analyse the influence of environmental factors on the choice of residential location (single-family houses and flats) in Poland. They gain their results from a survey of residents in three Polish regions. 269 people attended the survey. The identified factors reflect the housing preferences of real estate buyers. According to the Polish study, the following factors are important (order reflects importance): price, feeling of security, quiet neighbourhood and scenic values.

3.2 How individual factors influence the values and prices of properties

The study by Belanger and Bourdeau-Brien (2018) examines the effects of flood risk on the value of a residential property. It also considers properties located near water bodies that have been subject to flooding in the past and shows the effects on surrounding properties. The study is carried out in England and is based on flood maps and flood insurance policies data from 2004 and 2005. The study reveals that a location within a flood zone reduces the value of a property, especially in the first months after the flood. This phenomenon is not observed in tight markets, where potential buyers have less room for manoeuvre.

In contrast, Eves and Blake (2015) examine the relation between traffic noise and the residential property market. The study uses various studies on aircraft noise and compares this data with results from print and electronic media. Furthermore, aircraft noise (negative driver) is compared with other positive location factors such as distance to the workplace, to school locations, to services or to recreational facilities and the question arises whether the positive factors compensate the negative ones.

Another factor that influences the value of residential properties is the building environment. Mesthrige and Poon (2015) examine the effects of revitalized old industrial buildings on the market value of neighboured residential properties. The study deals with real estates in Hong Kong (China). By using a hedonic pricing model (based on a sample of 4015 transaction data), they examine whether the revitalization of old industrial buildings has an impact on property values in the surrounding area. The results did not prove that the revitalization projects have a positive price effect. However, there are differences in the type and scope of the project and its effects. A conversion of a wholesale business has fewer negative effects than a revitalization. The larger the project, the greater the negative effects. Negative public perception also reduces the value of the surrounding properties.

A further important factor influencing the dynamics of the housing market is speculative behaviour. Extrapolating investors' expectations can lead to a sustainable price deviation from the reference value and even to a price explosion (Zheng et al. 2017).

Larsen (2010) examines the effects of buyer type on house prices, asking whether investors systematically pay less for single-family houses than residents (owner-occupiers). The study

was conducted in a city in the USA and subjects data from 3443 single-family-house transactions to regression analysis. The outcome of the study is that investors paid an average of 13.24 percent less than buyers for owner-occupation.

3.3 Assessment of the value of a residential property

The above-mentioned studies mainly deal with factors influencing the value and price of a property. As described above, there is a difference between value and price in the real estate market. The following study supports the notion that there is a lack of knowledge about the value and price to be paid in the residential property market.

The study “The rose-tinted spectacles of homeowners” (van der Cruisen et al. 2018) proves that homeowners overestimate the value of their property. The study takes place in the Netherlands and focuses on household surveys from 2011 and 2014, supplemented by consumer surveys in 2013. The results of the regression analysis show that the overestimation is positively related to the mortgage loan-to-value ratio and the owner’s tenure. Owners have a tendency to overestimate the value of their properties when the actual value and purchase price of the house falls. The study includes also rational interpretations and psychological explanations.

3.4 Interim summary on the literature research

As already mentioned, there are two main research areas: research on behavioural factors influencing decision making and factors that influence the price. Most studies examine behavioural factors and start with consideration of factors by buyers during the purchase process. In most cases, the influencing factors are considered, i.e. factors are analysed that lead to a decision for or against a purchase. Studies elaborating the influence of residential property price give evidence that factors, such as environment, location of surrounding buildings, supply, demand, speculation, social and personal aspects, are most significant. Studies refer to limited research areas with a focus on one special country often without addressing the issue of generalizability. Most research approaches are based on quantitative methods, such as content analysis of a literature review, regression analysis and hedonic price method.

4. Gaps in research and research requirements

This discussion refers to the worldwide state of research. There is a lack of precise focus on buyer and seller behaviour. Indeed, regarding Germany, hardly any studies have been found that deal with buyer and seller behaviour. Therefore, the research gap has to be closed with a priority to Germany. Figure 3 highlights the most current topics as assessed by the systematic literature review and derives the research needs.

The focus on present research is about influencing factors in buying decisions and different influences on the price. There is a research gap concerning the behavioural characteristics of sellers and why prices in the residential property market are varying significantly. Our future

research activities will deal with value-driven parameters from a buyer's point of view, initially for German regions.

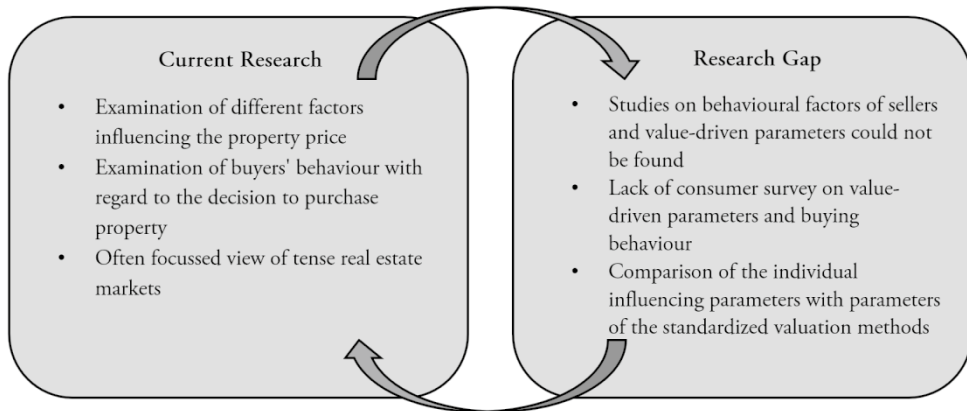


Figure 3: Outcome of literature review and gaps in research (own overview).

As a research approach, a change of perspective should be undertaken and the value-influencing parameters in residential property transactions examined from the perspective of both the buyer and the seller. The established valuation methods use existing market data and property information. The question arises if there are other parameters in addition to those commonly used which determine value from the buyers' or sellers' point of view. Furthermore, it should be assessed whether the parameters from the viewpoint of the buyers and sellers differ from those of the established approach of the valuation committees. Also, the research should deliver answers to the question of if the parameters can achieve general validity, ensure market transparency and guarantee an objective valuation.

As Ziegenbein (2010) demonstrated, purchase prices in the housing market systematically vary around a mean value. Dispersion in the condominium segment is lower due to the higher number of comparable properties. Future research should help to find an explanatory approach that allows the modelling of part of the dispersion as individual understandings of price.

In order to minimize this lack of transparency, a change of perspective will be taken. By analysing buyer behaviour and determining buyers' views of value-influencing parameters, dispersion can be better explained. This could have added value for the expert committees, allowing them better understanding of market developments in the future.

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Implementation Strategies for Sustainable Urban Development

Examples from Swedish practice

Abstract

Sustainability issues are gaining an increasingly prominent place in detailed development plans. However, there are several possible explanations why a completed construction project does not meet all the sustainability ambitions that have been defined early in the planning process. Some of these explanations can be linked to the regulations or deficiencies in the municipality's internal organization and routines. The aim of this paper is to explore opportunities and obstacles in the planning and land development process from detailed planning to building permits in order to promote sustainable urban development. Case studies of current detailed development plans in four Swedish municipalities with pronounced sustainability ambitions have been made.

The results from the case studies show that municipalities address a broad range of sustainability aspects in contemporary urban planning that are articulated in the requirements and evaluation criteria for land allocation competitions, and later on are formalised in the plan provisions and land development agreement. Strategies that municipalities use to implement sustainability aspects in current urban construction projects have been identified, with differences e.g. in terms of flexibility, organization and the relation to developers. Sustainability ambitions are addressed in the interface between municipalities and developers, but also in seminars, competitions and dialogues. The ambitions are formalized in detailed development plans and development agreements, but not necessarily in building permits.

1. Introduction

Sustainable urban development encompasses, among several things, sustainable construction and sustainable planning of houses, infrastructure, public places and transport, which in turn requires collaboration between several sectors including advanced forms of dialogue with citizens and the developers. Inclusive and innovative urban planning is needed to make cities sustainable for the future (The 2030 Agenda for Sustainable Development).

Most municipalities in Sweden, which in recent years have updated their comprehensive plans (showing intended land use covering the entire area), have formulated goals to reduce the environmental impact and ensure a sustainable economy with natural resources within the municipality. The goals and policies on overall concerns for environmental issues are

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vital for the integration of environmental perspectives into strategic spatial planning processes (Gustafsson et al. 2019). As part of this transition, the municipal organization has also been adapted to strengthening sustainability issues in planning by appointing sustainability coordinators and environmental planners involved in the planning work. This has resulted in sustainability issues gaining an ever more prominent place also in detailed development plans.

However, there are several possible explanations why a completed construction project does not meet sustainability ambitions that have been defined early in the planning process. Some of these explanations can be linked to the legal framework, which are either not designed or used to promote sustainable urban development. Other explanations relate to deficiencies in the internal organization of the municipality and routines that means that the work on sustainability goals does not have full effect. Here, both leadership and competence may play an important role. Besides this, different kinds of regimes of municipal planning could have an impact as well. In a development-led regime, as opposite to a planning-led regime, the result is depending on agreements between developers and the development engineers. This means that the detailed development plans become the product of prior negotiations with developers concerning land and property values (Zakhour and Metzger 2019) and that the role of planning hereby is reduced. An important question that governs the ability of the municipality to use municipal specific requirements and opportunities in achieving environmental quality goals for sustainable construction is whether or not the municipality owns the land. The different roles that local governments take in the production of the built environment may affect in several ways the solution of environmental problems as an important incentive for sustainable development (Salet and de Vries 2019). Swedish public law does not provide a complete regulation of the implementation of a detailed development plan. Therefore, agreements can be made between a municipality (public) and a developer (private), which means that private law will apply as well.

The aim of this paper is to explore opportunities and obstacles in the planning and land development process from detailed planning to building permits in promoting sustainable urban development.

Research questions:

- How are sustainability ambitions handled and implemented in the process?
- How is continuity ensured between the different stages of the process?
- How can sustainability aspects be strengthened in the process?

A combination of methods have been used to collect information and analyse today's practices in managing sustainability aspects in the planning and development process: case studies of current detailed development plans in four different municipalities with pronounced sustainability ambitions; literature and document studies; and interviews with actors involved in the case studies, such as municipal officials with different roles and representatives from developers. The results from these sources are combined. References in

the text are not included when they are based on planning documents and interviews. In this paper, sustainability covers all three dimensions, i.e. social, economic and environmental sustainability.

2. Planning Process and Land Development in Sweden

2.1 The detailed development process in a planning context

Detailed development plans and building permits are used as a tool to achieve a suitable land use, where public regulations can be used to providing prior approval to different types of land use (Ogus 1994). Internationally, the planning systems and regulations may differ. While the legislation serves as some kind of guidance in some countries and systems, other countries specify more in detail what is to be regulated in a plan (Cullingworth and Nadin 2006). In the Swedish case, it is specified clearly in the legislation what may be regulated in a detailed development plan. From previous studies of Swedish planning provisions in detailed development plans and development agreements, and how they are applied in practice, (Kalbro and Smith 2008; Caesar and Lindgren 2009; Kalbro et al. 2012; Kalbro et al. 2015), it could be noted that the plan provisions in the detailed development plans and the land development agreements between the planning authority and the developer often are outside the intentions of the legislation (Kalbro et al. 2015), which means that they sometimes contain provisions that are not allowed to be included according to what is regulated in the legislation.

The Swedish Planning and Building Act contains objectives and requirements to take into account when designing land use and buildings as well as regulating plans. The comprehensive plan sets out the basic features of land use and development and indicates national interests. The binding detailed development plan regulates land use and construction, and there are provisions on building permits as well. The detailed development plan is drawn up when developments are planned and where rights and obligations for the municipality and property owners are determined. Even though the detailed development plan indicates certain rights and obligations that the actors affected by the plan will have, a building permit must be applied for when implementing the plan. The detailed development plan is legally binding regarding permit decisions. Usually, a building permit will be issued if the applied measure falls within the specifications of the plan, but also other regulations will be checked in the process. The plan delineates three main categories of areas, namely public space, development districts and water areas and show land use (housing, industry, traffic facilities etc.), permitted utilization rate, and the main location of service, parks and traffic facilities. It may also regulate land use, the extent of buildings, location, design and construction, land and implementation issues, etc.

It is only the municipality as planning authority, who can decide where, when and how a detailed development plan should be drawn up. If necessary, the conditions and objectives for the planning work can be stated in a plan program. In case of significant environmental impact, an environmental impact assessment must be prepared. A consultation shall be held

with affected parties, such as property owners, the public, authorities, on plan programs and proposals for detailed development plans, with the aim of providing the municipality with knowledge and views and providing information to those affected by the plan. The final plan proposal should then be available for review. The detailed development plan is adopted by the Municipal Council, the Municipal Executive Board, or alternatively by the Building committee when it comes to plans of minor importance. Building permits are then applied for concerning the measures that require such permits.

Agreements between the municipality as planning authority and land owner, and the property owner or developer, are often linked to the detailed development plan to regulate, among other things, planning and construction as well as the execution, operation and financing of joint facilities and infrastructure. An implementation agreement regulates the relationship between the municipality and professional property owners/developers and their rights and obligations to each other, including the responsibility for carrying out various measures in the development and financing these measures to construct streets and other public spaces, water and sewage facilities, etc. These agreements are usually called land development agreements or land allocation agreements, depending on whether the developer or the municipality owns the land. They are negotiated between the parties before the adoption of the detailed development plan. The conditions in the agreements follow regulations that exceed private law contract regulations. The municipality is a planning authority and the conditions of the development agreements therefore must have support in public law, such as the Planning and Building Act. The municipality must not stipulate something outside this regulation. The contents of the agreements must be public and transparent and should be presented during the planning process.

Through the planning system a structure is created to concretise step by step municipal goals in the planning process. Overall, sustainability goals at various stages can be specified in the planning process, so that specified guidelines can be provided in the building permit. However, there are large variations depending on, for example, landowner conditions, interpretations of the regulations, the municipal organization and the dialogue between the developer and the municipality, which in many cases cause deficiencies in the coordination between the different steps in the planning process.

The municipality and the developer are two main actors in the property development process in Sweden. The municipality and the developers collaborate in joint responsibility to develop sustainability solutions, which then form the basis for the detailed development plan or the land allocation agreement. Even though it is the municipality, who has the sole possibility and responsibility of deciding when and how to draw up a plan, it is common for the municipality to discuss the contents of the plan with the developer in order to have some useful input on how it should be implemented. The municipality may have different roles in the development process, such as being a planning authority, a provider of infrastructure such as roads and water and sewage systems, land owner or owner of housing companies (Kalbro et al. 2015). The work can be organized in different ways within the municipality,

where during the process the main responsibility for planning and implementation is shifted between various municipal administrations with different roles and competencies. This may mean that some of the information is not transferred between different phases and that decisions from the early stages of the planning process are not followed up in later stages. Similar problems may exist within the large developer organizations with different departments and sub-consultants.

2.2 Developers' perspective

Interviews have also been conducted in the study with developers and the County Administrative Board in Stockholm County in order to gain their perspective on sustainability issues in urban development. The developers consider it as a major challenge how to balance the three sustainability aspects: ecological, economic and social sustainable development. They discuss whether one can invest in all these aspects within one and the same project and if there is any methodology for this to be applied.

The developers believe that it is important to investigate whether the municipalities link their sustainable development goals to the global sustainable development goals or any other type of framework. The collaboration between municipality and developer is intended to create a common framework and to make sure that these actors work with a common goal in mind. If the goals are linked to global goals or other well-known and accepted goals, it will make it easier for the developers to know what is expected and to adapt to it. They also want to know how municipalities deal with balancing different interests and issues regarding sustainable development, and whether there is any strategy or process for dealing with target conflicts. It is also important to consider the ambitions for sustainable development and whose ambition it is: the municipality or the developer.

The developers consider that all aspects of sustainable urban development need to be taken into account. A requirement list from the municipality is not always perceived as positive, but it is important for the developers to be involved in the process and to be able to come up with solutions, i.e. not just a top-down process. The requirements that are set are usually minimum requirements. Early in the process of a detailed development plan, all actors should agree on a common vision, principles and routines. In order to ensure the intended outcome, it must also be followed up.

Politically, the developers consider that there are different ambitions in the municipalities in terms of sustainable development. They expressed the opinion that requirements sometimes are set later in the planning phase, but should be set earlier. There should be a dialogue between the municipality and the developer about this. It is believed that the development agreement needs to be clear regarding what commitments are required. When the municipality owns the land, specific requirements are often determined in the development agreement.

Developers consider social sustainability to be more difficult to handle than ecological sustainability. Security issues, accessibility, and mixed housing forms could be mentioned as

examples of issues related to social sustainability. Social issues may also be to arrange community rooms and artistic decoration. The developers mention several initiatives on social sustainability issues. However, it is considered that the social part must be developed.

The developers believe that the plan programs will form the prerequisites to relate to and that the detailed development plan documents will set the framework. The building permit is the basis how well the detailed development plan is implemented. The development agreements also contain different ambitions with requirements depending on the ambition of the municipality. The developers believe that it is important that the sustainability ambitions are kept at a reasonable level. The most common requirements from the municipality that were mentioned by the developers concerned the environment, energy, storm water and green spaces. It is believed to be difficult to have an equally high ambition in all areas and that there is a need to balance between them.

3. Results and analysis

3.1 Case studies

The research project involves four case studies: Vikaholm in the municipality of Växjö, Kristineberg in the municipality of Vällentuna, Ulleråker in the municipality of Uppsala, and Södra Värtan, which is part of a large urban development area called Royal Seaport, in the City of Stockholm (see Figure 1). These cases have been selected on the basis of three criteria.

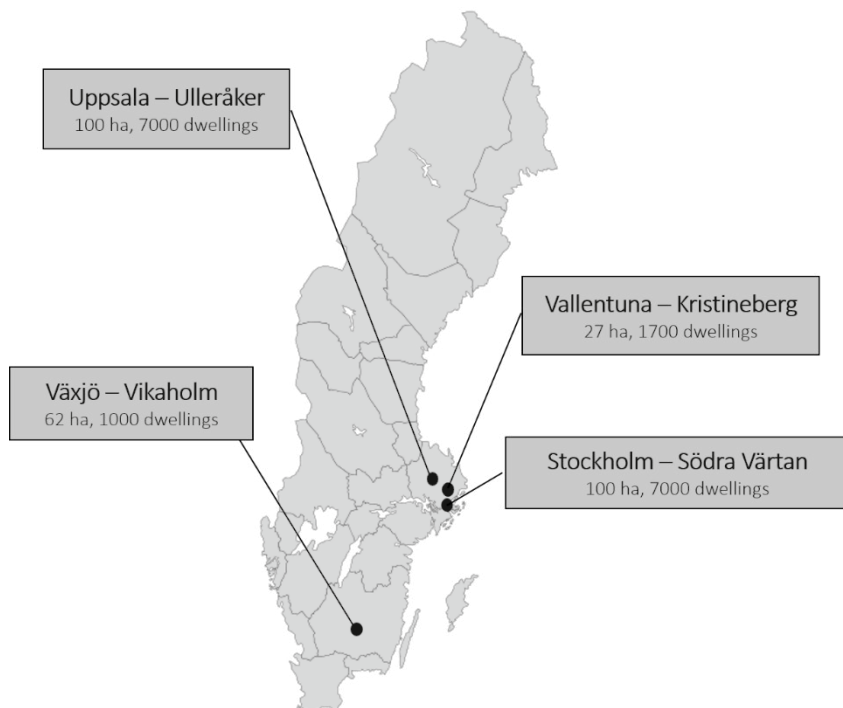


Figure 1: Case studies.

