

THE ANALYSIS OF URBAN PLANNING ASPECTS AND DEVELOPMENT OF RESIDENTIAL REAL ESTATE IN TALLINN, ESTONIA

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Abstract. At the present time, the world's population is rapidly increasing, and the existing resources, which are limited, are being significantly consumed. Due to this fact, in order to use these resources more efficiently, the concept of planning day by day gains importance in the framework of sustainable development. Although Estonia is one of the countries that has the fewest number of people in Europe, owing to its economic reliability, high development level and worldwide awareness of the field of software, Estonia has become one of the less affected countries by the crisis. At the same time, Estonia is one of European countries that executes planning for long-term economic development. The aim of the research is to analyse the interrelation aspects between urban planning and residential real estate development on different levels in Tallinn, capital of Estonia, in the context of sustainable development. Analysis and synthesis, comparison, observation, and logical deduction methods are used within the research. According to the research conducted, the price ranges of real estate objects are closer to each other in the condition towards homogeneity in residential settlements which have similar residential and planning features. It can be recommended to build a contemporary system regarding interrelation of urban decisions and tendencies within development of the real estate market, which can help investors and other market participants in sustainable, efficient, and long-term decision making.

Keywords: *Heterogeneity of real estate market, public-private partnership, real estate development, real estate market, residential real estate, sustainable development, sustainable development goals, Tallinn, urban planning.*

INTRODUCTION

Nowadays, the interaction of the world countries in the context of globalisation has increased; however, population of the world has doubled from 1970 to 2020 (Worldometer, 2020), and the reduction of limited resources has obligated the concept of planning, which also includes urban planning, for sustainable development at the end of these 50 years. Considering the relationship between real estate sector and decision-making mechanisms, once more it can be appreciated how important urban planning is in the context of sustainable development.

The historical section that we are in currently is a period, in which the effects of the 2008 financial crisis still could not be completely overcome. Moreover, another worldwide crisis, Coronavirus pandemic, which affects economies of many countries globally, has erupted. Though the countries that have resilient economies

have been less affected by both crises, emerging economies have been deeply affected by these crises. Due to the reliability of its economy and the ability to quickly respond to the fast-growing software requirements worldwide, Estonia has become one of the countries less affected by 2008 financial crisis. One of the most significant reasons of this fact is that even these resilient economies accomplish the planned economy model even partially, they get steadily increasing production and gross domestic product (GDP). In addition, at the moment the world is fighting against the Coronavirus pandemic, and almost all European countries maintain the economic life through producing basic needs only and planning the whole nationwide lives. Consequently, it is seen that the economic life can be maintained by the concept of planning. This approach is valid for urban life and, hence, for the real estate sector as well. The question is: “How does urban planning influence the development of residential real estate in Estonia?” Hereby, in order to answer this question, primarily it is necessary to define urban planning and, subsequently, to determine the effects of urban planning on real estate development in Estonia in general and in Tallinn in particular (Köse, 2019).

The topicality of the research stems from the fact that many countries, including Estonia, are striving to realise 17 Sustainable Development Goals until 2030. As these goals bring about social, economic, and environmental changes and transformations in Estonia and other countries, it can be anticipated that the real estate market would naturally be affected. Due to this fact, the present research scrutinises the potential effects of urban planning in Tallinn on the residential real estate market and development in the context of sustainability. The research intends to analyse the influence of urban planning on real estate development in Estonia in order to develop the recommendations for the improvement of the real estate market and the real estate objects.

The hypothesis is that the urban planning provides qualitative and quantitative way towards higher homogeneity within residential real estate market in particular locations, hence attenuates price range in the market, brings prices closer to each other, offering more options and positions for real estate objects to be developed, and gives an option for closer homogeneity in prices and its detection. The hypothesis is to be tested in the districts of Tallinn. *The aim of the research* is to analyse the interrelation aspects between urban planning and residential real estate development on different levels in Tallinn, capital of Estonia, in the context of sustainable development.

The research methods are analysis and synthesis, abstraction and concretisation, comparison, correlation, grouping of means and relative values, observation, and logical deduction in order to make conclusions and propose recommendations.

The object of the research is urban planning in the context of the development of both real estate market and real estate objects in Estonia. The subject of the research is residential real estate market of Tallinn.

The main interrelation aspects of the study are population density, distance from city centre, and average prices of residential real estate objects, which have similar features of residential settlements in Tallinn.

Due to the vast amount of information, the research has theoretical, methodological, temporal and geographical *limitations*. As a methodological limitation, precisely studying each real estate object is not possible using the received and limited data. As a temporal, limitation, this study focuses on recent market conditions over the past five years. As a geographical limitation, since the concept of location makes each real estate object unique, the study tackles populated urban areas.

In order to examine the residential real estate market in Tallinn and thus the potentials of today, first, the historical development process of the residential settlements in Tallinn are to be studied. Then, tendencies will be discussed to understand the actual situation with statistical data acquired between 2015 and 2019.

Although the historical development process of the city takes long time, the urban development process of Tallinn is studied in the period that started in the 19th century, when the main urban structure of today's city appeared, to the present. Over again, in the context of topicality of the research, in order to observe tendencies and price changes in the residential market, statistical data of the period between 2015 and 2019 are compared.

