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Housing investments and shaping a compact city

Summary of doctoral thesis

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The overview of the dissertation topic

In today's more and more developed and global world, more than 54% of the world's population lives in urban areas (World Urbanization Prospects: The 2014 Revision). Due to the global economic development and the increase in the world population, urbanization processes will certainly progress in the coming years. By 2050, urban population is projected to increase by 2.5 billion and will already make up 66% of the total population. After many years of criticism, cities appear as a space offering multidimensional benefits, and even, according to Gleaser (2012, p. 13): "the one of man's inventions that makes humanity more prosperous, smarter, healthier and happier, and the development of the world more sustainable". The city is a reflection of the changes taking place at the turn of human history (Graham, 2016, p. 5-9). It is the areas with high density of residence that focus economic and social life, it is cities that provide the best access to services, education, health care in an economically effective way, and it is in cities that the challenges of today's world focus.

With reference to these intensifying urbanization processes, one of the basic features of space, namely its limitedness (in the global dimension as well as at the level of countries, regions and cities) makes managing it an increasingly complex task. Many cities struggle with the movement of residents from city cents (overcrowded or unattractive housing) to the suburbs and suburban areas. This causes urban sprawl and, consequently, the environmental burden is increasing by intensifying individual transport and its adverse impact on the environment. Monofunctional suburban living zones force frequent travel to the center of the urban center not only to work or school, but also to meet the basic needs of people such as the supply of food products, services related to sport, recreation and medical services. Most of the new residential zones, not equipped with the basic commercial and service fabric, are becoming a significant financial and environmental burden for the city, not to mention the broad social consequences of this phenomenon. In other words, the current spatial development in spaces around cities does not allow shaping sustainable development, constituting a chaotic set of housing investments in former agricultural areas, while weakening municipal units.

An important question that constituted the introduction to the considerations about a compact city is "how much space does a man need to live, work, relax, have comfort of

communication and cultural sensations?" and "how to make people use space economically and care for its quality?" (Chmielewski, 2012, p. 259). A strong tendency is observed to spread the living space of man in an uncontrolled manner, which causes drastic reduction of areas valuable in terms of nature and agriculture.

In the light of the global tendency of the population to move to cities, the expansion of buildings in an uncontrolled manner, as well as the economic, social and environmental effects of suburbanization, there is need of an idea which eliminate adverse trends and to direct the development of Polish cities towards a more sustainable future. The idea of a compact city responds to a number of challenges faced by modern cities, by proposing development based on a relatively high density of housing, close access to local services and jobs, efficient public transport and connecting multifunctional residential districts. The concept of a compact city is compatible with sustainable development (OECD, 2012, p. 28). Planning urban development by setting a development limit and enlarging it only when the available space is used, helps to protect valuable areas. This concept postulates a clear boundary between the city and the countryside. A compact city, also known as a short distance city (walkable city), is a proposal enabling socio-economic development in a limited space while ensuring a high quality of life for residents. Appropriate housing density, mixed used, a wealth of service, shops, workplaces, education and entertainment facilities within a 15-minute walk allows you to build friendly neighborhoods (Gehl, 2009, p. 81). On the other hand, a number of regulatory tools (financial, spatial or cooperation-based) proposed for the concept of a compact city allow cities to develop with respect for space, which in turn brings a number of benefits in the form of lower costs of maintaining and developing infrastructure, popularizing low-emission means of transport and thus also reducing air pollution as well as strengthening social relations in multifunctional residential districts.

Municipal authorities are facing increasing challenges in the sphere of managing urban structures. The outflow of residents also means a decrease in the city's budget revenues, while not giving up the use of municipal technical and social infrastructure services. Cities need to seek solutions that reverse this negative process. Strengthening housing functions within cities, in multi-functional, well-connected and accessible neighborhoods is an important step to start developing the city "inwards".

The dissertation refers to a wide spectrum of issues related to the city's functioning in the field of housing policy, public finances, development of technical and social infrastructure, spatial planning, maintenance and protection of the landscape and the natural environment. The dissertation is interdisciplinary and the results of the research may be useful for various scientific disciplines: economics and finance, management, sociology, urban planning, spatial management, etc. It should be considered important to indicate practical possibilities in creating compact structures through cooperation of investor entities with local government in the field of building multifunctional residential districts.