Firstly, all cases are developments for which the municipalities have expressed explicit sustainability ambitions. Secondly, all cases are current developments, which means that the entire development is not completed. Thirdly, the cases represent different settings, two in the Stockholm region and two in main cities outside the Stockholm region.

An overall comparison of the case studies shows two categories of projects: on one hand Ulleråker and Södra Värtan, which are large-scale developments with multi-family housing on primarily municipality-owned land. The second category concerns medium-scale developments in Kristineberg and Vikaholm with mainly single-family homes and terraced houses in a peri-urban setting. Land ownership varies between the cases. Vikaholm involves municipality-owned land and Kristineberg is a mix of privately owned and municipality-owned land. Being a landowner enables municipalities to pursue sustainability ambitions through public as well as through private law.

3.2 Planning and land development

There is a pronounced sustainability focus of the urban development projects that were studied. Already in the early stages of the planning, the municipalities stipulated sustainability ambitions in the program for the detailed development plan, which frames the conditions for the development of the project area. The program refers in some cases to existing policy documents, e.g. the Environmental Plan in Växjö and the Program for Sustainable Development for the Stockholm Royal Seaport Area. For Kristineberg and Ulleråker, similar documents were developed at a later stage. The Environmental Program for Kristineberg elaborates measures within five themes and specifies who is in charge, and when it should be addressed and followed up.

Sustainability issues dominating the planning differ between the case studies, partly due to site-specific conditions. For example, in Ulleråker the site is located on the main drinking water source and hence the protection of the groundwater source is a central issue. This also involves restrictions for car-based traffic in the area due to the risk of contamination of the groundwater in the event of traffic accidents. In Kristineberg, the site is located in an ecologically sensitive area close to a nature reserve and therefore, ecological connectivity is central to the planning of the area. In other cases, political goals play a crucial role, which reflect the sustainability agenda of the municipality. For example, in the planning of Södra Värtan, energy is an important sustainability aspect as the City of Stockholm has stated that the Royal Seaport will be a fossil-free district by 2030. For Vikaholm, the municipality has identified five core issues in the quality program that enhance sustainable living.

In the detailed development plans for parts of the study areas, sustainability issues are addressed. In the detailed development plan for Kristineberg, these issues concern e.g. land use related questions such as division between development areas and public space, preservation of green qualities, localisation of retail and services, and transport infrastructure. Further, restrictions related to tree felling and storm water management are included. The detailed development plans for the other study areas cover similar sustainability aspects, but

each of the plans have some specific features, e.g. a detailed development plan for Södra Värtan addresses repealment of shoreland protection. In Uppsala, the municipality decided, based on experiences from an earlier development, that the detailed development plans for Ulleråker should be more detailed on property provisions in order to secure the urban qualities in the area, e.g. regarding specifications on green area factor and building heights. For Vikaholm, the municipality of Växjö developed a more flexible detailed development plan to provide room for negotiation with developers regarding the detailed design.

In the case studies, municipalities organised land allocation competitions for development of municipality-owned land. In most cases (Södra Värtan, Ulleråker, Kristineberg), the competitions started in conjunction with the detailed development plan going into consultation. At this point in the process, the municipalities have formulated a plan for the development of the area, which can be adjusted and supplemented with the winning proposals from the competition after the consultation. The municipality of Växjö works in a different way as the detailed development plan is kept general, while the requirements are specified in the quality program.

3.3 Sustainability considerations in urban development

Municipal land ownership plays a major role in the implementation of sustainability ambitions. In all case studies, the municipality owns a significant part of the land that municipalities in accordance with the Planning and Building Act can allocate to developers based on routines specified by the municipality. Through competitions, municipalities can call for proposals that meet the sustainability ambitions for the project. For each competition, municipalities specify requirements and evaluation criteria on which the proposals are assessed. An analysis of the requirements and evaluation criteria that are used in the competitions for each of the case studies shows three main differences.

First, different approaches are applied regarding land price. In Södra Värtan and Vikaholm, the competitions are based on a fixed land price, while for Ulleråker and Kristineberg the developer has to submit a quotation for the land. According to the interviewees from Stockholm, a fixed land price is needed to cover the costs for preparing the construction site through the revenues from the land sales. In Ulleråker, quotation is used as a first step in the selection. In interviews, developers question the high land prices and the reluctance among municipalities to take risks, e.g. for vacancies of commercial premises. Moreover, high land prices leave a lower budget for investments in sustainability measures.

The second difference between the case studies concerns the distinction between basic requirements and open requirements. In all cases, the municipality specified basic requirements, which define qualities that have to be met in order to be considered for land allocation. In Ulleråker, Södra Värtan and Kristineberg, the municipality also defines open requirements, which are issues for which the municipality call for innovative solutions. All municipalities have different systems for assessing and ranking the proposals.

The third difference involves the scope of the requirements and evaluation criteria. Vikaholm has the most limited scope addressing primarily construction issues (e.g. energy

efficiency and sustainable building materials) and facilities (e.g. local storm water treatment, waste sorting and charging stations for cars). In Kristineberg, similar requirements are included, but in addition, issues related to urban design (e.g. architectural quality, design of ground floor), traffic (e.g. parking, access to public transportation, walking and biking paths) and resilient outdoor environment (e.g. high green area factor, climate adaptation and adjustment to existing ecological qualities) are mentioned. In Ulleråker, more strict demands concerning ground water protection (e.g. closed systems for collection of extinguishing water, ban on copper and zinc in building materials) and urban design (e.g. micro-climate public space) are stated, as well as additional requirements concerning information to residents to increase awareness of sustainable lifestyles. The municipality of Stockholm has the most comprehensive requirements including, for example, collaboration between contractors, non-residential premises at all entrance floors, energy surplus for individual buildings and flexible building plans that can meet future needs.

4. Discussion

The results from the case studies show that municipalities address a broad range of sustainability aspects in contemporary urban planning. Although there is a strong focus on ecological and environmental issues, social sustainability is increasingly addressed, in particular, aspects connected with an inclusive built environment and mix of tenures. In addition, economic sustainability is considered in urban development, e.g. when trade-offs between different options are made in the planning process. Examples of this from the case studies are plot ratio and management of premises.

Since the Swedish Planning and Building Act does not permit special technical requirements, municipalities can only address sustainability issues that are related to land use in the detailed development plan. These may concern provisions regarding use of land for housing, infrastructure, green areas and services, which are important sustainability factors that determine the structure of the area, traffic flows within the area and the preservation of green areas. However, other aspects, such as technical specifications regarding energy provision, waste sorting, bike parking on development sites and green housing, cannot be regulated in detail by the plan or by technical regulations which only allow minimum requirements. Instead, these issues are addressed in land allocation agreements. The case studies show a broad range of sustainability aspects that are articulated in the evaluation criteria for land allocation competitions. Sometimes, these aspects are included in urban design and quality programs, but in recent planning the sustainability aspects are stipulated as more pronounced requirements and subject for competitions between developers. Hence, they play a more prominent role in urban development projects and result in voluntary commitments that developers take on to secure a land allocation.

Sustainability requirements often involve additional costs for urban development projects as novel solutions are applied and, according to the developers, the ambitions should be kept at a reasonable level. A challenge is the lack of legal guidance regarding how sustainability requirements should be weighed against each other, except when e.g. environmental quality

objectives or national interests are at stake, where legislation provides clear guidelines. Moreover, developers call for common sustainability requirements based on the global sustainable development goals that can be met with standardized solutions. Today, there exists a diversity of sustainability requirements among municipalities, which calls for customized solutions. The implementation of sustainability measures is therefore often subject of negotiation between the developer and the municipality, where the project calculus constitutes a framework for developers to decide which measures have to be carried out. Several factors play a role, e.g. land price, plot ratio, location, floor space and market conditions. The municipality can control some of these factors in the detailed development plan, while other factors are fixed, e.g. location and market conditions. In central and attractive locations, the municipality can set higher requirements, e.g. in Södra Värtan and Ulleråker, while Vallentuna municipality or Växjö municipality have to decide which sustainability goals to prioritise.

The need to emphasize sustainability requirements in the early stages of the planning that set a clear agenda for the subsequent planning process is recognised among the municipal practitioners that were interviewed in the case studies. An early dialogue involving both municipality and developer can enhance novel solutions and avoid problems in the later stages of the process (see also Högström et al. 2019). In this way, dialogues contribute to a shared understanding of challenges and opportunities for sustainable urban development, and facilitate a joint search for synergies and innovations in terms of design, building materials and technical measures.

5. Conclusions

In this paper, various municipal strategies for the implementation of sustainability considerations in contemporary urban development projects are identified, based on case studies in Swedish municipalities. The first research question concerned how sustainability ambitions are handled and implemented in the process. The findings of the case studies show that municipalities have addressed sustainability in different policy documents, although the scope of these documents differs. The documents provide municipalities with an agenda for sustainable urban development. Some of the items on this agenda are addressed in the detailed development plan, which provides an appropriate framework to regulating land use. Other items are addressed in the interface between municipalities and developers through land allocation agreements, but also in seminars, competitions and dialogues. This indicates weaknesses in the planning system and shows that progress in sustainable urban development requires an integrated process combining planning-law and private-law agreements.

The second research question concerned the continuity between the different stages of the process. The process described above shows an intimate relation between goal setting, detailed development planning and negotiations between the municipality and developers. However, it is important to maintain a permanent dialogue on the implementation of sustainability issues since projects are not static and new people enter, who need to be informed on previous discussions. This also concerns officers responsible for building permits, which are often disconnected from discussion during the planning process.

The third research question focused on how sustainability aspects can be strengthened in the process. This study showed the importance of municipal landownership, which allows municipalities to stipulate requirements through land allocation. Land acquisition may thus be a good strategy in municipalities with limited land ownership to facilitate sustainable urban development. Another strategy is the development of a municipal agenda for sustainable urban development that provides a basis for goal setting in upcoming projects. Finally, an early dialogue between municipalities and developers to discuss sustainability enhances innovation and commitment among partners. On a national level, a discussion on the role of the planning system in providing a stronger regulatory framework for enhancing sustainability in urban development is needed.

To broaden the knowledge, future research should focus on how sustainability considerations can be further strengthened in detailed development planning. In recent years, municipalities relied on land allocation competitions, which require attractive municipality-owned sites and strong demand for housing. These conditions are not met in all municipalities and thus there is a need to develop planning instruments that can be applied in contexts with different preconditions and to enhance that sustainability performance in urban development becomes mainstream in and outside Sweden. Moreover, additional research regarding the dualistic relationship between public planning and private property rights is needed to develop a better understanding of how these statutory frameworks interact in meeting the sustainable development goals.

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Parking Regulations¹ in Austria – Opportunity or Barrier for City Development?

Abstract

Vehicle parking consumes a lot of land, occupies valuable public space, contributes to urban sprawl and as a result has a negative impact on public transport and active mobility. While the origins of parking regulations in Germany and Austria have their roots in the past – the intention clearly was to support and expand individual motorized transport – discussions on this matter intensified in recent years in Austria. For this historic reason, up to today the regulations in almost all federal provinces of Austria define a minimum number of parking spaces that have to be built when constructing new buildings depending on the intended usage. Nowadays, this is quite contradictory to the results of mobility research which recommend the definition of maximum values. Furthermore, the recommendation also includes the demand for definition of those values with regard to regionally different spatial structures. In practice, all the regulations (except for Tyrol) define single minimum values for the whole area of the state. In addition, the regulations within the planning laws allow municipalities to adapt the values to their needs if required. As the needs and requirements are not adequately defined, several municipalities in Lower Austria commissioned a study to investigate the topic, do research on existing regulations and practices in Austria and in selected European countries. As a result, they asked for recommendations for aspects to be considered when defining values different from the defaults including appropriate justifications in order to support municipalities in their settlement development strategies with a special focus on residential buildings

1. Introduction

“The obligation to construct parking spaces for each residential unit was introduced by the National Socialist Reich Garage Ordinance of 1939. The explicit aim of this regulation was *to promote motorization*.” (Moser 2014, translated by the author)

While parking regulations were initially developed to increase motorized transport, changes of society, environment and general conditions as well as political intentions occurred.

Today, emissions from motorized transport contribute about 30 percent to the overall CO₂ emissions of Austria. And what is worse, all efficiency gains are offset by increased driving performance – resulting in a backfire effect (BMWWF 2017, UBA 2017). The Austrian Climate Strategy as well as corresponding federal strategies target to reduce CO₂-emissions

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¹ The study covers the obligation to construct parking spaces when constructing new or adapting existing buildings but no other aspects like management of parking spaces.

suggest to reduce the amount of mandatory parking spaces (BMNT and BMVIT 2018; AdNÖLReg 2014; AdNÖLReg 2011).

Usually, existing regulations define minimum values and differentiate by building types and functions but do not distinguish between different local conditions. The changes mentioned above differ between regions, however.

While the average size of households decreased in the last decades, the share of single-households increased significantly. This is visible in the construction of new flats – the share of smaller flats targeting one-person households increased (Statistik Austria 2018a). Furthermore, the average amount of living space per person, is still increasing, although there are differences between flats and single-family homes. The floor size of the latter is much larger compared to flats in multi-storey residential buildings. In addition, one can observe a difference between rented (mostly smaller) and owned (mostly larger) flats (Amann and Lugger 2016).

The importance of cars has also developed differently in different regions. However, a trend away from cars and towards public transport which can be observed in Vienna, for example, is not necessarily due to a change in values, but possibly to demographic and economic reasons. The desire of younger population groups (under 35 years of age) to have their own car is comparatively lower, whereas the share of this group in Vienna is growing rapidly. At the very least, if the general conditions remain the same, the decline in car use can be expected to continue (Ringler and Hoser 2016). This trend can also be observed in other cities and is measured by the degree of motorization (number of cars per 1000 inhabitants). It is much lower in cities – especially in the inner city – and higher in peripheral regions (VCÖ 2016, Statistik Austria 2018b). The same applies to the modal split (shares of means of transport in daily travel). The share of motorized traffic is much lower in (larger) cities – of course due to the availability of high-quality public transport and better conditions for walking and cycling (VCÖ 2016).

Finally yet importantly, the construction of parking spaces increases overall construction costs. Especially in cities – usually with few land resources in particular in central areas – the construction must be done underground which is estimated to increase construction costs by more than 10 percent (Paulitsch 2017, VCÖ 2015).

As a result, the conditions (and therefore the required amount of parking spaces) are quite different – not only between cities and villages, but also within municipalities. Parking space regulations are an important way of controlling traffic. However, experts find that not all communities are sufficiently aware of the available possibilities. Differentiated parking regulations are therefore a necessity.

2. Parking regulations in the Austrian Planning Law

Contrary to what one might expect, the subject of parking is not regulated in traffic laws, but in the planning law. Therefore, the main responsibility lies within the authority of the

nine Austrian federal provinces. All of them – with the exception of Carinthia² – enacted general regulations in their planning and construction laws. Quite typically for Austria, the results are heterogeneous in terms of basic definition, construction type (outdoor, underground), minimum (or maximum) values and requirements for different building types and usages. As the parking regulations were initially aiming to promote motorization, the ordinances define minimum values. Only in recent years, two federal provinces started to change their regulations, including also defining maximum values. The regulations concerning parking in Lower Austria, for instance, are included in the Planning Law, the Construction Law and in the Allotment Garden Law. As a rule, the specific values for the amount of required parking spaces that have to be constructed are enacted by additional ordinances issued by the federal province authorities. In Lower Austria, the Building Technology Ordinance regulates the minimum amount of mandatory parking spaces for 23 different functional usages (e.g. one per flat, one per 40 m² of office buildings or one per 10 seats in a bar). These values apply to all Lower Austrian municipalities. However, the legislator recognised that different municipalities may also have different requirements. For this reason, the planning law contains exemptions that allow the municipalities to define deviating provisions. While parking regulations are no core topic in the planning laws, these deviating provisions must be defined in accordance to the objectives and principles of the planning law and therefore well-reasoned. The following table gives an overview of objectives related to parking spaces within the specific planning laws of Austria's federal provinces. The more objectives, the more support for justifying adaptations is available.

Table 1: Objectives in the Planning Laws related to parking spaces³

Objectives/Federal Province ⁴	B	C	LA	UA	Sb	St	T	Vb	Vi
Save land resources	x	x	x	x	x	x	x	x	x
Avoid settlement sprawl		x	x	x	x	x	x	x	
Preserve appearance of town			x	x	x	x	x		
Strengthen town centres	x		x	x	x	x	x		
Protection of population	x	x	x		x		x		x
Reduce motorized traffic			x		x*		x	x	x
Climate protection			x		x	x			
Affordability (of housing)							x		

*implicit

² Carinthia delegates this matter completely to the municipalities.

³ Own Summary of evaluated planning laws from <https://www.ris.bka.gv.at/>.

⁴ Burgenland (B), Carinthia (C), Lower Austria (LA), Upper Austria (UA), Salzburg (Sb), Styria (St), Tyrol (T), Vorarlberg (Vb), Vienna (Vi).

All federal provinces implemented such exemptions and thus allow the municipalities to have individual regulations – either by municipal enactments or by definitions in the Local Development Plans (or sometimes both). (Some laws define additional exemptions for adapting the values. Unfortunately, these are very general and vague – like “local conditions”, “consideration of active mobility” or “interest of public transport”.) Quite often, this is done by setting different values that are valid for the whole municipality. This neither contributes to the homogenization of the regulations in general nor does it consider local differences. An approach with appropriate differentiation would therefore be desirable.

3. General recommendations

As literature studies showed, parking regulations are an important instrument to steer traffic (availabilities of cars), CO₂-Emissions and air quality. Often regulations specify only single values as a guideline for municipalities without differentiating between different settlement types or regions. This is strongly criticised in literature, as it reduces the steering influence. In the worst case, experts argue, it is even possible to achieve unwanted results because the values tend to be on the higher end of the range. In addition, minimum values are specified which also makes a coordinated definition of transport and settlement policy objectives more difficult. In more densely populated areas, the number of parking spaces that must be constructed (sometimes) exceeds the actual demand. In addition to (unnecessary) additional costs, this leads to an increased space requirement for construction projects as a whole – space that is partly withdrawn from public space. Subsequent densification, internal development, but also conversion in densely built-up areas becomes more difficult, since compliance with the parking space obligation is hard to achieve, more expensive (due to the compensatory levy) or completely impossible. In such cases, it is generally easier for developers and investors to move to the edge of the settlement – which can lead to urban sprawl. The achievement of other goals – such as switching from cars to sustainable transport or the affordability of housing – can also be jeopardized. Although the legislator allows the municipalities to adapt parking space requirements, there is no or hardly any concrete specification or assistance (Schopf and Brezina 2015, Frey and Schopf 2014, Pfaffenbichler and Schopf 2011, Kodransky and Hermann 2011).