Novelty of the research is the analysis of interrelation between urban planning and real estate development through analysing the market of Tallinn in the context of socio-economic development of Estonia. *Practical significance of the research* is to reveal the significance of urban planning in the process of achieving the sustainable development goals and new possible potentials for business. In this case, it can be stated that the concept of urban planning is directly related to the 6th, 7th, 9th, 11th, 13th and 15th sustainable development goals, which are respectively: clean water and sanitation; affordable and clean energy; industry, innovation and infrastructure; sustainable cities and communities; climate action; and, life on land (The United Nations, 2020). When it is considered that the residential real estate is the major part of buildings around the world, these goals require comprehensively planning from the global level to the local level and renewing urban infrastructure that involves water supply and sanitation systems, renewable energy systems, low-carbon emission production, consumption, and transportation. In search of the way these processes are maintained, a public-private partnership model has been examined.

The research is executed in three steps in the context of sustainable development: (i) Analysis of economic indicators of Estonia; (ii) Urban planning aspects in Estonia; and, (iii) The research of interrelation aspects between socio-economic and urban planning indicators, and development of the residential real estate market in Estonia.

Afterwards, it is expected that the research can be adapted to re-developing cities of world countries and can help avoid the devastating effects of potential crises through regulating supply and demand equilibrium by planning in the framework of the market economy. Thus, the research on the example of Estonia can be useful to different market participants worldwide, for instance, to other mixed market economies.

1. AN OVERVIEW ON THE SOCIO-ECONOMIC DEVELOPMENT IN ESTONIA BETWEEN 2015 AND 2019

According to the Human Development Report of the United Nations Development Programme (UNDP), the Republic of Estonia is ranked 30th by the Human Development Index (HDI) among 189 world countries (UNDP, 2019). According to the International Monetary Fund (IMF), Estonia is one of 39 advanced economies around the world (IMF, 2019). Estonia that consists of 15 cities and 64 municipalities, as of the Administrative Reform in 2017 (The Parliament of Estonia, 2016), has 43 465.32 km². Land area of 159.37 km² belongs to Tallinn, the capital city of the country (Statistics Estonia, 2020). Before examining the situation in Tallinn, the recent socio-economic development tendencies of Estonia are to be overviewed. Table 1 presents the key indicators of Estonia between the end of 2015 and 2019.

Table 1. The Key Socio-Economic Indicators of Estonia (developed by the authors, based on the data from Statistics Estonia, 2020)

Indicators	2015	2016	2017	2018	2019
Population, million people	1315.944	1315.635	1319.133	1324.820	1328.360
Population growth rate, %	+0.08	-0.02	+0.26	+0.43	+0.26
Land Area, km ²	43 465.32	43 465.32	43 465.32	43 465.32	43 465.32
Density, people/km ²	30.28	30.28	30.27	30.35	30.48
Gross Domestic Product at current prices, million €	18 041.54	18 691.99	20 618.46	22 661.90	24 392.74
Gross Domestic Product at current prices per capita, €	15 808.67	16 487.15	18 047.75	19 737.09	21 163.03
Manufacturing in Gross Domestic Product, million €	2868.98	2990.80	3213.10	3443.28	3616.13
Construction in Gross Domestic Product, million €	1098.48	1228.50	1389.25	1645.74	1694.01
Real estate activities in Gross Domestic Product, million €	1862.52	1989.42	2177.16	2410.30	2517.35
Information and Communication in Gross Domestic Product, million €	978.19	1044.75	1236.44	1410.81	1814.40
Long-term interest rate by housing loans, %	2.2	2.4	2.4	2.5	2.5
Inflation rate, %	-0.5	0.1	3.4	3.4	2.3
Employed people, thousands	640.9	644.6	658.6	664.7	671.3
Unemployment rate for persons aged 15–74, %	6.2	6.8	5.8	5.4	4.4
Average gross wage, € per month	1065	1146	1221	1310	1407
Corporate tax rate, %	20	20	20	20	20
Personal income tax rate, %	20	20	20	20	20
Foreign trade surplus / deficit, million €	-1521.37	-1617.89	-1893.09	-1796.21	-1710.64
Export, million €	11 575.29	11 896.93	12 877.63	14 421.34	14 385.70
Import, million €	13 096.66	13 514.82	14 770.72	16 217.55	16 096.34
Government debt to Gross Domestic Product, %	10	10.2	9.3	8.4	8.4

In accordance with the data indicated in Table 1, Estonia has slowly but steadily increasing population. At the end of 2019 year, 1 328 360 people and +0.26 % population growth rate compared to the previous year were measured. Due to this slowly increasing population rate, the density is observed between 30.28 and 30.48 people per square kilometre. In other respects, national account of Estonia rapidly increased, whilst Gross Domestic Product (GDP) at current prices went up from € 18 041.54 million to € 24 392.74 million, GDP per capita rose from € 15 808.67 to € 21 163.03. When composition of the GDP is analysed, it is seen that contribution of manufacturing increased from € 2868.98 million to € 3616.13 million, construction increased from € 1098.48 million to € 1694.01 million, real estate activities increased from € 1862.52 million to € 2517.35 million, and information and communication technologies increased from € 978.19 million to € 1814.40 million in the same period. Once long-term interest rate and inflation rate indicate the stability of the economy in the context of housing affordability, it is seen that the interest rate ranged between 2.2 % and 2.5 % and the inflation rate varied from -0.5 % to +2.3 % from 2015 to 2019. The lowest rate of both corporate and personal income taxes was 20 % in Estonia. Foreign trade in Estonia increased from € 1521.37 million to € 1710.64 million from 2015 to 2019. Afterwards, the government debt to the GDP, which is one indicators of reliability of Estonian economy, decreased from 10 % to 8.4 % in the period under consideration.