The last, but equally important reason to address this topic of work is the importance of the future of cities in the context of the functioning of future societies. The concept of a compact city can be considered as a way to achieve the shape of an optimal city, a city of short distances, as well as developing inwardly, intensively, but according to its scale and character (Solarek 2011). This approach involves many different aspects, and they are all extremely important from the point of view of rational management of available resources. The implementation of the goals of the compact city concept can help to protect these resources and enable future societies to function.

The subject, objectives and hypotheses of the dissertation

Accession to the dissertation was preceded by the formulation of the following research questions:

1. How strong are the processes of increasing the degree of compactness of Polish cities? How can they be monitored?
2. What is the significance of multi-family housing investments in building compact urban structures?
3. Do cities with a higher degree of compactness have lower expenditure on maintaining urban infrastructure?
4. Is the degree of compactness of the city related to the population and population density?
5. Is the compactness of the city oriented and required by local planning documents?

Given the above research questions, the main subject of the dissertation is to clarify and evaluate the possibilities of shaping a compact city through housing investments.
The specific objectives were set out in the PhD thesis, which helped to achieve the main goal:
a) Cognitive goals:

- C1: Review of foreign experience in implementing the compact city idea and assessment

possibilities of using compactness indicators proposed by the literature

- C2: Determining the compactness of selected cities, assessing the dynamics of its changes and the relationship with expenditure on infrastructure
- C3: Creation of a city typology based on a synthetic indicator of compactness
- C4: Identification of opportunities and barriers in co-creating a compact city by investors and local authorities

b) Methodological goal:

- C5: Development of a method for measuring the degree of compactness for Polish cities

c) Practical goal:

- C6: Proposal to define the scope and level of possible involvement of investors in the implementation of urban infrastructure accompanying the development of housing

Based on secondary sources and own observations, the following research hypotheses have been specified:
- H1: The degree of compactness of the city reduces public expenditure on maintaining urban infrastructure
- H2: Cities with a larger population have a higher degree of compactness
- H3: Housing investments determine the degree of compactness of the city
- H4: The increase in compactness of the city is an intended effect resulting from the urban spatial development strategy

The work has not only a cognitive layer, but also a utility character. The research results can be useful for city authorities, economists and urban planners involved in strategic urban development planning, especially in the pursuit of sustainable development. In addition, the

results of the work can be helpful in using the potential and shaping cooperation with private investors in housing construction to co-create a compact city.

Research methods and source material

The research procedure was composed of various quantitative and qualitative research methods. The theoretical part of the dissertation uses qualitative methods. The results of extensive literature studies were presented, both in the field of urban development theory, the role of housing construction in creating the city structure, the concept of a compact city, its genesis, goals and consequences. Literature studies have allowed to introduce factors of city formation and explain the role of housing construction in creating the spatial structure of the city. Analysis of the achievements of foreign literature in the field of the concept of a compact city allowed to clarify the genesis of its creation, made it possible to organize concepts and explain the essence of a compact city. Review of foreign activities in the field of compact city allowed for classification of regulations strengthening the building of compact urban structures. Thanks to the literature studies, the benefits resulting from the implementation of the compact city's goals were also synthesized and compared with the challenges faced by today's urban centers. This section uses research methods such as descriptive analysis and comparative analysis. The presented sample is limited due to the capabilities of one researcher,

In the empirical part of the PHD thesis, quantitative methods (structure and dynamics analysis) and the Pearson's linear correlation method using SPSS Statistics were used, mainly in the area of selected elements of the analyzed phenomena analysis and hypothesis testing. A special method was used to calculate the degree of compactness of selected Polish cities for 2012 and 2017 based on statistical data. Since the degree of compactness consists of many components, it was necessary to unify the nature of the variables (postulate of uniform preference) and secondly to bring different variables to mutual comparability (additivity postulate). It was decided to use the method of normalizing the values of variables, which goal is to bring the variables to comparability. As a result, it was possible to calculate the author's index of the degree of compactness (compact city index). The work uses statistical data from the Local Data Bank of the Central Statistical Office, Statistical Yearbooks of the examined

cities, numerous reports on the state of cities, as well as binding studies of conditions and directions of land development in the examined cities. The study was conducted for two time points (2012 and 2017).