From a planning point of view, it is important to set maximum values⁵ including a spatial differentiation (e.g. quality of public transport, modal split, degree of motorization, settlement density, building types and usages or size of dwellings) as a general normative regulation can even be counterproductive. Implementing equi-distance between public transport and cars is also seen as a crucial requirement. Furthermore, additional measures (e.g. managing public parking spaces) as well as transparency of costs are required (Rauch and Schlosser 2014, Pfaffenbichler and Schopf 2011, Kodransky and Hermann 2011, FSV 2008, FGSV 2005).

⁵ The aim is to reduce parking spaces.

Derived from the recommendations by experts, considering practicability and following the planning hierarchy, the following general recommendations have been defined within the study.

1. Definition of maximum values (limit) and (if required) also minimum values on federal level to support political (planning, environment and mobility) objectives. The definition shall be spatially differentiated considering local requirements, especially
 - settlement size and density
 - actual demand for motorized individual transport (degree of motorization/modal split)
 - quality of public transport
2. A differentiated approach is also required within the municipalities. Local conditions and location of areas within the settlement structures should be considered using similar criteria as defined in recommendation 1. Additional criteria can be
 - building types (single-family house, apartment building), usage (e.g. subsidized housing)
 - flat size
 - availability and quality of infrastructure for walking and cycling
3. The option to consider additional project-based or area-based parameters to develop a more detailed differentiation shall be possible for further reduction of parking spaces (e.g. development projects for car-free residential areas, availability of mobility contracts ...).
4. As suggested by the experts, supplementary measures should be implemented prohibit evasion strategies (e.g. charging of public parking with a reasonable fee) as well as to ensure cost transparency.

Of course, it would be desirable to research and evaluate the effects of the criteria mentioned above by comparing municipalities of similar structure where one implemented the recommendation while the other did not. In practice, this is hard to achieve, as it is hard to implement these recommendations in the first place because it needs a strong political will.

4. The case of Lower Austria

In order to implement the general recommendations, the affected laws and enactments need to be adapted, which usually requires a long political process on federal level. As requested by the clients of the study, possibilities for immediate implementation on municipal level were examined based on the current legal framework conditions.

In Lower Austria, municipalities can adapt the specifications “if required by *specific local requirements* especially in *dense core areas*” as specified in § 63 section 2 of Lower Austria’s Construction Law. Both, “specific local requirements” as well as “dense core areas” are not further defined. Nevertheless, they are crucial in the justification and reasoning for deviating provisions. Based on the general recommendations, the criteria “quality/availability of public

transport”, “settlement density”, “mix of land use” and “location within settlement structures” have been identified as a feasible basis for a differentiated approach. They are compliant with the legal regulation and reflect mobility and environment as well as planning-related objectives. The actual degree of motorization or the modal split have been regarded as not feasible as data are not available on a local scale.

In order to keep the effort manageable, existing data, analysis results and definitions have been evaluated. Especially the following two turned out to be very usable.

Quality of public transport

According to literature, quality of public transport is the most important criteria for adapting parking regulation. Furthermore, it is the most often mentioned criterion for adaptations in federal planning laws. It is obvious that the availability and quality of public transport is a crucial requirement to reduce car dependency. Following the Swiss approach (ARE 2018), so-called “ÖV-Güteklassen” (quality grade of public transport) have been implemented in Austria since 2017. Based on information on availability and quality of public transport (means of transport, intervals, accessibility on foot) all of Austria has been classified into 7 grades of quality from A (“urban, excellent”) to G (“rural, basic”). Areas too far away from public transport have been assigned “0/No Quality” (Hiess 2017). The following figure shows the results for St. Pölten, capital city of Lower Austria.

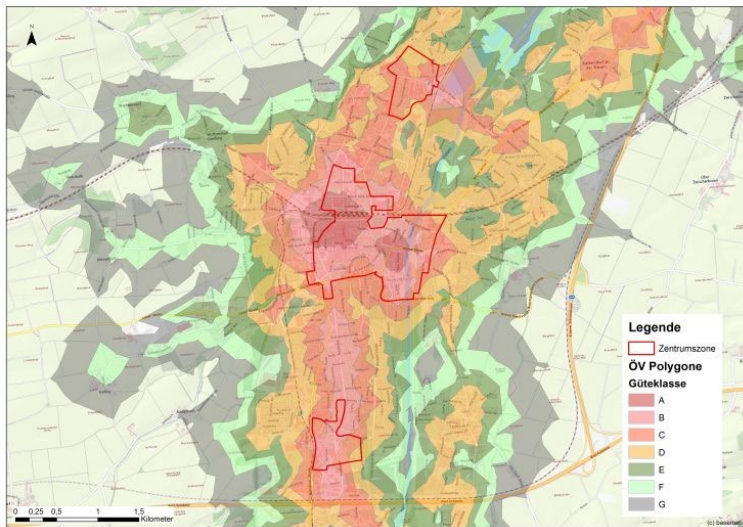


Figure 1: “ÖV-Güteklassen” and “Zentrumszonen” of St. Pölten, Source: basemap.at, Land Niederösterreich, St. Pölten.

As the automatic calculation results in rugged polygons and as the underlying data might have errors and does not reflect future planning, some manual adaptations are needed in order to use this data. Nevertheless, the classification is calculated for all of Austria in a

uniform objective way, making the results an excellent criterion for adapting parking space requirements.

Central areas (Zentrumszonen)

Planning Law in Lower Austria allows municipalities to define special areas, so called “Zentrumszonen” (§14 section 7 NÖ ROG). Such areas must be in a coherent settlement area with a minimum of 1.800 inhabitants. Furthermore, they must have a good appearance⁶, a higher density of residential buildings in combination with a higher than usual functional mix of usages, and a good individual motorized and/or public transport connection in order to support future extensions (§14 section 2 NÖ ROG). In this case, the administration of Lower Austria even provides a guideline for the definition of such areas. This includes some limits for density and rules on how to delimit these areas from the neighbouring ones.⁷

Figure 1 shows the defined Zentrumszonen within St. Pölten (red areas). It is possible to define more than one central area. As expected, the areas overlap with the denser core areas of the city. The higher functional mix supports the principle of short distances and thus the possibility to walk or use a bike more easily. An advantage of these areas is that in their definition future planning can be considered as well (e.g. extension or upgrade of public transport). In addition, it is enacted in the land use plan making it very strong in its reasoning. Disadvantages are that motorized traffic is also considered a good connection to transport and due to the limitations of density and minimum inhabitants, such areas cannot be defined in all – especially in smaller – municipalities. Therefore, this criterion is suitable with reservations.

5. Recommendations for Lower Austria

Based on the evaluation, the recommendation for Lower Austria is to use the “ÖV-Güteklassen” as main criterion for spatial differentiation within parking regulations by the municipalities. Higher grade of quality of public transport results in less parking spaces that must be constructed. In order to support a good differentiation level, areas of higher quality should not be merged into one. Areas of lower quality can be aggregated (e.g. quality grade C or D and lower). The “Zentrumszonen” should be used as an additional criterion and trigger a further reduction (= bonus). It is called a bonus because the ultimate motivation is a reduction of parking spaces. The amount of further reduction can be quantified for different types of municipalities and can also vary. It would be hard to argue that a larger city has the same bonus as a peripheral village. In addition, also project-based adaptations can be considered by the authorities (e.g. car-free housing projects). This is an individual decision

⁶ What exactly a “good appearance” is, unfortunately is not defined.

⁷ See <https://www.raumordnung-noe.at/index.php?id=243>

by the administration by case. In that case, the developer needs to prove the reduced necessity of having a car.

Figure 2 demonstrates the possible implementation in Amstetten, Lower Austria. In this case, areas of all quality grades (A to G) will be used.⁸

For the construction of a new building on a plot that is in the area of quality grade A, the limit (minimum parking spaces) is set to the pre-defined value. In case it is also located within a central area (the hatched area in the figure identifies “Zentrumszone+A”), the amount will be reduced further thus resulting in the minimal possible parking space requirements for Amstetten. The actual values to be used need to be defined by the city planners and approved by the city council. For the determination of these values, planning objectives, future development (e.g. enhancing public transport) but also the political will needs to be considered. Some municipalities might want to take a very progressive approach while others might want a solution in smaller steps.

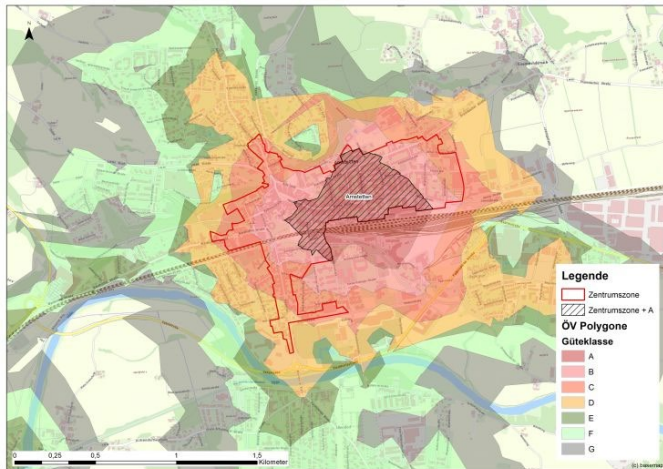


Figure 2: Example of implementing the recommendations in Amstetten, Lower Austria, Source: basemap.at, Land Niederösterreich, St. Pölten, own adaptation.

The definition of the actual minimum values is a difficult one. In general, the amount of parking spaces that need to be constructed is either calculated using the number of flats or the square meters (e.g. 1 per flat or 1 per 80 m² living area). This differs between federal provinces as well as between different usages of buildings. For residential areas in Lower Austria, the definition is based on parking spaces per flat; a minimum of one per flat has been defined on federal province level. In practice, the municipalities in Lower Austria have usually defined higher values.

⁸ Please note that in reality the polygons need to be adapted (manually), as there are some artefacts resulting from the automated generation.

In Switzerland a standard has been defined that provides basic limits according to a standard need (SN⁹ 640 281). This value is the basis for all following calculations to define the final values (minimum and maximum of parking spaces) as percentages of the initial value (VSS 2013). Depending on city type and size, the bandwidth of solutions is huge. In some areas with special characteristics, the minimum goes even down to zero – e.g. for historic parts in the city centre.

Based on this idea and considering the actual general definition in Lower Austria of one parking space per flat as well as the intention to reduce the requirements especially in dense core areas with a high grade of public transport, the following suggestions were stated.

Reducing the requirements in areas of excellent conditions (grade A) down to

- 0%, as taking a radical approach
- 20%–30%, for strong reduction
- 40%–50%, for reduction and
- 70%–80%, for restrained reduction

Of course, it is the result of a political will in the city (or municipal) councils.

6. Conclusion

The spatial differentiation by public transport quality classes (ÖV-Güteklassen) and central areas (Zentrumszonen) makes it possible to justify the adaptation of parking space requirements from a technical and planning point of view. The implementation on municipality level is independent from (but based on) specifications on the federal province level and can immediately be implemented. Supplementary (controlling) regulations at the province level (upper limits) contribute to the achievement of political objectives. Implementation requires political intention and will on all administrative levels. A significant reduction of minimum parking space requirements is desirable and overdue, especially in dense, mixed areas with public transport of high quality.

While the study was conducted in 2018 (finalized in October the same year), St. Pölten, one of the cities that commissioned the study, enacted a new parking regulation in April 2019. Based on the study, although adapted to local needs, a model with 4 zones was implemented (Weichhart 2019). Instead of former 1.5 parking spaces per flat, now only 1.0 is required in the core areas (zone A), thus reducing the requirements by thirty percent. For this effort, the city of St. Pölten was awarded the mobility prize of Lower Austria by VCÖ in the same year.¹⁰ In other cities that commissioned the study the political discussion is still ongoing.

⁹ SN stands for Swiss Norm.

¹⁰ See <https://www.vcoe.at/projekte/mobilitaetspreis/mobilitaetspreis-niederoesterreich>

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Mitigating Pluvial Flood Risks in Austria – the Contribution of Spatial Planning

Abstract

Pluvial floods arise from surface water runoff and/or saturated urban drainage systems, independent of an overflowing water body. They are triggered by locally limited rainfall with high intensity. Pluvial flood risks can be reduced by choosing an appropriate location of new buildings and applying comparably simple adaptation measures. Thus, spatial planning is likely to contribute to avoiding or reducing risks induced by pluvial floods. Due to their predominantly local character the focus is on spatial planning at municipal level.

Based on results of an interdisciplinary research project, this paper explores options and limitations of spatial planning in mitigating pluvial flood risks in an Austrian case study area. Research outcomes are derived from pluvial flood hazard modelling in the case study region, technical literature concerning flood mitigation and from two workshops conducted with relevant local and regional stakeholders. The project results reveal that spatial planning at local level can contribute to mitigating pluvial flood risks. A sustainable solution, however, requires a combination of local land use planning with various other approaches, including emergency measures, structural flood protection, green infrastructure as well as the implementation of runoff-reducing cultivation techniques in agriculture and forestry.

1. Introduction

Pluvial floods are triggered by rainfall with high intensity in small catchments. They are characterised by surface water runoff and/or saturated urban drainage systems, independent of an overflowing water body. Pluvial flood damage nowadays accounts for more than half of all flood damage in Austria (BMNT 2019).

Compared to river floods pluvial flood events have the following significant characteristics:

- Pluvial floods are ubiquitous events. Predicting potential hazard areas of pluvial floods is difficult as there are no easily defined flood plains like there are for rivers. But typically, places most at risk are those having run-off from surrounding areas into a central low-lying area (Zurich Insurance Group s.a.).
- Localisation and assessment of pluvial flood hazards is challenging. In Austria information about pluvial flood hazards is usually provided in the form of hazard susceptibility maps (BMNT 2019). Hazard susceptibility maps comprise information on the spatial extent of a hazard and thus serve to identify potential hazard areas. In contrast to hazard

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maps or defined hazard zones, hazard susceptibility maps do not include information on the probability of occurrence and the intensity of a hazard (Rudolf-Miklau 2012).

- In case of pluvial floods lead times are short. Those events occur quickly leaving limited time for immediate response (Rözer et al. 2016). Thus, it is all the more important to obtain reliable information about the most vulnerable zones, in particular critical infrastructure.
- Small-scale structures such as garden walls, non-working inlet grates or drainage ditches as well as the sewer system significantly affect surface water runoff and thus the outcome of a pluvial flood event (BMNT 2019).
- In Austria, specified protection goals¹ for pluvial floods are missing. Related to river floods, protection goals are based on benchmark events (e.g. the 100-year flood) providing a valuable input for risk evaluation in spatial planning. Due to hardly predictable catchment extents and variable land uses it is questionable whether specified protection goals for pluvial flood events are meaningful at all. The absence of those goals results in a more complex (compared to river floods), often multi-level risk evaluation in spatial planning.

Rainfall, terrain, land use in the catchment (in particular agriculture and forestry), urban drainage, building density and the degree of soil sealing have considerable influence on surface water runoff and on potential damage caused by pluvial floods. Spatial planning sets a framework for urban development and thus affects building density and soil sealing. The most important function of spatial planning in flood risk management lies within prevention. On the one hand, spatial planning is operative by displaying flood hazards in spatial planning instruments (informative function) and on the other hand in reducing vulnerability by minimising hazard exposure. Reduction of hazard exposure is carried out by distributing land uses and demands for future land uses according to the suitability of locations. There are zoning restrictions for highly vulnerable land uses (e.g. building land, transport infrastructure) in hazard areas and in areas with protective functions (e.g. areas suitable for water storage). To sum it up, spatial planning aims at coordinating hazards and land use interests with legally-binding impacts for individual real estate owners (Seher and Löschner 2018).

Unlike river floods, spatial planning legislation in Austria currently does not provide explicit regulation on highly vulnerable land uses (e.g. buildings, infrastructure) in pluvial flood hazard areas. Against this background and regarding the aforementioned characteristics of pluvial floods, this paper explores options and limitations of spatial planning in mitigating pluvial flood risks.

¹ Related to risks originating from natural hazards, protection goals separate acceptable from unacceptable risks (Hess 2011).

2. Materials and methods

This paper is based on the results of an interdisciplinary research project on integrative pluvial flood risk management the author was part of. The project was carried out in the Pielach catchment in the Alpine foothills in Lower Austria, funded by the Pielach Water Board (an association of municipalities in the catchment) and the Provincial Government of Lower Austria. The project team's area of expertise covered the various influencing factors of pluvial floods, i.e. hydrology and water engineering, urban drainage, green infrastructure, agronomy as well as spatial planning. The Pielach project aimed at

- assessing pluvial flood hazards for the whole Pielach catchment;
- developing mitigation measures for settlement areas in cooperation with local and regional stakeholders to increase resilience to pluvial flood risks;
- analysing the impacts of selected measures in two locally confined “hot spot” areas (Ertl et al. 2019).

The case study area accounts for approximately 410 km² with 19 rural municipalities sharing the catchment. The upper catchment part is characterised by steeper slopes with forestry and grassland as the major land uses. The lower part of the catchment part is a hilly area with crop farming being the predominant land use (Ertl et al. 2019).

As an initial step pluvial flood modelling (hydrodynamic 2D-surface-runoff-modelling) was carried out in 22 selected sub-catchments ranging from 13 km² to 27 km². The selection of the sub-catchments followed topographic criteria. Flood modelling was based on the precipitation scenario of a 100-year rain, a digital terrain model (1 m resolution) and land use information derived from cadastral data, an agricultural land information system and local land use plans (Ertl et al. 2019). Due to calculation capacities pluvial flood modelling in the 22 sub-catchments did not consider small-scale building structures (e.g. garden walls, culverts) and the drainage network. Those structures were integrated in detailed flood modelling in the two “hot spot” areas (Ertl et al. 2019).

Pluvial flood modelling in the 22 sub-catchments resulted in scenario²-based hazard maps including hazard information in the form of hazard areas, water depths (by categories), flow directions and flow velocities (by categories) as well as complementary information such as zoning and future development areas, current land use and aerial photographs. These pluvial flood hazard maps are provided to the municipalities as interactive maps allowing to select various combinations of content (Fig. 1).

Using these hazard maps allows to identify areas at risk of pluvial flooding and thus to select sites with priority need for action, both in an anticipatory way and in an emergency case. They can serve as a decision basis for local land use planning (sections 3 and 4) and provide information for developing other mitigation measures and for further investigations in the catchment area (e.g. impacts of changing farming practices).

² In this context, scenario is related to the selected flooding scenario described in the previous paragraph.