When these inputs are considered in the context of housing affordability and developing real estate market conditions within the national economy, it can be obviously perceived that there are reliable conditions in Estonia, which can also positively affect the development of real estate market in Estonia.

2. DECISION-MAKING MECHANISMS IN ESTONIA IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT: A THEORETICAL OVERVIEW

2.1. The Concept of Urban Planning in the Context of Sustainable Development

Even though in today's rapidly urbanised world 'the urban' has already being substituted for 'the city', it is grammatically a misuse. When it is looked at dictionaries, *urban* is defined as "[1] of or in a city or town; [2] relating to towns and cities" (Cambridge Dictionary, 2020c). In general, the accepted meaning of urban is 'relating to the city'. In this case, what is 'the urb' or 'the city'? The *city* is defined as: "a large town; a place where many people live, with many houses, stores, businesses, etc., and which is bigger than a town" (Cambridge Dictionary, 2020a). Moreover, a traditional concept of city is "freestanding built-up area with a service core with a sufficient number and variety of shops and services. A city also has administrative, commercial, educational, entertainment and other social and civic functions" (Squires, 2013, p. 14). With regards to what the urban planning is, the concept of *urban planning* is defined as: "the activity or profession of determining the future physical arrangement and condition of a community, involving an appraisal of the present condition, a forecast of future requirements, a

plan for the fulfilment of these requirements, and proposals for constructional, legal, and financial programs to implement the plan” (The Dictionary, 2020). As it can be understood by the definition, urban planning tackles those activities and spaces of activities that are carried out in the framework of requirement and resources.

In other respects, it should be noted that although evolution of cities is around a service core as mentioned in the definition above, in today’s circumstances and within this research, a city is discussed as *polycentric* and urban settlement as an alternative to *monocentric* and settlement.

At this point, the location theory would be illuminative to comprehend what monocentric and polycentric urban models are. The location theory, founded by Johann Heinrich von Thünen, Alfred Weber, William Alonso, and Walter Christaller, seeks to answer the questions of economic activity and why it is conducted. The theory, which occupies an important place in urban economics, has been expanded and developed by economists, geographers, and scientists in time (Nolen, 2009). William Alonso, who greatly contributed to the location theory with his work “Location and Land Use: Toward a General Theory of Land Rent” that was originally published in 1964, tackled various land uses, such as residential, commercial and industrial, and the access needs of these functions to the city centre by developing Johann Heinrich von Thünen’s thesis related to the development of agricultural products over market access, and that supposed that rent in any location was equal to product minus production and shipping costs (Alonso, 2013).

According to the statement of William Alonso in 1964, each type of land use has its own rent gradient or bid rent curve and this curve determines the maximum amount of rent to be obtained from any type of land use in a particular location, and according to the needs of access to the city centre, households, business and industries compete for each individual rental rent curve for locations (Nolen, 2009). In turn, von Thünen’s agricultural activities were in a circle consisting of four disks surrounding the city centre; in the *monocentric* urban model of Alonso (2013), retail, manufacturing and residential functions compose the residential area around the ‘central business district’, which is also known as CBD. However, this concentric model, which is significant for urban economics, has begun to lose its significance by developing transportation infrastructure and technology, and thus *polycentric* tendencies have started to appear.

When asked what the urban components are, one of the first answers that come to mind is ‘space’. In the context of space, Lefebvre describes the relation between the architecture and the urbanism as a relation between micro and macro levels, and interrelates the space and the decision-making mechanisms (Lefebvre, 1991, p. 75). However, the question of *how to measure and/or assess a city and assessment criteria* needs to be answered. At this point, Beyer inquired responses regarding urban indicators and extracted the main categories (Beyer, 2015). In the same way, in order to ensure comparability of all data and to get healthy results as much as possible, the most accessible data are found out. At this point, it should be mentioned that Building Information Modelling (BIM) (EUBIM, 2017) provides a large amount of information on buildings even though it has not been enough spread yet. In case of the spread of BIM systems around the world, more healthfully results

could be obtained on settlements, districts, cities, and countries by gathering all this information with large-scale databases. However, being aware of dimensions of heterogeneity (Vanags, Geipele, Sarkans, Usenieks, 2017), *in order to overcome limitations for further research* it is considered to find out and analyse this all information in the context of Tallinn and other probable cities: *Urban pattern, spatial structure, land use, urban sprawl, public transport network, electrification of the transport, air quality, average time in the traffic per capita, population density depending on the distance to the city centre, floor number of residential buildings depending on the distance to the city centre, average building age, energy consumption per household etc.* (Köse, 2019).