An analogous method was applied to the case study (city of Poznań), except that the number of component measures was extended in the study and the study was carried out for the period 2005-2017. The source of the data, in addition to generally available statistical data, was statistical data obtained from an internal database on housing investments of the Faculty of Architecture and Urban Planning of the Poznań City Hall; Municipal Transport Board and Municipal Transport Company.

The structure and content of the dissertation

In the theoretical part, the main theoretical trends in the role of the housing function in the city and the concept of a compact city as the idea of rational management of city development were analyzed. In the empirical part, a method of measuring the degree of compactness of Polish cities was proposed and an attempt was made to search for relationships of compactness with the population, standard of living, as well as the revenues and expenses of city budgets. At the end, a summary and recommendations were made regarding the implementation of the compact city concept in Polish conditions. The work has been supplemented with attachments and lists of abbreviations used in its pages, sources cited and drawings, tables and charts used in it.

The work consists of six chapters, preceded by an introduction.
The first chapter deals with the topic of housing construction and its importance in creating the urban structure. The methods of locating the residential function in the spatial structure of the city in the most important urban ideas were analyzed. The role of housing construction in the socio-economic development of the city was also presented.

The second chapter presents the essence of the compact city concept. Considerations were taken regarding space and its features as well as the city as a special spatial form, the genesis

and reasons for formulating the concept of a compact city were presented. Features and objectives of the compact city were characterized and possible benefits and threats resulting from the density of urbanized structures were presented.

The third chapter is an introduction to the following empirical chapters. It describes measures of compactness of cities proposed by European and world documents as well as those used in the literature on the subject.

The fourth chapter focuses on the degree of compactness of selected Polish cities. Measures for Polish cities were selected, with practical and theoretical difficulties identified in this regard. The compactness of the degree of selected Polish cities was measured, an analysis of the dynamics of the compactness phenomenon was presented and an attempt was made to make a typology of cities in terms of compactness. In this part, the reasons for the compactness of the city and the relationship between the degree of compactness and the management of spatial development, the number of inhabitants, the satisfaction of residents' lives and the revenues and expenses of city budgets were searched.

The fifth chapter analyzes the case study of a selected city - Poznań. The ideas and concepts that influenced the urban and functional structure of the city were explained. An extended set of compactness measures was presented, followed by an in-depth study of the city's compactness in the years 2005-2017. An analysis was made of the dynamics of the degree of compactness in Poznań and relationships were sought with increasing the number of inhabitants, the satisfaction of residents' lives, public safety as well as the city's budget revenues and expenses. In-depth interviews were also conducted with five enterprises that are investors in multi-family housing. In this chapter it was also verified form and level of involvement of private sector investors in co-creating multifunctional residential districts, which make up a compact city.

The results of the dissertation

The idea of a compact city is one of the possible variants of proceeding to achieve success in the form of an efficient, healthy, full of possibilities and sustainable city. Its essence is a

compromise between providing conditions for socio-economic development and respect for limited resources, especially space. Cities, especially Polish ones, need to take the path of development of compactness as well as tools and methods for implementing and monitoring the effects of these activities.

The work proposes author's method for measuring the compactness of selected Polish cities, an assessment of the dynamics of its changes as well as a typology of cities based on a synthetic indicator of compactness. The study confirmed that housing investments are a significant factor in the increase in the degree of compactness of cities. A relation between the population of the city and the degree of compactness was also observed - in larger cities the degree of compactness was higher in terms of population. In addition, there was a relationship between the degree of compactness of the city and the presence in the planning documents of guidelines for shaping compact urban structures. The analysis of the case study further confirmed that as the degree of compactness increases, the share of city budget expenditure on urban infrastructure decreases. Studies on compactness have also confirmed that spaces with more compactness are characterized by a higher degree of public safety.

The results of the work allowed to create a set of recommendations for local governments covering a number of actions aimed at achieving a compact, sustainable and accessible city. They concern the necessity of:

- identification of reserves, determination of absorbency and time perspective
- implementing compact city tools
- proper data collection and based on them, measuring city density
- ongoing monitoring of the consequences of increasing population density and housing
- reacting, updating, making corrections in actions

In order to further observe the phenomenon of compactness, it seems reasonable to conduct longer observation studies and to search for a greater number of relationships between the degree of compactness of the city and the city's financial efficiency, living conditions or the state of the environment. It is also seen as extremely important in comparing the phenomenon of density and dispersion of housing, comparing their strengths and effects.

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