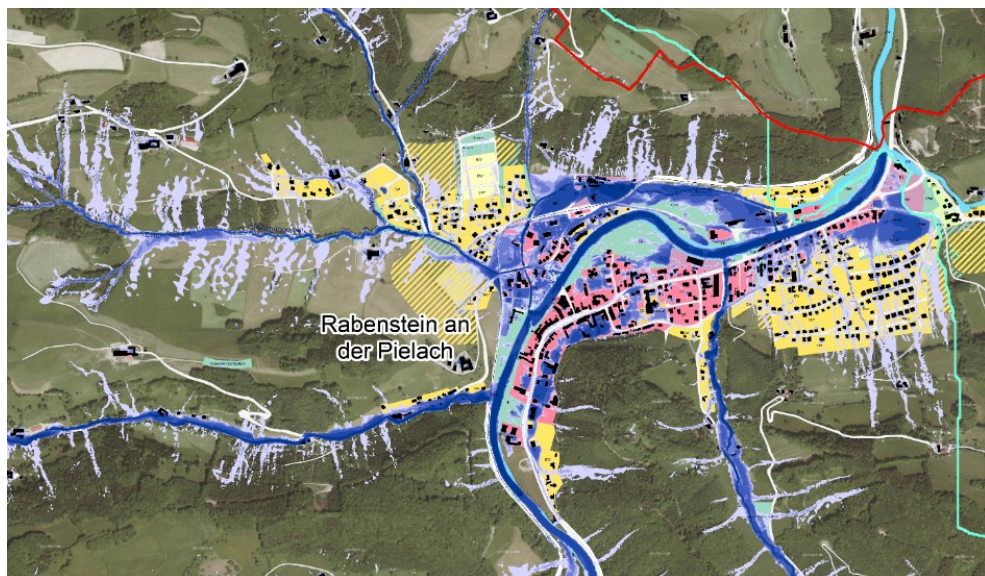


Figure 1: Pluvial flood hazard map displaying pluvial flood hazard areas, water depths and zoning information (Source: Ertl et al. 2019).

Within the project we used the scenario-based hazard maps as an input for two stakeholder workshops, one for the municipalities in the upper part and one for those in the lower part of the Pielach catchment. Based on experiences from flood-related research (Löschner et al. 2016) we organised these workshops in order to

- involve local and regional stakeholders with relevance for pluvial flood risk management;
- identify their interests;
- gather local expertise;
- jointly develop mitigation measures.

In total 60 participants with responsibilities and stakes in pluvial flood risk management attended the workshops representing municipalities, fire departments, provincial administration departments and the chamber of agriculture and forestry. Following a presentation of hazard modelling results, the participants had the opportunity to deal with the contents of the hazard maps displayed in the two respective venues. Afterwards, suitable adaptation measures were discussed in a “world-café” setting, organised in three different groups representing structural measures, spatial planning and mitigation measures in agriculture and forestry. In the spatial planning group stakeholder discussion focused on

- the way of informing citizens on pluvial flood hazards in the municipalities;
- proposals for suitable mitigation measures;
- challenges regarding the implementation of mitigation measures;
- allocation of responsibilities regarding pluvial flood risk management.

Findings from both stakeholder workshops and literature research were then incorporated into developing spatial planning options in pluvial flood risk management.

3. Results and discussion

3.1 Relevance of spatial planning in pluvial flood risk management

Pluvial flood risks can be reduced by choosing an appropriate location of new buildings and by comparably simple (building) adaption measures. Thus, spatial planning is likely to contribute to avoiding or reducing pluvial flood risks in case of new development or rebuilding existing properties (OEROK 2018). Due to the predominantly local character of pluvial flood events, the focus of mitigation measures is on local spatial planning, i.e. spatial planning at municipal level. In Austria, spatial planning instruments at local level comprise:

- the local development concept, a strategic planning instrument defining long-term land use objectives;
- the local land use plan, including parcel-specific legally-binding zoning regulations, an instrument mandatory for all Austrian municipalities;
- the local (building) development plan, implementing legally-binding building design regulations.

Information on pluvial flood hazards is usually provided in the form of hazard susceptibility maps (section 1). In general, those maps are based on a GIS-based terrain analysis and represent potential surface runoff paths in case of pluvial flood events. Some types of hazard maps also provide information on the size of the respective catchment, which allows a rough hazard classification at the intersection of flow paths with (potential) settlement areas. Hazard susceptibility maps provide easily accessible information on pluvial flood hazards and thus contribute to raising awareness for corresponding risks (OEROK 2018).

With the results of pluvial flood modelling, more detailed hazard information is now available for the Pielachtal municipalities, which includes water depths, flow velocities and flooding areas in addition to the representation of the flow paths. The upcoming sections discuss how this refinement of hazard information affects regular municipal spatial planning tasks and whether viable planning options can be derived.

3.2 Zoning of new building land

Keeping hazard areas free of buildings and infrastructure has great potential in minimising (pluvial) flood risks. Decisions on zoning building land can be taken either at strategic level in the local development concept or at operative and thus legally-binding level in the local land use plan (Seher 2011).

The *local development concept* allows to identify suitable building land (in the sense of avoiding endangered areas) as well as potentially endangered areas at a strategic planning level without taking legally-binding land use decisions. Taking pluvial flood hazards into account,

different development options can be compared and evaluated. If, for specific reasons, building land development in areas with lower flood hazard is prospectively being considered, stakeholder workshop results suggest to prepare a local development plan for these areas, including adaptation measures, such as flood proofing of buildings or clearing flow paths for surface water runoff (section 3.3). For those kind of strategic planning decisions, the scenario-based hazard maps are considered an adequate planning basis.

For legally-binding zoning decisions in *local land use plans*, however, spatial planning stakeholders do not consider the pluvial flood hazards maps sufficient. Their main concern is modelling accuracy as flood modelling implemented does not take small-scale building structures (e.g. garden walls) into account which can, however, make a decisive difference in pluvial flood hazard regarding a single parcel. In order to assess the suitability of potential building land in terms of pluvial flood hazards, an additional expert judgement is required based on more-detailed flood modelling. Zoning is then made dependent on structural measures or adjustments to the building, for example by a contractual obligation.

3.3 Structural and building adaptation measures in local development planning

Options for a detailed determination of structural and adaptation measures to mitigate (pluvial) flood hazards are offered by local development planning. Targeted protection measures in local development plans can contribute to a reduction of building-related flood damage (Seher 2011). In this order structural and adaptation measures in local development planning pursue the following objectives (LUBW 2016):

- to keep surface water away from buildings;
- to prevent water from entering buildings and
- to keep damage caused by water ingress as low as possible.

According to spatial planning stakeholders participating in the workshops, pluvial flood hazard maps available for the Pielach municipalities can form the basis to select areas for which a local development plan should be prepared. As mentioned in the previous section, it is useful to define those areas in a local development concept.

Protective measures that can be regulated in a local development plan include i.a. (Ertl et al. 2019):

- preservation of flow paths for a coordinated surface water runoff in the urban fabric, like providing roads as emergency drainage routes;
- provision of adequate drainage and run-off areas, like drainage ditches along roads;
- design of garden walls as barriers for surface water runoff;
- identification of landscaping opportunities to define open spaces as infiltration areas, so-called “green and blue spaces”, being set aside to store water or convey pluvial flood water to the urban drainage system;

- definition of minimum terrain levels to be realised in zoned building land;
- arrangement and design of cellar windows and light shafts.

Compared to flood adaptation by individual regulations (e.g. by plot-related building permits), local development planning provides two advantages (Seher and Stöglehner 2019): First, different individual projects of regulating surface water runoff and flood proofing can be coordinated within one concept. Coordination is crucial because civil law provisions stipulate that individual flood adaptation measures, e.g. by raising garden walls, must not result in an active drainage of surface water to other properties. Second, local development planning allows to involve both developers and individual builders at an early planning stage. In the planning process, it is possible to inform developers and individual builders about existing pluvial flood hazards and related protection and adaptation measures. In this way risk awareness can be increased.

3.4 Dealing with existing building land at risk

Compared to river floods, the existing urban fabric is more affected by pluvial floods (Houston et al. 2011; Zahnt et al. 2017), a finding confirmed by the results of the Pielach project (Ertl et al. 2019). This raises the question of how to deal with building gaps in potential hazard areas, i.e. with land that has already been zoned as building land but has not been used so far (Fig. 2).



Figure 2: Housing area with building gaps (highlighted in red) at risk of pluvial flooding (Source: Ertl et al. 2019).

In general, undeveloped building land in flood hazard areas is regarded as unsuitable for development (Kanonier 2005; Seher 2011). However, specific protection goals for pluvial flood events are missing (section 1). Zoning decisions then are up to the spatial planning authority in charge, i.e. the municipality. Considering different planning options, stakeholder workshop results provide good arguments, for both, leaving building gaps undeveloped and use them as flow paths during heavy rainfall events on the one hand, and for densification on the other hand.

In case building gaps are to be kept open to provide for flow paths, jurisdiction in Austria requests that public interest regarding this location must be proved by the local planning authority – preferably by expert judgement based on detailed pluvial flood modelling. Like for (legally-binding) zoning of new building land (section 3.2), spatial planning stakeholders consider pluvial flood hazard maps developed in the Pielach project too imprecise for rezoning decisions because of considerable interference with individual property rights.

In the stakeholder workshops, participants also emphasized the public interest in closing existing building gaps in order to avoid development on agricultural land outside the urban fabric. Thus, under certain conditions, it seems appropriate to realise structural protection measures and develop those building gaps, also with regard to regaining infrastructure costs already spent by the municipality. Claims for densification would request filling the building gaps. This approach, however, leads to an increase in residual risk as structural flood protection is able to reduce hazards only up to a defined design event (Barredo 2009; Nachtnebel and Apperl 2015).

4. Conclusion

The relevance of pluvial flood risks and respective risk management is expected to rise due to a combination of climate change impacts and ongoing urbanization. Results of climate modelling suggest that heavy rainfall will increase in the decades to come, both in frequency and intensity (Formayer and Kromp-Kolb 2009; Houston et al. 2011; Lehman et al. 2015). At the same time, urbanised areas expand and partly become denser, resulting in an increase in areas potentially at risk to pluvial flooding (Kaspersen et al. 2017; Zahnt et al. 2017). This risk can be mitigated by spatial planning, particularly regarding developing new properties or refurbishing old ones. Spatial planning approaches in pluvial flood risk management resemble those for river floods when it comes to restricting development in hazard areas or providing for flood-adapted land uses. Research results presented in this paper suggest, however, that applying approved planning accesses in pluvial flood risk management faces two-fold limitations: first, regarding hazard information and protection goals and second, concerning the influence on the existing building stock.

Pluvial flood hazard information and the lack of specified protection goals for pluvial flood risk management affect the procedure of taking related spatial planning decisions. For river floods, benchmark hazards (e.g. a 100-year flood event) defined in spatial planning laws allow for straight forward decision making in local land use planning when it comes to

evaluating the suitability of a location for zoning building land. This is different with pluvial floods, where due to various and changeable input parameters, flood modelling is subject to higher uncertainties. This raises the question whether benchmark hazards as consensual protection goals for pluvial floods can be determined at all. Legally-binding zoning decisions then require additional expert statements. As an alternative, strategic planning can be an applicable option in (pluvial) flood risk management (Hutter 2007). This approach defines a strategic goal (e.g. reduction of pluvial flood risks); it applies communicative planning and involves planning methods such as land use and development scenarios³, participation in “risk dialogues” (Löschner et al. 2016), value-based negotiation processes or strategic environmental assessment to take related land use decisions.

Compared to river floods, the exposure of existing buildings to pluvial flood hazards is significantly higher. Thus, the relevance of the existing building stock for managing pluvial flood hazards outweighs new development by far (Ertl et al. 2019; Zahnt et al. 2017). Spatial planning options, however, are very limited with already existing buildings increasing the relevance of flood insurance, awareness raising and incentives for voluntary individual flood adaptation. In Austria, organisations responsible for flood hazard mitigation provide respective guidelines for individual builders and homeowners (OEWAV 2013; BMNT 2019). Spatial planning stakeholders are able to support individual flood adaptation by communicative and persuasive planning approaches.

Pluvial flood risk management comprises various measures. Lower influence of spatial planning on the existing building stock brings to mind that spatial planning authorities are not the only stakeholders there. Due to its interdisciplinary character, the Pielach project provides further mitigation measures, such as emergency measures, structural measures, “green and blue infrastructure” as well as runoff-reducing cultivation techniques in agriculture and forestry, concluding with the recommendation to combine those measures according to site-specific requirements and related options (Ertl et al. 2019).

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Urban Agriculture for Sustainable Cities – Case Studies at Two University Campuses

Abstract

Since the second half of the 20th century, the world has encountered many global problems caused by human beings. One of them is the global change as regards the environment. The environment has clearly always been under attack by humanity, especially in cities. Urban agriculture is an important and effective solution to these environmental problems in cities in the context of sustainable urbanization.

Many forms of urban agriculture have existed for thousands of years. For city dwellers growing food in backyards or even on window sills, this is essentially, farming in the city. As current farming practices are proving to be unsustainable in the long-term, urban agriculture is seen by many as being a critical shift required to ensure a level of food security in the near and distant future.

In this paper, the possibilities of urban agriculture are evaluated and documented by two case studies. One was carried out at McGill University in Montreal. The post-graduate students of the School of Architecture studied the concept of urban agriculture and applied the learnings in campus area. The other case is from Hacettepe University in Ankara. Like at McGill University, the post-graduate student group applied campus agriculture in existing unused spaces around the Faculty of Fine Art.

Keywords: Urban Agriculture, Campus Agriculture, Sustainability, McGill, Hacettepe.

1. Introduction

With the Industrial Revolution of the 19th century, cities began to grow rapidly. The urbanization process, which started with the Industrial Revolution and brought people to the city centres where factories are located for a better life, has been the starting point of ecological problems. Rapid growth of cities has resulted in increased use of motorized vehicles, population density, noise, deterioration of environmental quality, declining life quality and social decomposition. This concept of economic development, which ignores nature and uses natural resources spontaneously as if it will never end, has made our earth unsustainable (Keskin 2012).

With the impact of globalization, it has been found that there are the same kinds of problems throughout the world, and urban-based solutions for the future of mankind have begun to be searched. In this context, it can be said that the recognition of the negative developments

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that threaten human life created the concept of *sustainability*. At the end of the 20th century, the human conscience created the approach of “*sustainable urbanization for a sustainable world*” that cares about the needs of future generations, recognizes the right to life of the other species in the nature and emphasizes that man is not a master of nature but a part of it (Keskin 2012).

This study questions the applicability of urban agriculture in today’s megacities and the opportunities of Urban Agriculture in daily life in the current urban order, in line with the goals of sustainable urbanization. The aim of the study is to scrutinize the urban agriculture as the alternative solution to the challenges of meeting the cities’ need for green areas as well as the next generations’ need for food. In this study, the applicability, the different application methods, the results and the sustainability of urban agriculture were investigated through examples applied in different geographies. The examples presented prioritized preferred, as they are unique studies that the authors personally observed and where the authors participated in all the implementation processes. With these examples which include applications made in Campus Areas of different regions and of different climatic conditions, the applicability of urban agriculture in workplaces or schools has been tried to be set forth apart from the residential gardens.

2. Urban sustainability

Sustainability and sustainable development are about the concerns of future generations in social, economic, political, and environmental practices, and they are related with the conditions to be better for the future generations in the application of these practices (Perkins et al. 1999). As it is defined before, in Unesco-Most 1996, sustainability is “long-term provision of social relations between society and nature” (Çahantimur and Turgut Yıldız 2008). In this context, three dimensions of sustainability can be identified for the sustainable development. Ecological sustainability, sociocultural sustainability and economic sustainability. Their focal point is the «quality of life» and the common goal of all is «raising the quality of life». The quality of life in Megacities, which nowadays host the greatest population, has to be promoted.

In the developing world, every month 5 million people migrate to cities from rural areas. In 2010, the world’s urban population for the first time exceeded the rural population. By 2050, this urban population is estimated to 6.7 billion people, or two-thirds of the world’s population (UN 2019). The rapid growth of cities in the developing countries and the increase in migration from rural to urban has led to a high increase in the number of megacities. In 1990, the number of mega-cities with a population of 10 million was about 10. In 2014, there are 28 mega-cities with a total population of 453 million people (UNDP Turkey).

The aim of raising the quality of life in the cities has brought to the point that all systems that provide the livability of the cities should be considered in terms of quality of life. This situation has shown that *sustainable development policies* must coincide with *urbanization*

(Çahantimur and Turgut Yıldız 2008). Thus, the concepts of “*sustainable city* and *sustainable urbanization*” have come to the agenda. Sustainable city responds better to human needs than today’s cities and sustainable city allows urban systems to be developed in a way that will not hinder the needs of future generations and it is also where socio-economic interests are harmonized with concerns about the environment and energy in order to ensure continuous change (Tosun Karakurt 2013). Likewise, cities aiming sustainable urbanization are settlements where the environment is polluted at the least level, where resources are used efficiently and productively, where the field is used vertically not horizontally, where urban mobility is minimized, and where spatial designs which have habitable quality are created in human scale (Tosun Karakurt 2013).

Sustainable urbanization only can be achieved through effective land use planning (Gönenç 2015). Land Use Planning is particularly important to achieve sustainable urbanization goals. Especially with regards to “green spaces”, “green buildings” and “green production from regional resources”, urban agriculture emerges as an effective method in the context of land use planning for urban sustainability. Besides, due to the rapid depletion of natural resources, threatening future generations’s food security, the concept of ‘*urban agriculture*’ comes into term.

3. Urban agriculture in the context of urban sustainability

Urban Agriculture is basically to cultivate and distribute food products that will partly provide the city’s needs by using the city’s social and economic resources. In detail, urban agriculture can be defined as the growing of plants and the raising of animals for food and other uses within and around cities and towns, and related activities such as the production and delivery of inputs, processing and marketing of products (FAO 2007). In addition, many definitions for Urban Agriculture exist. The UNDP¹ (1996) defined it as: “Growth of food and nonfood plant and tree crops and the raising of livestock (cattle, fowl, fish and so forth), both within (intra-) and on the fringe of (peri-)urban areas.” According to Sachs (1991), Urban Agriculture is food production inside the city and on its outskirts. It is conditioned by the availability of private and public land, which can be converted on a permanent or on a temporary basis into small individual kitchen gardens, or into larger collective vegetable gardens in schools and factories. Urban Agriculture contribute essentially for the self-consumption of the gardeners and their families.

In many societies in Asia and Europe urban agriculture has a long history. Because of the weakness of communication between cities and the difficulty of transportation in the past, the inhabitants of cities had to grow their own food. Intensive horticulture, dairy and hog farms have been an intrinsic part of cities and played a vital role in their functioning since the formation of urban settlements in Asia, Europe, the Middle East and Latin America. After the Industrial Revolution, the industrialized “north” has largely separated food production and urban settlements. In the “south”, there has been less separation. In China and

¹ United Nations Development Programme, United States.

other Asian countries, vegetable as well as small animal and fish production continues to flourish in urban regions. On a global scale, the food production function was reduced in numerous towns and cities.