After finding out what urban and urban planning are, the research goes on with sustainability and sustainable development concepts. *Sustainability* is defined as: “[1] the quality of being able to continue over a period of time; [2] the quality of causing little or no damage to the environment and therefore able to continue for a long time; [3] the idea that goods and services should be produced in ways that do not use resources that cannot be replaced and that do not damage the environment” (Cambridge Dictionary, 2020b). Use of the concept that appears as a consequence of attempts and leadership of the United Nations dates back to 1972. The idea of three pillars was promoted in the 1990s and adopted by the member states in the Johannesburg Declaration on Sustainable Development in September 2002 (UN, 2014, p. 141). Recently, Paris Agreement was signed by the Parties of the United Nations Framework Convention on Climate Change on 12 December 2015 (UN, 2015). Eventually, General Assembly of the United Nations formally adopted the universal, integrated and transformative 2030 Agenda for Sustainable Development with a set of 17 Sustainable Development Goals and 169 targets on 25 September 2015 (The United Nations, 2020).

Although these *globally* scaled goals seem like the required solution, the question of how these 17 SDGs will be implemented still waits to be discussed. With this purpose, on *international-regional* scale, *urban dimensions* of the policies of the European Union (EU) are led by the European Commission (EC) and, hence, sustainable development of urban areas is underlined. As of 1997, the member states were already called to create and update an urban agenda toward 2020. In this case, a *polycentric urban structure, compact settlements* and *limited urban sprawl* are the most significant concepts to determine the European urban territorial development (EC, 2014). Besides, interrelation between *energy infrastructure* and urban planning is one of the main subjects to be considered under the conditions of climate change. With regard to the sustainable development goals, although the general opinion is that the initial investment costs of renewable and sustainable energy production are high, concrete steps are taken at global, regional, national and local levels (Gabillet, 2015). Thus, the EU adopts an initiator attitude and the 2012 Energy Efficiency Directive was amended in 2018 to update the policy framework to 2030 and beyond under the name of *Clean energy for all Europeans package* (EC, 2018). Consequently, the concept of long-term planning comes to the fore and the energy performance of buildings becomes one of the most crucial topics in parallel with the 17 SDGs. Consequently, it is perceived that fulfilment of the 17 SDGs necessitates long-term planning, a major part of which is the built

environment. In this regard, it can be undoubtedly stated that Estonia is one of the countries that integrates both articles of agreements of the United Nations and directives of the European Union into its national policy and fulfils the requirements of long-term planning. Within the *National Spatial Plan of Estonia 2030+* drawn up by the Ministry of Regional Affairs (MoRA) of the Republic of Estonia, six main titles are included and the significant future trends impacting Estonia's spatial development are explained under the first title (The MoRA, 2012). Also, subtitles of the plan give satisfactory opinions about prospective of Estonia for 2030. For instance, shaping living and economic environments that are supported by the existing settlement structure and provide options (The MoRA, 2012, p. 11) and ensuring the availability of jobs, educational institutions and various services by means of linkage within and between daily activity spaces (The MoRA, 2012, p. 13) give reference to the research in terms of sustainable and spatial development. In substance, it can be stated that the Estonia 2030+ is, more than ever, significant in terms of emphasising the concepts that constitute the structure of this study, such as comprehensive planning at the national scale, urban planning, urban infrastructure, development of settlements, accessibility to the public services, public transport network, energy efficiency and self-sufficiency.

Furthermore, the concept of long-term planning was involved into Tallinn Development Plan 2014–2020 in hierarchical sequence as well. According to the plan, the urban concept is mentioned in various subjects, the most notable one in the part of '*Main risks associated with the implementation of the main objectives of the development plan and the options for their mitigation*' is as follows: "Uncontrolled expansion of urban sprawl, involving the inexpedient use of urban space, excessive load on the natural environment and infrastructure, inefficiency of providing public services and excessive dimensioning of competitive relations in the activities of local governments" (Tallinn City Council, 2014, p. 76). In turn, the most striking risk mitigation option was mentioned: "Increasing the importance of long-term planning compared to the 'laissez faire-model', the city's increased participation as an initiator of development activities and as a partner for the state, the private and non-profit sector, including participation in shaping the policy of using state land and applying different financing models for investments and provision of public services when implementing solutions that match the intentions of conurbation" (Tallinn City Council, 2014, p. 77). Once more it is seen that the planned development is highlighted in both *National Spatial Plan of Estonia 2030+* and *Tallinn Development Plan 2014–2020*. Ultimately, it can be concluded that these plans are regarded as strategic documents that aim at achieving a convenient utilisation of space of Estonia in general and Tallinn in particular.

The further subsection describes how these plans are implemented and how decision-making mechanisms operate in Estonia.

2.2. Interrelation between Urban Planning and Decision-Making Mechanisms in Estonia

To demonstrate the interrelation between urban planning and decision-making mechanisms in Estonia, the planning instruments and the main responsible actors

will be examined. As mentioned before, as a member country of both the United Nations and the European Union, Estonia forms its spatial plans and development plans in accordance with the framework of these two associations.

Initially, it should be said that there is not any uniform planning culture in Europe, and there are five planning systems in Europe depending on the existing traditions. Estonia is categorised into the Eastern European transition processes together with other Baltic States, Latvia and Lithuania (Kaklauskas, Zavadskas, Dargis, Bardauskienė, 2015, p. 387). As a result of the globalisation and the enlargement of the European Union, various urban planning systems, which interrelate the urbanisation traditions and decision-making mechanisms as well as display the evolution of the planning instruments, have appeared (Kaklauskas, Zavadskas, Dargis, Bardauskienė, 2015, p. 386).

Table 2 provides the general structure of planning system in Estonia.