However, nowadays, there is rising evidence that many cities are actively engaged in urban agriculture. The degree and intensity of urban agriculture varies considerably from one country to another and; it can be related to geographical location, to the level of economic development, to traditions of agriculture, to governmental policies and to many other factors. Urban agriculture, which is, broadly defended as cultivation of plants, medicinal and aromatic herbs, fruit trees and the raising of animals to support household economy, is widespread in rapidly growing cities of the Third World, where large masses of poor populations with limited resources have to be housed and fed. These low-income communities continue to do urban agriculture to meet their nutritional needs. Though, the middle and upper income group people are dealing with urban agriculture for the reasons of healthy nutrition, obtaining fresh product and having a pleasing activity (Nugent 1997). It is argued that the poor, the unemployed or the under-employed can be gainfully engaged in urban agricultural activities. It is also proposed that Western cities can be made more ecological – greened – if they become centres of food production, especially if the under-used grey and brown areas are employed for growing food (Bhatt and Kongshaug, 2005).

Urban agriculture not only nurtures cities but also aims to increase the quality of life by providing continuity of the urban system. However, it is not limited to this. Apart from food production, the concept of “agriculture” also includes other tasks, such as generating income from plant and animal sources, fuel production and feed production for animals. So, Urban Agriculture is seen as a solution for the negative effects of growing cities, such as rapid depletion of agricultural lands stem, the loss of natural resources, environmental pollutions in cities, soil erosion, the decrease of soil fertility, the decrease in income levels, living health problems caused by nutrients, ongoing famine disaster. It supports economy and, protects environment, like air, soil. Urban Agriculture upgrades society and socialization, it is good for human and health and it provides food and nutrition. In addition, it is a solution for waste. Urban Agriculture can use and transform urban wastes (organic and domestic wastes) as a main resource (*as fertilizer in the production process*) in cities that are drowning in their own waste and pollution. The preindustrial cities were to a substantial degree an ecologically closed loop system like this. The liquid and solid wastes of the city were returned to the land and served as the prime source of soil building and enrichment for the production of perishable food for the city (Yılmaz 2012).

Besides all these positive effects, Urban Agriculture creates habitat for wildlife, provides conservation and enhancement of biodiversity, creates microclimate, reduces heat island effect, boosts the humidity, increases air quality, provides recovery of urban solid and liquid waste, reduces ecological-carbon footprint, reduces noise and dust, reduces vulnerability to natural disasters, has positive impact on human health, provides healthy and adequate nutrition possibilities and food security, improves urban landscape, protects from sun and rain, allows assessment of idle spaces and roofs, offers recreation opportunities, creates

physical exercise areas, supports social integration and rehabilitation possibilities (Duysak and Arslan 2014; Aşiloğlu and Çay 2015). For these reasons, Urban Agriculture has been put forward as a possible solution for urban problems and has been included in the Sustainable Development Movements in the Brundtland Commission Report (WCED 1987: 211–212).

Urban Agriculture can be subdivided in peri-urban and intra-urban agriculture. Peri-urban agriculture is located in larger areas in the urban periphery. It is characterized by larger scale intensive production and a tendency to more capital intensity. It is heavily reliant on machinery, energy and chemical inputs. Use of technology is high and peri-urban agriculture is strongly market-oriented. It also has socio-economic impacts both on urban and rural lifestyles. Intra-urban agriculture is located in the inner city, mainly on vacant and under-utilized land areas, like areas not suited for building (along streams, close to airports ...), public or private lands temporarily not being used for construction purposes (lands waiting for construction); community lands, public spaces and parks; household areas (home gardens); steep slopes, road sides, areas over the buildings (roof top gardening) and some indoor spaces (cellar, barn); also institutional gardens (school, hospital, factory etc.). Intra-urban agriculture is characterized mostly by small-scale production with a preference to a more subsistence-oriented production.

4. Case studies of urban agriculture

Today, rapid urbanization affects Urban Agriculture and, accordingly, the lifestyle and diet of people. Usually, small family-farms in peri-urban are non-competitive to today's mega-size industrial farms and may disappear due to urban sprawl. Their disappearance changes both the physical and social qualities of the countryside. It also affects the quality and the selection of food for the urban dweller, possibly making locally produced vegetables hard to get. For this reason, food has to be imported. Food imported and transported over long distances is energy-intensive, carries extra costs, may be fumigated or cold pasteurized if the produce crosses borders, and/or contains traces of pesticides and chemical fertilizers (Bhatt and Kongshaug 2005).

Because of these reasons, without making discrimination peri-urban or intra-urban, the Urban Agriculture has to be supported. Initiatives, like hobby gardens or roof gardens, vertical gardens, balcony greenhouses individually support intra-urban areas. Community Supported Agriculture (CSA) is a collective effort. It is an alternative with the main objective to resolve some of the problems associated with industrial agriculture. CSA is a peri-urban partnership between farms and city dwellers, where each participant "sharer" buys a share in a local farm's production, hence supporting local, family-based farming practices, and securing a share of organic, locally-grown produce to the participants (Bhatt and Kongshaug 2005). Growing food and animal husbandry has sometimes been discouraged or even banned from the city, deemed unsanitary or as impeding urban economic development. Despite this challenge, people naturally cultivate in times of crises, or for pleasure. The areas farmed are sometimes very small. Farmers make innovative uses of the under-utilized lands, such as the side of railways, access streets, abandoned lots, balconies, etc.

In the 1970's, researchers started looking at this activity in the cities of the North as well as the South. In this regard, the Minimum Cost Housing Group at McGill University School of Architecture has been a pioneer in this field. As a similar example, Güneşköy Cooperative supported by Middle East Technical University, has been a pioneer in Turkey. Today, initiatives are launched also in other universities, like Hacettepe University Faculty of Fine Arts.

In this study, two campus agriculture cases have been examined in context to urban agriculture opportunities in intra-urban areas. One of them is the Canadian, McGill University School of Architecture and the other one is the Turkish, Hacettepe University Faculty of Fine Arts. These cases were selected, as the authors participated in all the implementation processes and were they personally monitored the studies.

4.1 Campus agriculture at McGill University

The Minimum Cost Housing Group at McGill University investigated Montreal for growing food in the city. In the early 1970's, the group was involved in the "Rooftop Wasteland Project" which is popularly known as "the students' ghetto area". The group realized that even in the midst of dense cities there are hundreds of acres of undeveloped space, namely unused rooftops. They developed a 1000 square meter rooftop community garden and highlighted the potential of rooftops as a living classrooms for horticultural activities and courses for the community. They found that related opportunity costs to growing on the roof were high, especially making existing rooftops accessible, secure and usable without damaging the existing structure. In 2002, Minimum Cost Housing Program investigated urban agriculture in Montreal. They found that traditional backyard gardens – as well as the front yard ones – were kept and well maintained by residents. In addition to private gardens, the City of Montreal has a well-developed network of municipal community gardens. It is one of the largest community gardening programs in a North American city, serving close to 7000 urban farmers. The community gardens, established and run by the City of Montreal, can be found in most neighbourhoods (Figure 1). Often located in high-density boroughs on vacant municipal land, these allotments have been given to city dwellers, most living in apartments or multiplexes and without access to a garden.



Figure 1: Community Gardening, Montreal, Canada (Yılmaz 2006).

After searching for Urban Agriculture both in Canada and in other countries, Minimum Cost Housing Group has started to look for the possibility of UA in the McGill Campus. In the MacDonald Campus of McGill which is a bit outside from city of Montreal they found a field for growing only pumpkins (Figure 2).



Figure 2: Pumpkin Field in MacDonald Campus of McGill University (Yilmaz 2006).

In 2008, the downtown Campus of McGill University joined together with the Minimum Cost Housing students an urban agriculture project led by Prof Dr Vikram Bhatt. They used waste plastic bans to grow foods. There were two bans, one inside the other one, in order to apply rare irrigation. They cultivated beans, tomatoes, eggplants and some other vegetables (Figure 3).



Figure 3: UA in Downtown Campus of McGill University (Yilmaz 2008).

In the scope of Ecocity World Summit (2008), the partitioners studied the concept of urban agriculture in a workshop in McGill campus area. They designed a system consisting of two buckets, one into the other one. They used waste pickle buckets for sowing and waste water pipes for irrigation. One of the buckets was drilled to the required extent for the water pipe

and for the perforated reservoir. They provided waterlogging with the perforated reservoir, which they placed between the areas of the two buckets by fixing it to one of the buckets. In the bucket that is filled with soil and sowed plant, the required water can be supplied with the help of a waste water pipe. With the study, the campus area has become a small farming area (Figure 4).



Figure 4: Two interpenetrated buckets with a pipe for irrigation and a perforated base (Yılmaz 2008).

In addition to the method of planting in the buckets, other farming methods such as direct soil cultivation and greenhouse methods have been applied at campus agriculture with the result that, besides producing fresh fruits and vegetables at a lower costs, McGill University has provided a greenery campus.

4.2 Campus agriculture at Hacettepe University

Considering the global environmental problems, the topic of “Sustainability and Sustainable Cities” is handled for the last few years in the course of “Sustainable city and space design principles”, which is in the curriculum of Master’s Program of the Department of Interior Architecture and Environmental Design in Hacettepe University, Turkey. The aim of the course is, to provide an understanding of the concept of sustainability and to raise consciousness about sustainable city and sustainable urbanization. Another goal is to raise awareness among students as a designer and, more importantly, as an individual, about the importance and effectiveness of environmental and sustainability issues.

In the fall semester of 2017–2018, the students investigated opportunities of urban agriculture in the context of urban sustainability by conducting agricultural practices by themselves at the campus area.

At first, lecture researches to urban agriculture have been carried out and a campus visit was made to find a suitable place for the application. Like at McGill University, the post-graduate student group exercised campus agriculture in unused spaces around the Faculty of Fine Art. The students investigated the Ankara climate data and decided about the products they could produce in these conditions. Three different approaches for campus agriculture were

applied. The first method was Vertical Gardening. Students used waste plastic bottles for planting and waste wooden transport pallet for the vertical structure. The second method was cultivating in plastic crates and the third one was direct soil cultivation (Figure 5). All applications were irrigated manually.



Figure 5: Agriculture Applications in Hacettepe University Beytepe Campus (Yılmaz 2017).

In the practice of vertical gardening, a hole was drilled under each plastic bottle to place a bottle on top of the other. The plastic bottles were stacked in a vertical structure. Some soil and seed were placed in each plastic bottle. Through the holes in the lid, the water in the top pet bottle drops down to the bottle below by dripping and even sweating. It was observed that the garden rocket seeds germinated in the bottles in a short time with this method (Figure 6).



Figure 6: Vertical Gardening (Yılmaz 2017).

For second method, waste plastic crates were used and the holes on the crates were covered by plastic bags. Various vegetables such as parsley and mint were produced using this method (Figure 7).



Figure 7: Vegetables in waste crates (Yılmaz 2017).

Finally, an unused soil area behind the faculty building was used. The area was partitioned by waste wood planks and bricks according to the production type to be cultivated. Various vegetables such as onion, scallion and tomato were produced using this method.

These urban agriculture practices at the Hacettepe University campus provided a greener environment, as well as growing fresh fruits and vegetables at least for the Faculty of Fine Arts (Figure 8).



Figure 8: Growing Food in Small Lots (Yılmaz 2017).

5. Findings of the case studies

Following findings of the two case studies can be listed:

- Grow healthy food with the techniques that is compatible with the nature;
- Besides the ecological philosophy, students learned and experienced ecological agricultural techniques.
- The sharing of the agricultural products was exercised among the participating students and lecturers and awareness about consumption was raised.
- Every step of the production and consumption loop was observed and recorded.
- Results were discussed and the gained experience was shared.
- The ecological agriculture applications have been a training area for the producers, consumers and the university managers.
- The risks that occurred during the production have been determined.
- The capacity of produced foods and the consuming period were analysed and the relationships between the producer and the consumer were investigated.

6. Summary and conclusion

Cities have always been an expression of the triumph of humans over nature, of the felt need for liberation from the tight bonds, and of the commitments to nature and the environment. The desire for independence and freedom from commitment and personal responsibility for nature and the environment materializes in modern construction and urban planning. This attitude created environmental crisis in the World. The role of ecological urban restructuring in solving the environmental crisis is based on the fact that cities represent the most materialized form of a society's interaction with the natural environment. In contradiction, the population of cities increase continuously. People prefer to live in cities.

Healthy and qualified nutrition of people in cities is one of the major challenges. To live in a city and to consume safe and healthy vegetables and fruits promotes the quality of life. In markets or bazaars, people in cities come across with mass produced vegetables and fruits some chemicals used to grow them. Because of this, many people suffer from some diseases.

Urban agriculture gains importance at this point and meet the challenges of the growing cities'. Urban agriculture within the cities, in the gardens of houses or vacant places or in the outskirts of the cities, provides healthy nutrition to the citizens besides the environmental benefits. The economic contribution of urban agriculture, the actual food production from the urban areas, and most importantly, how growing can be integrated in housing and urban design at a fine grain level has rarely been considered by designers. Whereas, by covering unused surfaces such as courtyards, roofs and facades with vegetation, the ecologically active, 'green' surfaces in cities can be increased 10 times. Local temperatures in built-up areas could be significantly lowered, and the oxygen and humidity content of the air be increased. Noise emissions could partly be absorbed by soft, porous facades and greened roofs. The urban population could even become partly self-sufficient with herbs, lettuce and vegetables from rooftop greenhouses.

Two case studies presented in this article, gave evidence about existing vacant campus areas becoming green and producing food at the same time. In addition, students learned to use unutilized areas for agricultural activities and to use waste materials to provide equipment for the urban agriculture. They became aware about the importance of the chosen site for agricultural activities. These sites must be free of any contaminant activity nearby that could affect the safety of the foods. Students socialized through the collaboration in cultivation activities and they also learned about the necessity of relationship between rural and urban areas for a «sustainable future».

The Campuses Alumni experienced the ecological agricultural activities and are motivated for further applications. The consumption of the products has been shared between students, lecturers and the university management and a common bond has been installed for a common goal on producing healthy food.

Especially, the Corona Pandemic period has established a great demand on the application of urban agriculture even in small balconies of the residential buildings in cities. People preferred healthy and secure food for consuming and the most secure that they grow cultivate food by themselves.

So, an increase on the applications of urban agriculture has been observed during the pandemic period. Special attention has to be given to expand the sphere of smart city applications regarding climate change and urban agriculture.

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Compulsory Purchase of Land in the Context of the Concept of Sustainable Development

Can purchase of private real estate be a sustainable tool for the placement of transport infrastructure objects in Ukraine?

Abstract

Ukraine has joined the global sustainable development process. In order to establish a strategic framework for national development of Ukraine for the period up to 2030, the process of adaptation of 17 Sustainable Development Goals was launched. The targets of the 9th Goal “Innovation and Infrastructure” include the requirement to build sustainable infrastructure and to promote the sustainable development of industrialization and innovation.

This article aims to discover the contribution of compulsory purchase of land for the placement of transport infrastructure objects of Ukraine in the concept of sustainable development. It is likely that privately owned land needs to be used when investment projects in the transport sector are implemented. If this is the case, the mechanism of compulsory purchase of land plots of private property can be regarded as a tool for sustainable development. To find out if such a statement is justified it is necessary (i) to analyse the directions of the implementation of the concept of sustainable development in Ukraine and (ii) to have a closer look at the implementation of the reform of Ukraine’s transport infrastructure. A summarized concretization of the economic, ecological and social factors playing a role in the choice of infrastructure-placement allows to show the function of compulsory purchase in this context. Considering the circumstances in which expropriation can be demanded permits to conclude that compulsory purchase is also an essential tool to implement sustainable development in Ukraine.

1. Introduction

In September 2015, at the 70th session of the UN General Assembly in New York, the UN Summit on Sustainable Development and the Adoption of the Post-2015 Development Agenda approved new benchmarks for society. The outcome document of the Summit “Transforming our world: a 2030 agenda for sustainable development” approved 17 Sustainable Development Goals and 169 targets (The Global Goals 2015).

Goal 9 of Sustainable Development “Innovation and Infrastructure” envisages building sustainable infrastructure and promoting the sustainable development of industrialization and innovation, and includes the following main objectives:

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- to ensure the development of a sustainable infrastructure to promote economic development and the well-being of the population;
- to strengthen the ability of small-scale industrial and other businesses to access financial services, including affordable lending and integration into production networks and markets;
- to upgrade infrastructure and modify industries, ensuring their sustainable development, enhancing the efficient use of resources and environmentally friendly production technologies and processes;
- to intensify the implementation of research, modernize the technological capacity of the industrial sectors in all countries, including by promoting innovation and increasing the share of research and development workers by 1 million people, and by attracting private investment in research and development sphere;
- to promote the sustainable development of infrastructure in developing countries.

Ukraine, like other UN member states, has joined the global process of sustainable development. To establish the strategic framework for Ukraine's national development for the period up to 2030, an inclusive process of adapting the Sustainable Development Goals has been initiated on the basis of the principle "No one left behind" (Sustainable Development Goals: Ukraine 2017).

In order to verify in which direction the development of Ukraine moves it is necessary to identify what has been done to date on the path of introducing the Global Concept of Sustainable Development.

2. Ukraine in the concept of sustainable development

To achieve the Sustainable Development Goals, the Ukraine 2020 Sustainable Development Strategy has been developed. The aim of the Strategy is to introduce European standards of living in Ukraine. For this purpose, the following vectors will be advanced by the Sustainable Development Strategy "Ukraine 2020":

- Vector of development – ensuring sustainable development of the state, carrying out structural reforms and, as a consequence, raising living standards. To do this, it is necessary to restore macroeconomic stability, ensure sustainable economic growth in an environmentally sustainable way, and create favorable conditions for economic activity and a transparent tax system.
- Vector of security – ensuring the security of the state, business and citizens, protection of investments and private property.
- Vector of responsibility – ensuring that every citizen, regardless of race, color, political, religious and other beliefs, gender, ethnic and social background, property status, place of residence, linguistic or other characteristics, will have access to a high quality education, health care system and other services in the public and private sectors.

- Vector of pride – ensuring mutual respect and tolerance in society, pride in one's own state, its history, culture, science, sport (Sustainable Development Strategy “Ukraine 2020” 2015).

The Sustainable Development Goal 9 on Industry, Innovation and Infrastructure has been adapted for Ukraine in the National Report 2017 on Sustainable Development Goals (Ministry of Economic Development and Trade of Ukraine 2017) by declaring the following main objectives:

- to develop a quality, reliable, sustainable and affordable infrastructure based on the use of innovative technologies, including environmentally friendly modes of transport;
- to ensure the expansion of the use of electric transport and the relevant infrastructure network;
- to ensure the availability of road infrastructure based on the use of innovative technologies, in particular through the expansion of forms of government involvement in various infrastructure projects.

The Ukraine 2020 Sustainable Development Strategy envisages the implementation of 62 reforms and state development programs within the four movement vectors. Among them are those that meet the Sustainable Development Goal 9: tax reform; reform of transport infrastructure; participation program in trans-European networks; program of development of Ukrainian export; energy efficiency program; land reform; investment attraction program; public property management reform; judicial reform; the program of energy independence; environmental protection program; decentralization and public administration reform; health care reform.

3. Reform of Ukraine's transport infrastructure in the concept of sustainable development

The Cabinet of Ministers of Ukraine approved the National Transport Strategy of Ukraine for the period up to 2030 (National Transport Strategy 2018) in accordance with the mentioned reforms of the Sustainable Development Strategy “Ukraine 2020”, the context of the “vector of development” and the implementation of “reform of transport infrastructure”.