Table 2. General Structure of the Planning System in Estonia (developed by the authors, based on Vision and Strategies around the Baltic Sea, 2018, p. 4)

<div style="writing-mode: vertical-rl; transform: rotate(180deg);"> Strategic directions in spatial development Requirements concerning land use and building </div>	Planning instrument	Hierarchical sequence	<div style="writing-mode: vertical-rl; transform: rotate(180deg);"> Hierarchical sequence Changed interactively </div>
	National Spatial Plan (Delineations)	<ul style="list-style-type: none"> • Principles and directions of spatial planning • General principles and directions of development of human settlement • Principles of infrastructure development • Basis for preparation of country-wide spatial plans 	
	Country-wide Spatial Plan (Scale from 1:150000 to 1:100000)	<ul style="list-style-type: none"> • Directions of regional spatial development • Principles of balanced development of settlement and centres • Placement of infrastructure networks • Directions for preparations of comprehensive plans 	
	Comprehensive Plan (Scale from 1:30000 to 1:5000)	<ul style="list-style-type: none"> • Development principles of municipality • Detailing of development of settlement and infrastructure • Basis for preparation of detailed spatial plans or design specifications 	
	Detailed Spatial Plan (Scale from 1:1000 to 1:500)	<ul style="list-style-type: none"> • Implementation of comprehensive plan • Determination of plots, building rights, requirements concerning building and architectural solutions • Basis for preparation of design specifications 	

In compliance with the Estonian planning system (Vision and Strategies Around the Baltic Sea, 2018), four different instruments are executed in hierarchical sequence. These are respectively descended from the national spatial plan as a delineation, country-wide spatial plan at the scale from 1 over 150 thousand to 1 over 100 thousand, as a comprehensive plan at the scale from 1 over 30 thousand to 1 over 5 thousand and as a detailed spatial plan at the scale from 1 over 1000 to 1 over 500. It is seen that while going downwards, strategic directions in spatial development are executed in hierarchical sequence; and conversely, while going upwards, requirements are changed interactively concerning land use and building in compliance with the planning system in Estonia. It is figured out that planning

instruments can be examined on *three levels: national, regional and local* in Estonia. Consequently, it is seen that the integrated decision-making levels in the context of sustainability are dealt with at *five levels: global, international, national, regional, and local level*. In case of Tallinn, decision-making levels are as follows: the United Nations, the European Union, the Government of Estonia, Harju County, and the city of Tallinn.

Although this multi-level approach is significant, the public participation and thus 'people perspective' should be emphasised in order to develop the Public-Private Partnership, PPP or 3P, which is a widely used approach today for large-scaled urban development projects (UN-HABITAT, 2011). *PPP is a kind of cooperation model in which government and business involve and work together to complete a project, which has higher initial investment cost, and/or to provide services to the population for a long-term* (Caves, 2013). In case of developing brownfields via public-private-people partnerships, also referred to as "4P", which are executed by the Baltic Urban Lab, the people perspective has given inspiring results: "The 'people perspective' represents an effort to balance the influence of private actors (*landowners, investors, etc.*) and the public sector (*planners and decision-makers*). Baltic Urban Lab has aimed to bridge the gap between city-led and private-led development, in order to find new ways to reach a common vision and understanding by strengthening public-private-people partnerships. This corresponds to Baltic Urban Lab's objective of improving urban planning in the Baltic Sea region by increasing the capacity of local authorities and planners" (Oliveira e Costa, Kellecioglu, Weber, 2018, p. 7).

As a result, it can be said that public-private-people partnerships could play a significant role in decision-making mechanisms in the context of residential real estate development in Estonia in general and in Tallinn in particular.

3. PRACTICAL PART: AN OVERVIEW ON THE RESIDENTIAL REAL ESTATE MARKET IN THE LIGHT OF HISTORICAL AND ECONOMIC ISSUES OF URBAN DEVELOPMENT

3.1. Historical Development Process of the Residential Settlements in Tallinn

Residential settlements have been developed owing to the Baltic Sea, which is the most important trade route between central and northern Europe ever since medieval ages. Construction of the railway also became a determinative factor for the development of Estonia by the second half of the 19th century, and, subsequently, large industries began to be established in Tallinn (City of Tallinn, 2017). Due to the enrichment of the city by commercial activities and large industries, by the end of the 19th century and in the first quarter of the 20th century, buildings made of brick and stone made the urban area greater. Due to the Soviet occupation in 1944, Soviet workers who settled into Tallinn caused a rapid increase of the city population and thus an urgent requirement for housing has appeared (Hess, Tammaru, 2019).

Consequently, since 1958, typical mass housing blocks built in suburban areas of the city by the Soviet Union and two-thirds of the population have caused urban sprawl. Even though these Soviet housing projects were built until 1991 and a great part of them (prefabricated typical panel buildings) (Hess, Tammaru, 2019, p. 144) was built in the period from 1958 to 1971 in the Soviet Union (Meuser, Zadorin, 2015). On the other hand, it is seen that these panel buildings were not used in Estonia as much as in other Soviet cities. According to statistics, it is observed that mass housing production in Estonia reached its peak in the period of 1970–1974 with 72 thousand dwellings and 3,676 thousand square meters (Statistics Estonia, 2020), and a great part of these buildings in this period were built using reinforced concrete frame construction (Meuser, Zadorin, 2015). Hereafter it is seen that typical housing and site plan schemes imposed by the central Soviet authorities were adapted by Estonian architects to large cities of Estonia such as Tallinn and Tartu under the influence of Finnish and Swedish urban planning culture and Scandinavian modernism (Hess, Tammaru, 2019, p. 153).