The objective of the Strategy is to create an integrated, securely functioning and efficient transport complex of Ukraine with the intention to meet the needs of the population in transportation and to improve the conditions of doing business in order to ensure the competitiveness and efficiency of the national economy. To achieve this goal, the Strategy should take into account global trends in the development of transport, namely the use of fuel, economic and environmentally friendly vehicles, the use of alternative fuels, “green” modes of transport, the priority of environmental protection and the conservation of valuable nature areas when developing transport infrastructure.

For implementation of the National Transport Strategy of Ukraine, the main tasks will be fulfilled (National Transport Strategy 2018): creation of a competitive and efficient

transport system; innovative development of the transport industry and global investment projects; introduction of safe, environmentally friendly and energy efficient transport; ensuring seamless mobility and interregional integration.

Among the main problems that need to be resolved for the implementation of Ukraine's transport strategy are the following: the incompleteness of administrative reform, including the process of delimitation of functions of state regulation and control, including the formation of relevant state bodies of management, operations and functions of economic activity of transport enterprises, and also the lack of competition in the market for transport services and the lack of compliance with European requirements for access to the transport market services.

Among the main tasks that need to be addressed in the implementation of the National Transport Strategy are the following:

- making use of the best world experience to ensure the development of the transport industry, improve the quality and reliability of the provision of transport and logistics services, taking into account the foreign economic and regional relations of Ukraine and on the basis of a comprehensive systematic approach to coordinate the work of all modes of transport and the national transport model;
- ensuring the development of transport infrastructure in accordance with EU standards, in particular improving the functioning of border crossings;
- improving the efficiency of internal freight transport logistics by removing existing obstacles and improving the relevant infrastructure, as well as its interconnection with the international and trans-European transport network (TEN-T).

Today, the transport industry as a whole meets only the basic needs of the population and the economy in transportation, but not in quality. The current state of the transport industry does not fully meet the requirements of effective implementation of Ukraine's European integration course and integration of the national transport network into the Trans-European Transport Network (National Transport Strategy 2018).

A number of international transport corridors pass through the territory of Ukraine: Pan-European transport corridors # 3, 5, 7, 9; corridors of the Organization for the Cooperation of the Railways (GCC) # 3, 4, 5, 7, 8, 10; Trans-European Transport Network (TEN-T), Europe – Caucasus – Asia corridor (TRACECA) (National Transport Strategy 2018).

Passenger transportation by land transport is decreasing, with road transport reduced by almost 30% and transportation by rail by almost 2% compared to 2014, freight departures and transportation by 27%.

One of the reasons for the critical level of development of the transport industry was also the systematic underfunding, insufficient maintenance of infrastructure and transport, as

well as technical backwardness, which threatens not only the fulfilment of its socio-economic functions, but also national security.

4. Factors influencing sustainable placement decision and construction of transport infrastructure

There are many factors that need to be taken in the process of developing transport infrastructure projects (Petrakovska and Mykhalova 2018). The following gives only a short and incomplete description. The aim is to understand better the role of compulsory purchase costs within these factors.

The main factors can be sorted into the following groups (Figure 1; see also Lizunova 2019). In order to ensure the Sustainable Development Goals, it is advisable to focus on a more detailed study of the groups of Economic, Environmental and Social factors that underpin the principles of sustainable development.

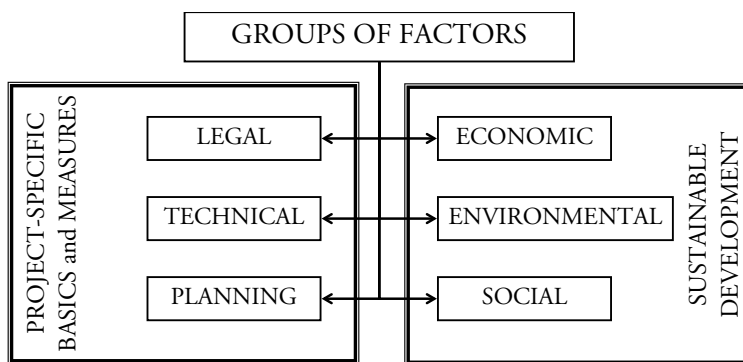


Figure 1: Groups of factors that affect placement and construction of transport infrastructure. Factors on the left are relevant for the project-realization, factors on the right are general requirements related to expected project-impacts (own representation).

Factors of sustainable-development must be specified for the project. To identify relevant factors, it is advisable to pay attention to those that directly affect this process. So we have to look in more detail at each of the groups of factors that form the basis of the principles of sustainable development.

4.1 Economic factors

For the group of Economic factors we can state that there is an *a-priori-decision* which says that sustainable development of Ukraine needs more infrastructure to improve the economic conditions (see section 3 above). The costs of infrastructure project-planning and construction contrast with this general benefit. Variable costs of the concrete project concern placement of infrastructure and the way it is constructed. These project-costs can be further differentiated. Figure 2 shows that – not only but particularly – costs of the pre-project-research are linked to the efforts to find a site that is sustainable for ecological reasons. It is clear, that also the costs for compulsory purchase play a role in the search for a sustainable choice.

PROJECT-RELATED ECONOMIC FACTORS

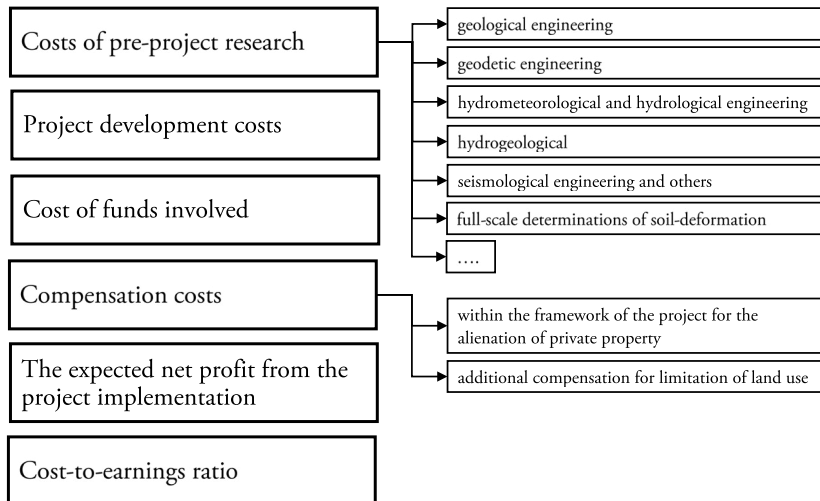


Figure 2: Constituent groups of project-related economic factors (own representation).

4.2 Environmental factors

ENVIRONMENTAL FACTORS

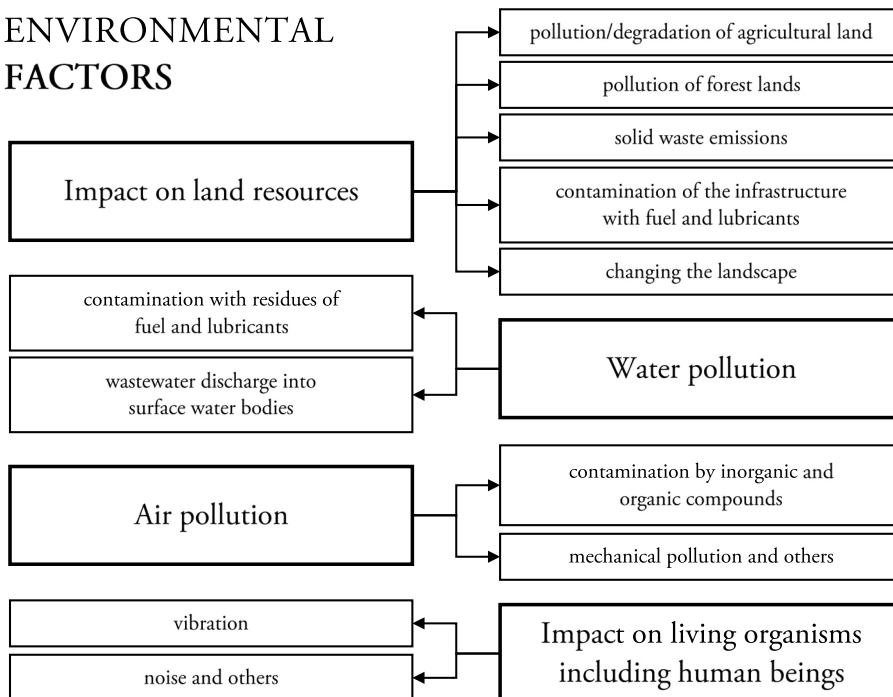


Figure 3: Constituent groups of environmental factors (own representation).

The main factors in the group of Environmental factors are those that affect pollution of land resources, water pollution, air pollution, living organisms and human beings (Figure 3; for more details see Lizunova 2019).

4.3 Social factors

The main factors in the group of Social factors are: the relevance of the project to the public need and its importance for the development of society and the region, public interest in project results and public opinion, employment of the population during the project implementation, employment of the population in the field of railway transport.

The most important and at the same time the most difficult issue is to determine the balance between economic, environmental and social factors and to take into account their interaction.

5. Compulsory purchase as a tool for sustainable development

Sustainable development of the country requires executive agencies and local governments to provide public facilities and infrastructure that ensure safety and security, health and welfare, social and economic enhancement, and protection and restoration of the natural environment. An early step in the process of providing such facilities and infrastructure is the acquisition of appropriate land. In order to obtain land in the right place at the right time, the executive agencies and local governments are using the right of compulsory purchase of land for public needs.

Legislation in Ukraine defines the legal, organizational and financial basis for regulating social relations arising from the compulsory purchase of land and other immovable property which is located on a site required for public needs but owned by individuals or entities (Lizunova and Mykhalova 2012).

In all cases when we are dealing with placement of transport infrastructure objects crossing the territory of private properties, we should clearly outline the public needs. This includes the lawfulness of the decision to make use of the right of expropriation for public needs or to follow the path of concluding a contract between the owner and the development company.

Compulsory purchase of private property is permitted only as an exception for the common good on the basis of and in accordance with the rules and procedures established by the law and on condition of prior and full compensation for its value (Kalbro 2007). It is one of the fundamental legal preconditions of the European Convention on Human Rights and Fundamental Freedoms (European Convention on Human Rights) that land alienation may be caused only to the public interest. Every individual or entity is entitled to the peaceful enjoyment of his possessions. No one shall be deprived of his possessions except in the public interest and subject to the conditions provided for by law and by the general principles of international law.

Article 1 of the Law of Ukraine “On compulsory purchase of land plots and other real estate objects placed on them, being in private ownership, for public needs or for reasons of social necessity” (Law of Ukraine 2009) defines: the appropriation of land and other immovable property for public needs or for reasons of public necessity as “the transfer of land titles and other immovable property owned by individuals or entities to state or municipal ownership through their compulsory purchase for the needs of the state, the local community and the society as a whole”.

The power of compulsory purchase is executed by the government which is divided into state bodies (representative of state ownership) and local bodies (representative of municipal ownership). In accordance with their competence provided by this law, the state bodies and the local government bodies have the right to buy out land plots which are in private property owned by individuals and entities for the following public needs:

- ensuring national security and defense;
- construction, repair, reconstruction and maintenance of linear objects and objects of transport and energy infrastructure and facilities necessary for their operation;
- placement of foreign diplomatic missions and consular posts, representations of international organizations in Ukraine in accordance with international treaties of Ukraine;
- placing and maintenance of facilities related to mining;
- construction of protective hydraulic structures;
- construction and maintenance of oil and gas wells and production facilities required for their operation, facilities for underground storage of oil, gas and other substances and materials;
- creation of city parks, construction of pre-school educational establishments, recreation grounds, stadiums and cemeteries;
- location of nature reserve fund objects.

In the process of development of transport infrastructure, a mechanism for compulsory purchase of private property land may be involved to meet public needs. This mechanism can be activated primarily because one of the public needs is “construction, repair, reconstruction and maintenance of linear objects and objects of transport infrastructure”.

As a result one can say that compulsory purchase of land for public needs is an important tool for sustainable development of territories as for public needs. However, this implicates that the economic, ecological and social effects are decisive for the choice of location of the project. If this is the case, expropriation can be a major focus of public authorities when implementing the sustainable development.

6. Conclusions

To date, Ukraine has joined the process of ensuring sustainable development. The results of this process are the formulation of the Sustainable Development Strategy of Ukraine. The

gradual implementation of the Sustainable Development Strategy reforms ensures the advancement of Ukraine's transport infrastructure. To accelerate the sustainable development of infrastructure, the National Transport Strategy of Ukraine was adopted.

Compulsory purchase of land for public needs is an important tool for sustainable development of territories as for public purposes for which the expropriation is a major focus of public authorities implementing the sustainable development of human settlements and the country as a whole. However, safeguarding of the protection of constitutional rights and freedoms of the owners and users as one of the goals of the social components of sustainable development that must be ensured during the compulsory purchase for public needs. Environmental components of sustainable development play a major role in the pre-project research and the placement-planning but also when introducing advanced environmentally friendly technology solutions during construction, reconstruction and maintenance of transport infrastructure as ensuring environmental components of sustainable development.

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Financing Instruments for the Urban Land Development in Ukraine

Abstract

The article considers the financing instruments which are the source for the urban land development in Ukraine. The roles of all interested stakeholders (executive authorities, local governments and territorial communities, investors, land owners/users, businesses) in urban land development have been analysed. An analysis of strengths and weaknesses of urban land development sources is carried out. The paper illustrates the level of efficiency of financing instruments in Ukraine.

1. Introduction

Over the course of decades, since the late XIX century, urbanization processes have been taking place around the world, accompanied by urban growth and development. The conventional intensifying of world urbanization clearly illustrates the increasing of urban population. According to the United Nations estimates, in 2018 more than half of the world's population currently lives in cities (4.2 billion). Given this trend, urban population is expected to reach 60% of the world's population by 2030 (United Nations, 2018).

According to the data of 2018, the proportion of urban population in Europe is 74.5%, in Asia 49.9%, in Africa 42.5%, in Northern America 82.2%, in Latin America 80.7%, in Australia and Oceania 68.2%. The highest rates were achieved in Monaco, Singapore, Nauru, Qatar, Kuwait, Belgium, and Malta. Countries that reached the lowest levels: Trinidad and Tobago, Burundi, Liechtenstein, Uganda. Ukraine ranked 86th place (%) among 226 countries by the level of urbanization. The nearest in meaning to Ukraine urbanization rates observed in European countries: Italy (69), Hungary (71), Czech Republic (73), Estonia (68), and Latvia (67).

Increasing level of urbanization pose challenges to all interested stakeholders (executive authorities, local governments and territorial communities, investors, land owners/users, businesses) during urban land development. Urban land development is multidimensional and multifaceted process. It depends on spatial planning and land management. In the study the authors investigate the relationship between spatial planning and land management as an activity of executive bodies, and land development as a commercial activity, as well as their participation in the land cost increasing process (Patraa et al. 2018).

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To avoid misunderstanding, the authors present their own understanding of the task spatial planning and land management. The task of *spatial planning* is to create optimal city development model aimed at providing of its sustainability. The task of *land management* is to regulate and control land use, rights, taxation issues, protection of valuable lands.

The aim of the article is detection the financing instruments aimed at the urban land development. The authors allocated private investments and funds from the state and local budgets. The article deals only with public financing sources for urban land development. Local taxes, among which a property tax, which includes a real estate tax other than land plot, and land tax shall be considered in the paper.

A framework is based on consolidated new knowledge of comparative research, involving all interested stakeholders experience. The paper provides analytical work on the study of various financing instruments which are the source for the urban land development in Ukraine. The study of financial instruments is carried out on the practical cases in Kyiv. The analysis and synthesis, comparison and system methods were used during this work.

2. Urban land development and regulation methods

Urban land development is a complex process that can only be ensured through a deliberate strategy by the public authorities and an involvement of all interested stakeholders. The main regulation methods of urban land development, to which the works of many scientists are devoted, include legal, spatial planning, economic, administrative, judicial, etc.

Particular emphasis in considering legal methods is made on the methods aimed at ensuring urban land development. These methods regulate the following issues:

- (1) spatial planning procedures and land use strategy;
- (2) investment opportunities;
- (3) possibility of stakeholder participation;
- (4) ownership/use rights and their restrictions when using urban land.

Spatial planning tasks are aimed at forecasting the economic and social development of urban land, ensuring environmental stability, increasing the value, cost and investment attractiveness of urban land. There is a spatial basis created through spatial planning methods aimed at solving these problems. It is the basis for making sound management decisions on the use of urban land in general and land plots in particular. Spatial planning mechanisms, one of which is the development of urban planning documentation, are also aimed at enhancing the value, cost and investment attractiveness of urban land. It is well-known international practice that the land use directions are determined when developing spatial planning plans at the national, regional and local levels. The last level directly regulates the use of urban land (Petrakovska and Tatsiy 2015).

The practical implementation of spatial planning results requires significant investments, many of which are funded from the local budgets. As the urbanization level increases, the volume of urban services and requirements for their supply level change as well. As a result, a pressure on local budgets increases. The pace of anthropogenic burden on urban land, as well as the consequent financial needs, has outstripped the growth of urban budgets in many countries. Therefore, the search for additional financing sources and adequate tools for its practical implementation is an extremely important and pressing issue today.

Increasing local budget revenues may be partially addressed by increasing the value, price and investment attractiveness of urban land through the spatial planning methods.

The investment opportunities of each country are governed by national legal norms that set out the rights and obligations of possible contributions to the financing of urban land development activities by all the parties involved.

As a result of studying the participants interested and involved in the process of urban land development, we identified major stakeholders: executive authorities, local governments and territorial communities, investors, land owners/users, businesses.

The peculiarities of the Ukrainian model of acquiring property rights in the primary market include the need to develop land management documentation. It is the basis for the emergence of legally defined property/use rights and their restrictions and is the task of land management activities. The land management powers include also the land use control and protection, property rights protection, issues related to mass valuation and taxation, etc.

The socio-economic changes that have appeared because Ukraine had become an independent state have led to the introduction of a fundamentally new approach to the formation and investment of real estate – real estate development, – which changes the value and cost of urban land. Its essence lays in a systematic approach to the implementation of real estate development projects. Real estate development objects can be: undeveloped land; developed, but not built up land; built up land. The land development is aimed at increasing the land price and includes land planning, project design, construction, engineering preparation, facility commissioning. Given the intensive urban growth, the reconstruction of territories and the infill development and redevelopment (as implementation mechanism), which can be attributed to the development of built up land, become very important.

Depending on the development object, the sequence and completeness of the implementation stages of the development project may change in Ukraine. However, measures of spatial planning and land management are necessary in any case (regardless of the object).

Taking this into account, it becomes clear how strong the interrelationship between spatial planning, land management and land development is.

3. Relationship between planning and land management process

Urban development is inextricably linked to land use regulation. At the local level, urban planning documentation is presented by a master plan of the settlement, a detailed plan of the territory and a zoning plan according to which the possibility and expediency of using urban land are determined. At the same time, there is a need to form land plots, change the land use, set boundaries of the rights of land owners/users, and determine the spatial boundaries of restrictions under the conditions of the private ownership of land. Land management documentation is being developed to address such issues. The interests of many land owners/users and third parties shall be secured when the urban planning and land use documentation are integrated.