When large-scale housing settlements of Tallinn built in the Soviet period are examined, three large micro-district based residential settlements, i.e., *Mustamäe*, *Väike-Õismäe** and *Lasnamäe*, attract attention. All of them have comparable distance from the city centre and similar housing features. Major part of these buildings (88 %) are five-storey and just a small part of them (4 %) are 16 to 22-storey tower blocks (Hess, Tammaru, 2019), high-rise buildings with 2 elevators within each core** of these towers. The reason why the major part of these buildings is 5-storey is to avoid the use of an elevator (Meuser, Zadorin, 2015). However, a small number of all required social facilities could have been implemented, even though schools, high school or gymnasium, cinema, library, health centre or hospital, canteens, restaurant, saunas, shops and service centres were also planned for each micro-district within a 500-meter range (Hess, Tammaru, 2019, p. 146).

In other respects, these mass-housing blocks more or less completed their economic life-cycles (Meuser, Zadorin, 2015), and these circumstances enabled to appear residential real estate development potentials such as the progress of ‘urban transformation’ and/or ‘urban regeneration’ that can be used as an opportunity. Figure 1 shows the location of large housing settlements in Tallinn.

As demonstrated in Fig. 1, *Mustamäe*, *Väike-Õismäe* and *Lasnamäe* micro-districts are located 5–6 km away from the historical city centre. As explained above, it is known that residential buildings in these settlements have similar features as a consequence of typical prefabricated panel buildings.

Having studied the historical development process of the main residential settlements in Tallinn, the next subsection will discuss actual tendencies in the light of the acquired statistical data between 2015 and 2019.

* Väike-Õismäe settlement is today located within the boundary of Haabersti district (Google Maps, 2020).

** The core is used in the meaning of a central zone around which elevators, stairs, and service shafts are located in a high-rise building (Harris, 2006).

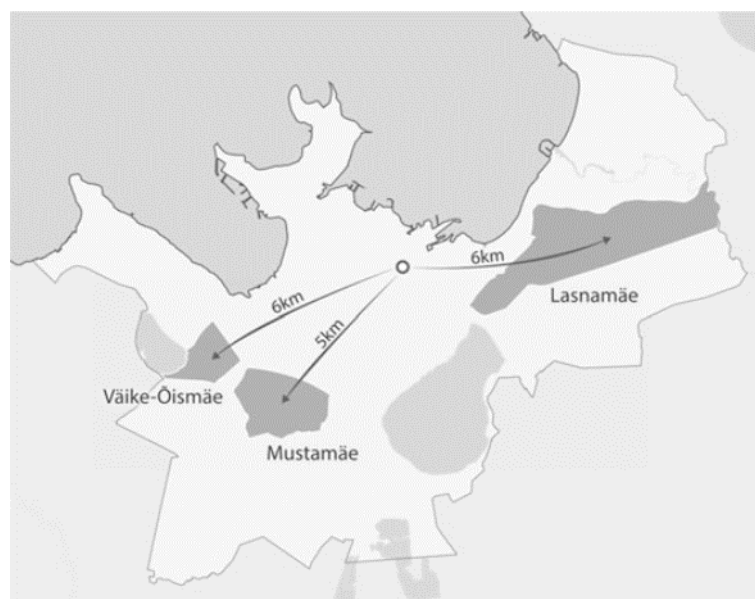


Fig. 1. Location of large housing settlements in Tallinn (Hess, Tammaru, 2019, p. 145).

3.2. Actual Situation in the Residential Real Estate Market in Tallinn between 2015 and 2019

In the light of the historical development process of large-scale residential settlements, which have caused urban sprawl, it can be undoubtedly said that Tallinn as an urban area has been *monocentrically* urbanised around its historical old town due to its natural borders like most European cities. On the other hand, statistical data obtained for the period of the past five years can reveal contemporary residential tendencies.

The statistical data on urban development can help identify socio-economic development tendencies in the residential settlements, improve principal and comprehensive approaches in the context of sustainability and, consequently, plan prospective inputs such as population, density, quality and quantity of dwellings, household size, energy consumption, and carbon dioxide emission depending on the energy infrastructure etc. that present future requirements and development potentials in the context of sustainable development. Even though all required statistics are not available in the housing context, existing data are quite explanatory.

In this context, Table 3 displays the selected urban indicators of Tallinn between the end of 2015 and 2019.

Table 3. Selected Urban Indicators of Tallinn between 2015 and 2019
(developed by the authors, based on the data from Statistics Estonia and Statistical Yearbook of Tallinn, 2019)

Indicator	2015	2016	2017	2018	2019
Urban population, thousand people	423.420	426.538	430.805	434.562	437.619
Population change compared to the previous year, thousand people	+3.118	+4.267	+3.757	+3.057	–
Area, km ²	159.31	159.37	159.37	159.37	159.37
Urban density, people/km ²	2657.84	2676.40	2703.18	2726.75	2745.93
Urban households, each	186.169	193.854	197.217	202.099	–
Average resident in household, people	2.2	2.2	2.2	2.1	–

Population of Tallinn varies from 423 420 to 437 619 people, the population density of the urban area varies from 2657.84 to 2745.93 and both indicators are in tendency to slightly increase. On the other hand, the average number of residents in households decreases from 2.2 to 2.1. However, there are no statistical data on the total residential stock area and the total number of dwellings in Tallinn.