Ukraine has been legally obliged to take into account the land rights when conducting spatial planning since 1992. The obligation to combine tasks of spatial planning and land management was determined in 2011 (Law of Ukraine № 3038-VI, 2011). But modernity illustrates the lack of consideration of the transformation of land relations that has taken place since 1992, as well as the inextricable practical interconnection of urban and land law. It should be noted that in Ukraine spatial planning and land management issues are regulated by different laws (Code of Ukraine № 2767-III, 2001; Law of Ukraine № 858-15, 2003; Law of Ukraine № 3038-VI, 2011).

4. Stakeholders of the urban land development process

All participants in the urban land development process seek maximum benefit. It is meaningful for each of them. Their understanding of benefit is different, and often, they can be fundamentally opposite in reality. The problem of finding a balance in measuring “benefit” is an urgent one, especially when it comes to land resources.

The implementation concept of “balance” can be based on a set of indicators that characterize the quantitative ratio of the urban system elements. The balance of interests in urban land development is a dynamic category. It depends on the relevance and importance of the development facilities in certain space and time. It is only possible to reach the balance of interests of any common goal, if each individual participant is interested in it. Then the authors discuss in greater detail the major stakeholders identified in the process of urban land development.

4.1 Local self-government bodies

Local self-government bodies are delegated the authority to represent state and public interests, which may be politicized and aimed at suppressing the interests of both groups: municipality population, and entrepreneurs. The efforts of local self-government bodies shall be aimed at ensuring the modern urban living conditions, which also sometimes requires restriction of the owner’s rights. The interests of the territorial community, which has delegated its authority to land administration to the local self-government bodies, shall be directed to: ensuring the rights of the population to receive necessary services; preserving the

functional integrity and planning organization of the territory; improving the level of engineering and transport services of the population; increasing the investment attractiveness of territories; developing the local infrastructure; preserving the ecological stability.

4.2 Executive bodies

The powers and goals of the executive bodies depend on their status. A special place in the implementation of measures for the urban land development is occupied by central (ministries, other agencies) and local (their “representative offices” formed by the central executive bodies in the respective territories (administrations, offices, committees, agencies, departments, etc.) authorities. The central executive authorities that exercise the powers conferred on them by the Cabinet of Ministers of Ukraine on urban development are the State Forest Resources Agency of Ukraine, the State Ecological Inspectorate of Ukraine, the State Service of Geology and Mines of Ukraine, the State Agency of Water Resources of Ukraine, the State Service for Protection of Cultural Heritage of Ukraine, the State Service of Ukraine for Geodesy, Cartography and Cadastre, the State Architectural and Construction Inspectorate of Ukraine, which are subordinated to different ministries. The executive bodies perform control-supervisory-managerial functions in accordance with the law.

4.3 Land owners/users

During the land development process, the land owners/users may be state, communal and private property entities (local self-government bodies, executive authorities, individuals and legal entities). Depending on the entity, the land plot granting procedure for the land development is different. For example, the local self-government and executive bodies, which are the managers of communal and state-owned lands, are exempt from some taxes when transferring the property rights.

4.4 Businesses

This group includes legal entities and individuals engaged in professional business activities within their competence during the land development process. They perform tasks that require complex problem-solving, decision-making that is based on a significant base of theoretical and factual knowledge in the specialized field. On the basis of the International Standard Classification of Occupations (ISCO-08), the professionals involved in the urban development process have been systematized.

As a result of analysis, it was found that the specialists in the field of engineering, finance and administration are involved in the land development process. According to ISCO-08 (2018), specialists in the field of engineering sciences are represented by such professionals as:¹ Building and Landscape Architects (Building architect, Landscape architect), Town and

¹ The professions within the group are shown in the brackets.

Traffic Planners (Land planner, Traffic planner, Urban planner), Cartographers and Surveyors (Cadastral surveyor, Cartographer, Land surveyor, Photogrammetrist).

Specialists in finance and administration are represented by Credit and Loans Officers (Loans officer, Mortgage officer, Financial institution branch manager), Valuers and Loss Assessors (Appraiser, Claims assessor, Claims inspector, Insurance assessor, Real estate appraiser, Valuer), Insurance Representatives (Insurance agent, Insurance broker), Real estate agents and property managers (Estate agent, Property manager, Realtor, Salesperson [real estate]), Legal Professionals (Attorney, Barrister, Lawyer, Solicitor, Notary), again in accordance with ISCO-08 (2008).

The above list of specialists involved in the land development process proves that this is an interdisciplinary task, the solution of which requires the involvement of professionals from different fields.

4.5 Investors

An investor may be represented by both public authorities and private institutions. The basis of any investment is to guarantee these investments and future rights. Regardless of the investment subject, the investor is always interested in optimizing planning decisions that maximize costs and maximize profitability. A special condition is the minimization of environmental impact, or the investor will be forced to take measures to reduce this impact and spend additional money.

Depending on the investment subject and the investment origin, the land development process is implemented in different scenarios. For example, if the local government is an investor and the development project is funded with the budgetary funds, then the land development process becomes more complicated and bureaucratic and requires more time, approvals, but is exempt from paying certain taxes.

5. Financing sources for urban land development

As a result of analysis of the financing sources aimed at the urban land development, the authors allocated private investments and funds from the state and local budgets. This paper deals with public financing sources for urban land development (see Andersson 2015).

The work considers in detail direct payments to the local budgets – local taxes, among which a property tax, which includes a real estate tax other than land plot, and land tax, shall be considered.

5.1 Fee of detailed development plan

An inherent feature of Ukrainian development is the implementation of projects on the existing land plots with certain functional use according to the master plans of settlements. At the same time, most of the master plans are outdated and do not meet current needs in Ukraine.

For these reasons, in order to be able to further develop the land, it is very often necessary to change the land use purpose. For this purpose, Ukrainian legislation requires to develop a detailed site plan. Detailed site plans are becoming increasingly practical used in Ukraine. They should be an official compulsory basis when changing the land use. However, it does not mean that it is unnecessary to develop master plans, which, according to current legislation, are the main documents that define the urban land use strategy and are binding.

Depending on the territory location where the detailed plan is being developed, it may be contracted by various public authorities. Financing of the detailed plan development can be done at the expense of both budget and private funds.

If the development of a detailed site plan solves the tasks of complying with the balance of investment interests/interests of the territorial community and ensuring the land value increase, regardless of the financing sources, the implementation results will have positive effects as a whole and give a boost to an increase in the land value in particular. The benefits of rising the real estate value in the form of increased fees and taxes are reflected in the local budget revenues. Landowners have the right to defend their interests by participating in official public discussions. The results of the discussions can be both positive and negative for the owners. But the owners have no guarantees of taking into account their recommendations because public interests are taken into account first and foremost. The following describes in more detail the fees and taxes on real estate, which are increased, if the value of real estate increases.

5.2 Real estate tax other than land plot

The taxpayers are individuals and legal entities, including non-residents, who own residential and/or non-residential real estate. The taxation item is residential and non-residential real estate, including their shares. The exception is state and communal property that is not taxable under the law. The tax base is represented by the total property area and depends on the facility and area. Residential real estate is taxed when the apartment area is more than 60 square meters and the house area is over 120 square meters. Non-residential real estate is taxed regardless of area.

Tax rates for residential and non-residential property owned by the individuals and legal entities are set by decision of the settlement council or the council of united territorial communities. The rate depends on the location (zoning) and types of real estate and cannot exceed 1.5% of the minimum wage per square meter of taxable base (Code of Ukraine № 2755-VI 2010).

5.3 Land fee – land tax/rent

Land tax is mandatory for all land owners, except for the statutory beneficiaries. The taxable base includes the regulatory monetary land valuation, which is approved by the local self-government bodies, which also have the authority to set the land fee rates independently, depending on the type of use and the land tax benefits. However, these rates may not exceed

the maximum amounts specified in the Tax Code of Ukraine. For example, the tax rate for public land is not more than 1% of its regulatory monetary valuation, and for farmland – not less than 0.3% and not more than 1% of its regulatory monetary valuation (Code of Ukraine № 2755-VI 2010).

It should be noted that the land fee depends not only on the type of land use, but also on the form of ownership of land plots in Ukraine. There is a kind of land fee as rent for state and communal property. The rent is set at not more than 12% of the regulatory monetary valuation for land plot used by the individuals and legal entities.

5.4 Share participation

Until 2020, the Ukrainian legislation stipulated the obligation to pay by the construction customers of a share contribution for the development of the settlement's infrastructure. Contribution amounts to 4% of the estimated cost of residential construction and 10% of the construction cost of non-residential real estate. These funds were directly used exclusively for the creation and development of the engineering, transport and social infrastructure of the respective settlement (Law of Ukraine № 3038-VI, 2011).

However, according to the Doing Business 2017 rating, the existence of a share contribution increases the costs for administrative procedures related to the industrial facility construction by an average of 15.2% in Ukraine. Given these arguments, the share participation was cancelled in November 2019.

A transition period is set for 2020, the share participation will be paid at the following rates: for non-residential buildings and structures: 4% of the total estimated cost of the facility construction; for residential buildings: 2%; for all industrial sites: 0. From January 1, 2021, the share participation in the settlement infrastructure development is completely abolished. No alternative tax is currently offered.

5.5 Strengths and weaknesses of urban land development sources

The article examines the strengths and weaknesses of the above financing sources and the level of their effectiveness. The effectiveness level was determined in terms of replenishing local budgets based on the budget revenue statistics.

The results of the strengths and weaknesses investigation are summarized in Table 1.

The results of the research are the basis for further scientific discussions and are possible ways to improve the urban land develop.

The level of filling of local budgets provides the opportunity for local self-government bodies to independently solve the issues of development of the social and engineering transport infrastructure and stability of their functioning. Due to this fact, local budgets should be one of the main financing sources for the urban land development.

Table 1: Financial sources of urban land development in comparison

Land development fees	Strengths (most striking examples)	Weaknesses (most striking examples)	Level of efficiency in Ukraine	Step of enrollment in local budgets
Fee of detailed development plan	High investor interest in developing a plan	Finding a compromise between the complexity and the municipality interest	High/low	Spatial planning – development of urban planning documentation
Land tax/rent payment	Form a steady revenue source	Small amount	high/high	Land management land plots formation
Annual real property (without land) tax	Reliable and predictable Facilitate medium and long term local planning	Rare used Existence of restrictions in local tax	Low	Land development – real estate formation
Share participation	Stable revenue source Allow long-term investment Planning and financing Contribute to municipal financial autonomy	Weak administrative control	Low	Land development commissioning of the construction object

6. Conclusions

1. The problem of filling local budgets is urgent and has been exacerbated in recent decades in Ukraine.
2. The peculiarity of Ukraine is the presence of unrelated types of urban planning and land management documentation involved in the urban land development process. Combining the tasks of these types of documentation will increase the transparency of the land development process.
3. All financing sources for the urban land development, which fill the local budgets and are distributed to the benefit of the local community, are combined in direct and indirect payments, and are dependent on land development to a large extent.
4. Share participation is the only type of direct fee payment to local budgets aimed at the infrastructure development, which was abolished in 2020.
5. Currently, there are no models of direct financing for the social and engineering transport infrastructure development in Ukraine. Local governments have access to the funds that come from local taxes and are allocated to various aspects of city development.

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Analysis of Expert Bases for Levying Municipal Contribution in Slovenia, Taking Into Account Fundamental Principles

Abstract

An important source for financing the land development is the municipal contribution, a duty to be paid by investor prior to obtaining a building permit. Municipal contribution is a purpose-oriented source of financing for the construction of municipal infrastructure. After 1991, when the applicable Constitution was adopted in the Republic of Slovenia, the expert bases for the municipal contribution levy was changed. The research question for this study was to what extent do the expert bases for municipal contribution levy in the legal regulations in Slovenia consider the fundamental principles for the formulation of non-tax contributions. The analysis results show that legal regulations in the period from 1997 to 2002 defined the expert bases for municipal contribution levy and calculation in compliance with the fundamental principles. In the period after 2002 more and more expert bases were included, which were not in proportion with the factual costs of land development, and for which the factual values did not exist and the municipalities needed to assess them by their own according to provisions of legal regulations. Thus, municipal contribution was not formulated according to fundamental principles anymore, and more and more the municipal contribution took on the character of a tax.

1. Introduction

The Constitution of the Republic of Slovenia/*Ustava Republike Slovenije* (hereinafter referred to as the Constitution) guarantees in its Article 9 the local autonomy (self-government). Inhabitants of Slovenia may realise local autonomy in municipalities and in other local communities (Article 138 of the Constitution). The competencies of a municipality comprise local affairs which may be regulated by the municipality autonomously and which affect only the residents of the municipality (Article 140 of the Constitution). Among the original tasks of municipalities belong the implementation of economic public services, the construction of municipal infrastructure, and the development of land for construction.

Construction of municipal infrastructure belongs to the important activities of a municipality in building land development, whereby the municipalities provide for the sufficient quantity and accessibility of land for the residential, working and recreational purposes (Article 141 of ZUreP – 2). The Spatial Planning Act/*Zakon o urejanju prostora* (hereinafter

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referred to as ZUreP – 2) (2017) defines land development as planning and construction of municipal infrastructure and facilities, and networks of other economic public infrastructure, which are necessary for the spatial development and facilities planned in the spatial acts. As construction may only take place on developed building land, an important legislative definition is that developed land is the building land that disposes of an arranged access to public road network, and which may have connections arranged to public electric power supply network, public water supply network, and public waste-water drainage network.

The condition for realisation of constitutional principle of local autonomy is the financial capacity and autonomy of a municipality. Thus, municipalities need to ensure a sufficient volume of their own financial resources (Article 142 of the Constitution) to finance the implementation of the required tasks. The municipal contribution (hereinafter referred to as the MC) is an important source for financing land development. MC is a duty to be paid by investor prior to obtaining a building permit. MC is a purpose-oriented source of financing of construction of municipal infrastructure (Article 229 of ZUreP – 2). Based on a Decree for the adoption of the municipality budget, a municipality shall define the MC as purpose-oriented income.

A municipality is the (fundamental) local community and the legal person of public law, which is included in the overall legal system of the Republic of Slovenia. Thus, within the scope of the Constitution and the applicable laws, the municipality autonomously regulates the local matters of public importance, which are laid down by the Local Self-Government Act/*Zakon o lokalni samoupravi* (1993) by the sectoral acts and by the general municipality acts (statutes, decrees). In formulating the contributions, the municipality has to consider also the fundamental principles, including the equality before the law, the equity, proportionality, and economy. This means that the expert bases, whereupon the MC is levied, shall be prepared and developed in such a trustworthy and accurate manner that the MC is in proportion to the costs of construction of municipal infrastructure (Rakar et al, 2008).

MC thus constitutes a part of the public finance system at local level. In the period from 1999 to 2015, the share of MC in municipal income in Slovenia amounted to on average of 3.1% (Malenšek 2016). A survey (Rakar et al. 2008) carried out with a sample of 40 municipalities of a total of 212 communities in Slovenia, identified that the MC for a single-apartment building with a net floor area of 150 m² on a plot size of 500 m² in the administrative centre of the municipality (for roads, water-supply system, waste-water sewage system, waste-disposal system, and public areas) ranged between EUR 780 and EUR 14,300. The average was EUR 5,963 (standard deviation of EUR 2,945) and the median was EUR 5,430 (Ložar 2016). A detailed analysis of expert bases for MC levy and of the MC calculation method could give evidence 1) why the differences are so large and 2) whether any fundamental principles for the formulation of MC as public (non-tax) contribution in Slovenia have been infringed by the prescribed MC levy method.

With the adoption of the Constitution of the Republic of Slovenia (1991), the expert bases for the MC levy was changed. Thus, the purpose of this research is to find a response to the

question: To what extent do the expert bases for MC levy in the legal regulations in Slovenia consider the fundamental principles for the formulation of non-tax contributions?

2. Fundamental principles for MC levy in Slovenia

Fundamental principles for the formulation of non-tax contributions, in this present case for the formulation of expert bases for MC, have been derived from the constitutional and taxation fundamental principles, taking into account the characteristics of non-tax contributions and the applicable legal regulations in the country. Many authors have pointed out that these characteristics should at non-tax contributions be taken into account most consistently, as in the opposite case this is not a non-tax contribution but a tax (Šinkovec 1999, Chantelau and Möker 1989).

Relevant literature (Chantelau and Möker 1989, Šubic Kovač et al. 2002, Šubic Kovač et al. 2003, Rakar et al. 2008) document that in context with non-tax contributions, the following fundamental principles are considered:

- Principle of proportionality, in conjunction with the principle of equivalence (principle of duty and counter-duty),
- Principle of financial compensation/counter-payment,
- Principle of equality before the law, and
- Principle of coverage of costs.

Principle of proportionality requires that the ratio between an encroachment upon a right of an individual and the benefit should be proportional. To be taken into account is the proportionality between the encroachment upon an obligor for MC, and the public benefit, which is to be paid by the obligor on being granted the usufruct of municipal infrastructure. Usufruct of municipal infrastructure is conditioned by the construction of municipal infrastructure of sufficient capacity, so that any particular land owner within the municipal infrastructure area may connect to it.

Principle of equivalence or the principle of *duty and counter-duty* is derived from the principle of proportionality. MC has the characteristics of a counter-duty/counter-payment and is imposed on land owners within the municipal infrastructure area for the purpose of ensuring the (production, purchase or increase of) public facilities. This does not necessarily mean the factual usufruct of municipal infrastructure, but only granting the possibility of usufruct of municipal infrastructure.

The *principle of financial compensation* is derived from the principle of equivalence. The non-tax compensation payment obligor is definable, and the counter-compensation is levied individually. MC may be levied only as an individually allotted counter-compensation.

The principles of proportionality and of equivalence are linked to the *principle of equality before the law* (Article 14 of the Constitution), which ensures that obligors in similar situations will be encumbered with the approximately the same public-finance contributions. At

equal usufruct of municipal infrastructure, the individual MCs has to be approximately the same, unless there exists a justified differentiation of obligors.

The *principle of coverage of costs* determines that the sum of funds collected from contributions of obligors shall cover but not exceed the factual costs of an accomplished service. Chantelau and Möker (1989) document that in Germany this principle is not legally prescribed at state level, but may be used by provinces (*Länder*) in their respective legal regulations. In Slovenia, the principle of coverage of costs may be linked to Article 51 of the Local Self-Government Act/*Zakon o lokalni samoupravi* (1993), which requires the municipalities to manage its assets with due diligence.

If these principles do not apply to a particular non-tax contribution, and the funds are spent without any specific purpose, then such a non-tax contribution turns into a tax (Šinkovec 1999).

3. Analysis of legal bases for MC levy through legal regulations after 1991

MC was introduced in Slovenia in 1959, as “*contribution of investors to costs of preparation and municipal arrangement of building land*”. This field was regulated by several laws and implementing regulations. The currently applicable ZUreP – 2 (2017) allocated the MC among the “Land Policy Funds”.