In other respects, with regard to the 17 sustainable developments goals and relevant tasks until 2030, in Estonia statistics have been recorded since 2000. Table 4 represents sustainable development indicators according to the United Nations, (The United Nations, 2020).

Table 4. Sustainable Development Indicators according to the United Nations
(developed by the authors, based on the data from Statistics Estonia, 2020)

Indicator	2015	2016	2017	2018	2019
Share of architectural monuments in good and satisfactory condition, %	–	–	65	79	–
Number of traffic accidents with casualties	1376	1468	1406	1469	1406
Emissions of fine particulate matter (PM < 10 µm), thousand tonnes	14.54	11.92	13.91	–	–
Accessibility of green areas, % of population	–	–	90	90	–
Households satisfied with condition of dwelling, %	89.6	89.9	90.7	90.8	–
Share of people commuting by public transport, by bicycle or on foot, %	42.5	40.1	38.9	38.5	38.8

As demonstrated in Table 4, except the share of architectural monuments and accessibility to green areas which have been recorded for the first time since 2000, data are collected for the period of 2015–2019. According to the data obtained, it is seen that the number of traffic accidents tended to fluctuate between 1376 and 1469 per year, the share of people commuting by public transport tended to decrease from 42.5 to 38.8 percent, and emission of fine particulate matter decreased from 14.54 to 13.91 thousand tonnes between 2015 and 2017. It means that the use of public transport slightly decreased, consequently the number of accidents slightly

increased; however, the environment-friendly means of conveyance started to be used. The most important data in terms of users' expectations and requirements are the households satisfied with condition of dwellings the number of which very slightly increased from 89.6 to 90.8 percent, but still there were 9.2 percent of households unsatisfied with the conditions.

After all, it can be said that these indicators focus on living habits in order to make them better. They could also be interrelated with the planning concept in a long term, such as the development of architectural environment, the use of public transport, accessibility to green areas and satisfactory quality conditions of dwellings. In line with this objective, the use of the term of long-term planning already constitutes the backbone of the *Estonia 2030+* (The MoRA, 2012).

At this point, with the purpose of understanding the relationship between location-based population density and real estate prices in Tallinn, the population density and land use, as well as average prices of real estate objects by districts will be further examined. Population density and land use map of Tallinn are illustrated in Fig. 2.

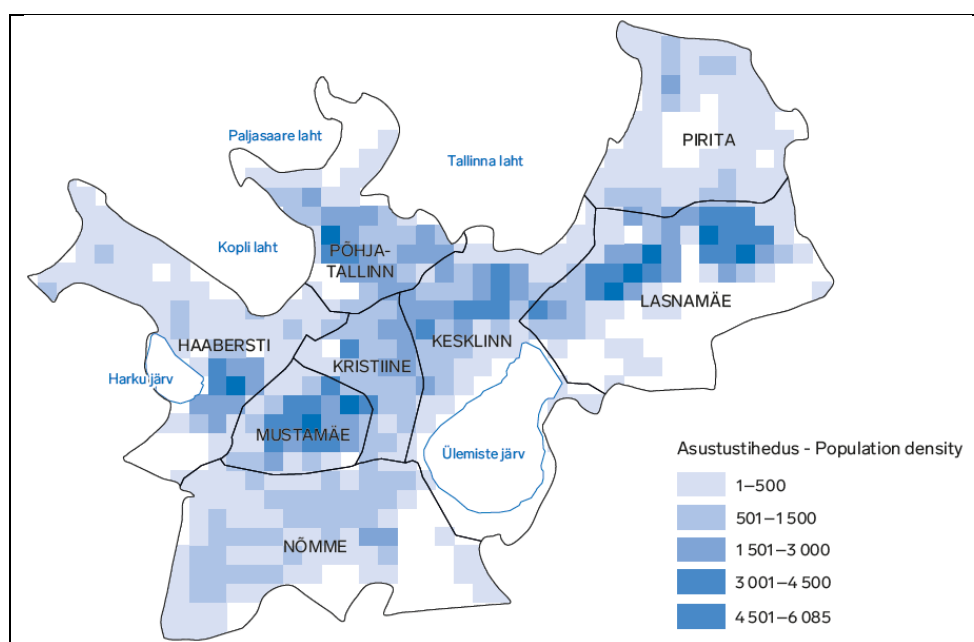


Fig. 2. Population density and land use in Tallinn (Tallinn City Council, 2019).

According to Fig. 2, districts with the population density within the range of 4.501–6.085 people per square kilometre are *Mustamäe*, *Lasnamäe*, *Põhja Tallinn* and *Haabersti*. Moreover, *Mustamäe* and *Lasnamäe* have similar features in terms of residential settlements such as population density, distance from city centre and accessibility to the public network (Meuser, Zadorin, 2015).

With the purpose of concretising the interrelation among residential real estate objects, location, and value, it is necessary to overview the prices of real estate objects in Tallinn. Table 5 indicates real property price statistics in Tallinn by

district and purchase-sale transactions along the period from the end of 2015 to the end of 2019.