3.1 Legal regulations as basis of MC levy in Slovenia

In the period after 1991, MC was governed by the following legal regulations (laws and implementing acts), which are divided into two groups:

Legal regulations in the period 1997–2002:

ZSZ, *Zakon o stavbnih zemljiščih*/Construction Land Act with pertaining implementing acts.¹

Legal regulations in the period 2002 – to date:

ZUreP – 1, *Zakon o urejanju prostora*/Spatial Management Act with pertaining implementing acts.²

ZPNačrt, *Zakon o prostorskem načrtovanju*/Spatial Planning Act with pertaining implementing acts.³

¹ Official Gazette of the Republic of Slovenia, No 44/1997, 67/2002 – ZV-1, 110/2002 – ZUreP-1 and 110/2002 – ZGO-1

² Official Gazette of the Republic of Slovenia, No 110/2002, 8/2003 – popr., 58/2003 – ZZK-1, 33/2007 – ZPNačrt, 108/2009 – ZGO-1C, 80/2010 – ZUPUDPP and 61/2017 – ZUreP-2

³ Official Gazette of the Republic of Slovenia, No 33/2007, 70/2008 – ZVO-1B, 108/2009, 80/2010 – ZUPUDPP, 43/2011 – ZKZ-C, 57/2012, 57/2012 – ZUPUDPP-A, 109/2012, 76/2014 – odl. US, 14/2015 – ZUUJFO and 61/2017 – ZUreP-2

ZUreP – 2, *Zakon o urejanju prostora*/Spatial Planning Act with pertaining implementing acts.⁴

3.2 Expert bases for MC levy in the period 1997–2002

In the period 1997–2002, the building land development was conducted based on the development programme, according to the applicable law. MC was levied only for the construction of new municipal infrastructure or for reconstruction and increase of existing municipal infrastructure and its connection to the relevant supply system networks. MC was defined in relation to the level of all the building land development with public infrastructure, taking into account the size of the land, possible connections to public infrastructure and its capacity.

The MC was calculated based on the costs of initial construction of municipal infrastructure, which had the status of public infrastructure, and of its connection to the relevant supply system networks. Costs for operation and for regular maintenance of the municipal infrastructure were excluded. The law specified that MC in the period pending the adoption of the development programme could *exceptionally* be calculated on the basis of average costs of construction or municipal infrastructure reconstruction and its connection to the relevant supply system networks. Average municipal infrastructure costs were defined as the mean of land development costs per square metre (1 m²) of all building land parcels in the municipality in the previous year.

The development programme of each particular development area defined MC for all types of municipal infrastructure using the following formula:

$$kp_x = \frac{s \cdot ps}{vpsp} \cdot psp$$

where:

- kp_x – means MC for a particular municipal infrastructure type (x), in Tolars⁵
- s – means the costs of construction or reconstruction of a particular municipal infrastructure type and its connection to the relevant supply system network, in Tolars
- ps – means the contribution level of a particular obligor, in %
- $vpsp$ – means the size of all the building land parcels in the development area, in m²
- psp – means the size of building land parcel of the obligor, in m².

Legal regulations did not include any directions for the assessment of the particular expert bases, as they presupposed that both values of factual costs as well as values of building land

⁴ Official Gazette of the Republic of Slovenia, No 61/2017

⁵ Tolar was the Slovenian currency from 1991 until 2007 (1000 Tolar ~4 €)

parcel would be estimated. As the development programmes had not been prepared in time, most municipalities made use of the derogation in law, and levied MC based on the average construction costs of municipal infrastructure or costs of its reconstruction and its connection to relevant supply system networks. What had originally been envisaged as derogation, became the rule and the outset for new expert bases for MC levy in the subsequent legal regulations. The authorities justified this change with the supposedly expressed requests from the municipalities for such MC arrangement.

3.3 Expert bases for MC levy in ZUreP – 2

Between 2002 and 2008, instead of factual costs of the construction of networks, facilities and installations, which are considered as land development, the amount of MC usually was calculated using the following equation:

$$\text{amount of MC} = \text{average building costs} \times \text{correction factors}$$

Between 2002 and 2017, the calculation of MC based on legal regulations, did not consider – inter alia – the constitutionally guaranteed principle of equality before the law and the fundamental principles of public financing contributions, namely, the principle of equivalence of contribution and counter-contribution (Rakar et al, 2008). Therefore, we need to investigate if and how the applicable ZUreP – 2 (2017) tried to remedy these shortcomings.

An essential novelty of ZUreP – 2 (2017) is that MC is based on *the existing municipal infrastructure* and on *the new municipal infrastructure*, respectively. The expert bases of MC levy for the new municipal infrastructure are defined by the development programme of the development area, where the new municipal infrastructure is being installed. MC levy for existing municipal infrastructure are defined by special bases, defined by issuing a Decree, for the whole municipality or for the supply area of a particular municipal infrastructure within the municipality.

Expert bases for MC levy and calculation include:

A) New construction and improvement of capacity of existing municipal infrastructure

Criteria for MC levy for new municipal infrastructure include:

- Size of a building land parcel of a building,
- Total floor area of a building, (or the size of a construction engineering facility, or the size of other construction interventions),
- Ratio between the share of the building land parcel of a building (DpN) and the share of the size of a building (DtN) in calculating the MC for new municipal infrastructure.

MC for a particular type of new municipal infrastructure for buildings shall be calculated by adding up the share of MC that falls on the building land parcel, and the share that falls on the total floor area of the building, according to the following equation:

$$KP_{nova}(ij) = (A_{GP} \times C_{pN}(ij) \times D_{pN}) + (A_{STAVBA} \times C_{tN}(ij) \times D_{tN})$$

where:

- $KP_{nova}(ij)$: means the amount of MC for a particular type of new municipal infrastructure within a particular settlement of account area,
- A_{GP} : means the size of a building land parcel of a building,
- $C_{pN}(ij)$: means the costs of development per square metre (m^2) of a building land parcel of a building with a particular type of new municipal infrastructure within a particular settlement of account area,
- D_{pN} : means the share of a building land parcel of a building, in calculating the MC for new municipal infrastructure,
- A_{STAVBA} : means the total floor area of a building,
- $C_{tN}(ij)$: means the development costs of a square metre (m^2) of the total floor area of a building with a particular type of new municipal infrastructure in a particular settlement of account area,
- D_{tN} : means the share of size of a building in calculating the MC for new municipal infrastructure,
- i : means the particular type of new municipal infrastructure,
- j : means the particular settlement of account area.

MC for new municipal infrastructure, which shall be levied on the obligor, shall be calculated as the total sum of MCs for a particular type of new municipal infrastructure

$$KP_{nova} = \sum KP_{nova}(ij)$$

- where KP_{nova} means the amount of MC for new municipal infrastructure, which shall be levied on the obligor.

B) Existing municipal infrastructure

Regarding the expert bases for the existing municipal infrastructure, ZUreP – 2 (2017) envisages two options, namely:

- *Option A1*: Municipality adopts the bases for MC levy for the existing infrastructure of the whole municipality within six months from the entry into force of the municipal spatial plan. The Municipality Council adopts such bases by issuing a relevant Decree.
- *Option A2*: Municipality does not adopt the bases for MC levy for the existing municipal infrastructure within six months from the entry into force of the municipal spatial plan. Bases for MC levy for the existing municipal infrastructure are defined by a national regulation (Rules).

Option A1: Criteria for MC levy for existing municipal infrastructure include:

- Size of building land parcel for a particular building, total floor area of the building, (or the size of a construction engineering facility, or the size of other construction interventions),
- Ratio between the share of building land parcel for a particular building (D_{pO}), and the share of the size of the building (D_{tO}) at calculation of MC for existing municipal infrastructure,
- Factor of purpose-orientation of the building F_n , and
- $p_{sz}(i)$: Obligor's contribution level (%).

The method of calculating municipal contribution is similar as in the case of calculating the MC for new construction and improvement of capacity of existing municipal infrastructure, except that two new criteria are taken into account: Factor of purpose-orientation of the building F_n , and $p_{sz}(i)$: Obligor's contribution level (%).

Option A2: In this case, *average costs of development of building land are defined countrywide* for a particular type of municipal infrastructure, converted per square metre (m^2) of the building land parcel size and of the total floor area, which suffices for the flat sum definition of MC for the existing municipal infrastructure. In the particular case, only 30% of the calculated MC are taken into account. Therefore, the municipalities as soon as possible should prepare a Decree, with which they define their respective expert bases for the calculation of the MC.

4. Discussion on expert bases and on compliance with fundamental principles for formulation of MC

The analysis of amendments of legal regulations in the field of MCs after 1991 give evidence that the simple model to calculate MCs of the period from 1999 to 2002 became even more complicated and less transparent with each adopted new legal regulation. In addition MC was not only levied for secondary municipal infrastructure (networks, facilities and equipments), as after 2002 every development of municipal infrastructure constituted also new construction of municipal infrastructure; In addition, MC was not levied only for the construction of new municipal infrastructure, but also for the existing municipal infrastructure.

With regard to MC, ZSZ (1997) dealt only with new municipal infrastructure and presupposed that the existing municipal infrastructure had already been paid for. ZSZ (1997) and pertaining implementing acts took into account the principle of coverage of costs, as the sum of MCs of individual obligors for payment of MC was limited to the factual costs incurred by the construction of municipal infrastructure in a certain development area. For each individual obligor, the levy took into account the costs, which was proportional to the size of the obligor's building or of the building land parcel, where the obligor intended to construct a building or the building had already been constructed. Expert basis for MC levy was the size of building land and its share in the sum of building land sizes in the settlement

of accounts area. Thus, the principle of equality before the law and the principle of equivalence were satisfied.

The method of calculation of MC and certain expert bases for MC levy under ZUreP – 2 (2017) does not consider the aforementioned principles as analysed below.

MC for existing and new municipal infrastructure

MC for existing municipal infrastructure was introduced by ZUreP – 1 (2002) to resolve, at least seemingly, the issue of equality of obligors for payment of MC in the sense of “who builds, should pay”. The legislator defined in ZUreP – 2 (2017) the MC for the existing municipal infrastructure, as the “*contribution for encroaching upon the existing municipal infrastructure, which shall be paid by the obligor to the Municipality*” (therefore, not as a contribution to the costs of construction of municipal infrastructure), but still as a public contribution.

The obligor for payment of MC for the existing municipal infrastructure under the 2017 Act cannot pay the MC as a counter-duty for the factually incurred costs, as these costs are not known. For the existing municipal infrastructure and for the particular supply areas no records are available when the development was implemented, about the level of MCs for the particular building land parcels, and how many MCs have already been paid. Likewise, the sum of already paid MCs and other sources of financing the land development is not known. According to the principle of coverage of costs, the MCs should not be higher than the factual costs of land development. These costs may more or less well be assessed, but it is still not known, how many of such costs have already been covered. Thus, we may conclude that under ZUreP – 2 (2017) the principle of equality before the law is seemingly taken into account and the same applies to the principles of equivalence and the principle of coverage of costs.

Payment of MC for an increased capacity of a building

Questionable is also the incorporation of “*capacity of a building*” in the calculation of MC. MC for the existing municipal infrastructure under ZUreP – 2 (2017) is levied also in case of change in the capacity of a facility, e.g. if the total floor area or the purpose-orientation of a building is changed. In both the cases, the capacity of municipal infrastructure does not increase or the existing municipal infrastructure is not additionally encumbered. Nevertheless, the MC is levied, whereby the principle of equality before the law and the principle of equivalence are clearly infringed.

Dependence of costs of land development on the total (net) floor area of a building

ZUreP – 2 distinguishes the municipal infrastructure into the new one and the existing one. This division is only seeming as the calculation of MC differs only in the factor of purpose-orientation of a facility and in the contribution level of the obligor. Questionable is also the formula for the calculation of MC, wherefrom it is obvious that the costs of land development are proportional with the size of a building land parcel and the net floor area

of the building. In addition, the Municipality itself defines or assesses the ratio between the share of the parcel and the share of the net floor area of a building at the interval of 0.3 to 0.7, where the sum of shares equals 1.

Taking into account the construction calculations, the costs of land development per unit (m of network, m² of construction parcel) depend on construction costs based on category and type of the terrain (natural conditions) and on costs of materials, including the costs of assembly. Taking into account only the costs of municipal network (without facilities and equipments), they depend, at given terrain, profile and material, on the length of individual municipal conduits, and these on the entire built size or settlement density. At constant specific costs per m of network (EUR/m), at constant number of inhabitants and constant necessary length of certain municipal network per size unit of built size (m/ha), the costs of municipal network decrease if the density of inhabitants increases (Rakar 1979). Taking into account the total (net) floor area of buildings in the MC calculation implies higher MCs (in similar cases) in areas with higher settlement density. This is not only in contradiction with the principle of equivalence, but it stimulates irrational use of building land, and urban sprawl.

Legal regulations after 2002 commit municipalities to define autonomously the individual expert bases, which causes – despite the orientations in national legal regulations – that MC may be differing for similar cases.

Assessment of costs of existing and new municipal infrastructure

MC for the existing and new municipal infrastructure under ZUreP – 2 (2017) are not defined in the same way. MC for the existing municipal infrastructure is a contribution for the *encumbrance* of the existing municipal infrastructure, which is payable by the obligor to the Municipality. MC for new municipal infrastructure is the payment of a part of *costs of construction* of municipal infrastructure, which the obligor shall pay to the Municipality. Nevertheless, in both the cases, the word is about MC and about taking into account the fundamental principles in formulating such contributions.

According to instructions of legal regulations and within the prescribed intervals, the Municipality may assess certain expenditure bases, and consequently, the fundamental principles may be infringed, as follows:

Costs of existing municipal infrastructure shall in line with Regulation (2018) be defined based on data from business books kept by the direct budgetary beneficiaries (register of assets). Alternatively, the costs shall be defined by replacement costs, which are equal to the costs of construction of new municipal infrastructure that guarantees the comparable capacity and level of municipal supply as the existing municipal infrastructure, or of the factual costs of investments accomplished. Usually, few data are available on the factual costs of investments accomplished, and additionally, the costs of existing municipal infrastructure acquired are not the factual costs of existing municipal infrastructure. The reason is in the inadequate cadastre of economic public infrastructure, which does not include all the

municipal infrastructure. In addition, in the deficient accounting records the value of municipal infrastructure usually is underestimated due to an inadequate revalorisation. As the drafters of the legal regulation realised that this was a problem, they prescribed that the Municipality could take as average costs of building land development the costs of existing municipal infrastructure per unit of measurement from the provisions of the national regulation.

Analyses have shown (Ložar 2016) that in the past municipalities arbitrarily defined even the total costs of land development for new municipal infrastructure. Often, they have even adapted to the interests of the investors. Total costs even changed significantly during a project development (Miklavžin 2012). It was found that the factual costs of land development of land for a particular municipal infrastructure was significant higher than the costs assessed in the development programmes (Ložar 2016). Likewise, differences in costs of land development per unit for a particular municipal infrastructure, in similar cases, and between different municipalities could not be justified. In the light of the aforementioned, it may be expected that also in defining the costs of the existing municipal infrastructure under ZUreP – 2 the situation will not improve essentially, all of which is going to create the conditions for infringements of the fundamental principles.

Definition of size of building land parcels at MC levy for existing municipal infrastructure

The use of the term “*building land parcel*” as a *special land parcel* has continuously changed through history. A final result is that in Slovenia this particular field has not appropriately been regulated. The applicable ZUreP – 2 (2017) requires that building land parcels shall be defined for new buildings.

Legal regulations from the period between 1997 and 2002 avoided this problem by introducing the term “*building parcel*”, which is not a uniformly definable term. ZUreP – 2 (2017) and pertaining implementing regulations determine that for the calculation of MC levy for existing municipal infrastructure the size of a building land may be assessed. In this case, the size of the ground area of the building multiplied with the size calculation factor (F_p) is the bases for the calculation and not the size of the building parcel. Within the whole Municipality, F_p lies in the interval between 1.5 and 4 depending on the particular type of building, or the multiplier is 2.5 if the Municipality does not define such a factor. This means that also the MC shall be levied from a fictive building land parcel, whereby the principle of equality before the law, the principle of equivalence, and the principle of equality of obligors for payment of MC are infringed.

Definition of factor of purpose-orientation for MC levy for existing municipal infrastructure

Within the prescribed limits, a Municipality may define the “*factor of purpose-orientation*” of a building. The factor of purpose-orientation lies in an interval between 0.5 and 1.3 and as such is contestable, as it is not related to the costs of land development. In addition, at mixed use of a building the prevailing use of the building is normally taken into account. The decision on MC levy refers to the owner of a particular part of the building with certain

purpose-oriented use, which is contrary to the principle of counter-payment and indirectly to the principle of equivalence and the principle of equality of obligors for payment of MC.

5. Conclusions

In the period between 1997 and 2002, legal regulations defined the expert bases for MC levy and calculation in compliance with the fundamental principles for the formulation of non-tax contributions.

After 2002, expert bases for MC levy were becoming more complicated and non-transparent. In addition, unprofessional definition of expert bases within the competence of the municipalities caused even greater differences in the levels of MCs for similar cases in different municipalities.

Through development of the field of MC, expert bases were added, which were not related to the factual costs of land development and for which the factual values did not exist. The municipalities were required to assess them by their own, according to provisions of legal regulations. Thus, MC was not formulated according to fundamental principles anymore (principle of equivalence, principle of equality before the law, principle of counter-payment, and principle of coverage of costs), and MC more and more took on the character of a tax. Particularly contestable is the method of MC levy for existing municipal infrastructure.

ZUreP – 2 (2017) interprets the principle of equality of obligors for payment of MC as “*anybody who constructs shall pay the MC*”. It is not correct that investors, who are connected to the existing municipal infrastructure, are not included in the payment of MC. This lack should be regulated appropriately. Costs of municipal infrastructure, of MCs levied, and of MC payments made have to be recorded and documented for particular areas and related to building land parcel. Currently, such records are not existing in Slovenia, and ZUreP – 2 (2017) does not envisage any such records.

ZUreP – 2 (2017) introduces the building land records, which do not include MCs. Novelty of ZUreP – 2 (2017) is the definition of land development, and of the development levels of the unbuilt building land, which shall be kept in the building land records. These development levels do not include the level of “developed land without paid MC”, the level of “developed building land with paid MC”, or the level of “MC at a particular building land parcel”. All of which is necessary information for the decision-making of an investor on whether to build on a certain parcel or not, for the assessment of the market value of a parcel, and for the verification whether the fundamental principles in formulating the MC have been complied. Due to the shortage of financial resources in the municipalities for the development of building land, and due to citizen protests in certain municipalities, a new system of calculating and assessing the MC may be envisaged to be developed in Slovenia with the aim to abolish the shortcomings of the existing MC calculation and assessment system.

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The peer reviewed papers in this new volume of the European Academy of Land Use and Development (EALD) inform about investigations on the common subject «land management» – due to the interdisciplinary nature of the EALD from very different views. The spectrum of contributions covers regulations, governance and the implementation of land management as well as the assessment of relevant data supporting these tasks. Various approaches, methods, systems and understanding of the government's role in the different countries of Europe are highlighted. Committed to sustainability, the articles give evidence that Europe provides an experimental field for land management issues, and they enable to increase knowledge of new practices, to verify them and to learn from each other.

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