Table 5. Average Real Property Price Statistics in the districts of Tallinn by purchase-sale transactions in the period between 2015 and 2019, €/m² dominated (compiled by the authors, based on real property price statistics from the Estonian Land Board)

District	2015	2016	2017	2018	2019
Kesklinn	1118.99	1535.65	1276.58	1575.59	1710.03
Põhja Tallinn	314.93	403.58	615.18	846.76	1115.23
Mustamäe	814.01	910.93	619.51	798.91	701.43
Kristiine	524.39	571.27	558.22	743.07	572.51
Lasnamäe	381.85	360.13	401.65	395.17	661.53
Haabersti	161.03	269.88	263.00	362.89	253.82
Pirita	194.82	260.93	222.70	315.50	178.56
Nõmme	136.22	223.15	214.90	204.84	255.80
Tallinn	376.37	505.11	498.52	576.81	601.14

According to Table 5, the average price of real estate objects in Tallinn increased from 376.37 to 601.14 €/m², the highest prices were observed in the old town, called *Kesklinn*, from 1118.99 to 1710.03 €/m², and the lowest prices were recorded in *Nõmme* comprising from 136.22 to 255.80 €/m² between 2015 and 2019. Another remarkable point is that the prices are lower in low density populated districts than in high density ones. As seen in Table 5, the prices in *Nõmme* and *Haabersti* increased from 136.22 to 255.80 €/m² and 161.03 to 253.82 €/m², respectively. On the contrary, prices in *Pirita* fluctuated in the range of 178.56 and 315.56 €/m² in the five-year period. When the prices in *Põhja Tallinn* are examined, it is seen that the district has the highest increase from 314.93 to 1115.23 in the same period. When *Mustamäe* and *Lasnamäe* are compared, it is observed that while the prices in *Mustamäe* tend to go down from 814.01 to 701.43 €/m², in *Lasnamäe* they tend to increase from 381.85 to 661.53 €/m². In *Kristiine*, in turn, the prices have a steady tendency from 524.39 to 572.51 €/m² in the period between the end of 2015 and 2019. A significant and sudden decline was observed in 2017, which could be explained by the change in aggregate supply and demand and consequently the factors affecting supply and demand (Binovska, Kauškale, Vanags, 2018).

According to the information on the population density and land use, and average real property prices in Tallinn, it is seen that population density, distance from the city centre, and average prices are in relation with each other and they are in the supply-demand equilibrium. As long as the distance from city centre decreases, the population density increases, and the average price decreases. Even though the population density and distance from the city centre by district cannot be certainly known, they present useful output to obtain the interrelation between urban planning and residential development potentials in Tallinn.

CONCLUSION

Within the research, the interrelation between urban planning and residential real estate development potentials in Tallinn has been comprehensively studied through analysing recent socio-development tendencies and decision-making mechanisms in Estonia in the context of sustainable development and historical development process of residential real estate market in Tallinn. As a result, the following conclusions have been made:

1. Price range of real estate objects is close to each other in the conditions towards homogeneity in residential settlements, which have similar residential and planning features – built in the same period and located at a comparable distance from the city centre and public services.
2. Nowadays, 17 sustainable development goals until 2030 led by the United Nations and influentially observed by the European Union are of great significance globally. Accordingly, Estonia also integrated these goals into the National Spatial Plan of Estonia 2030+ and Tallinn Development Plan 2014–2020 in hierarchical sequence. To fulfil these goals, the concept of long-term planning is highly considered. Additionally, it is considered that most sustainable development goals are somehow interrelated with the built environment. Polycentric urban structure, compact settlements and limited urban sprawl have come to the fore in the European urban agenda. Consequently, the concept of energy efficiency is also addressed in parallel with these objectives.
3. In the context of sustainable development, decision-making mechanisms in Estonia have also been studied within the framework of the present research. First, the concept of urban planning and, second, the interrelation between urban planning and decision-making mechanisms in Estonia have been examined.
4. In the course of time, Tallinn has been *monocentrically* urbanised around its old town. From the late 1950s, large-scale residential settlements, especially Mustamäe and Lasnamäe, were built during the Soviet period. In this regard, considering factors affecting supply and demand, it can be said that these settlements have comparable distance from the city centre and public services, similar housing features, as well as price range is close to each other in the conditions towards homogeneity.
5. The fact that these buildings have substantially completed their life cycles reveals a great need for housing today. When the necessities of the time and urban dimensions of the EU, polycentric urban structure, compact settlements and limited urban sprawl are taken into account, it can be concluded that the urban transformation and comprehensive planning based on a 4P principle seem a solution, which fulfils all the needs in the context of sustainable development. At the same time, these circumstances enable one to generate added value by increasing economic activities, as the real estate is in the first place and contributes a considerable amount to the gross domestic product.

As the research has its limitations, for example, comparison of prices, precise measurement of price range, and the conditions and prices of all singular real estate objects have not been examined in detail, they can be considered a future research area, taking into account the latest tendencies in the industry and previously available information and good practices of Tallinn. Thus, it can be recommended to obtain complete urban information and compare the effects on each separate object and, by analysing more questions related to the topic, to build a contemporary system regarding the interrelation of urban decisions and tendencies within the development of the real estate market, which can help investors and other market participants in sustainable, efficient and long-term decision making.

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