

## COMPACT CITY IN DISPERSION

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**Abstract:** Shaping a compact city shouldn't refer to historical patterns, but must take into account modern conditions and phenomena such as urban sprawl. The compact city should be understood by the efficiency of land using and the quality of life rather than geometric shape or selected indicator such as population density. This is why it is possible to shape dispersed development which has some attributes of compactness like efficient infrastructure and land using, good access to public services, and strong neighbourhood ties.

The goal is not a dense city but economical one which assures good quality of life. This goal can be reached with good management, organisation, tezzation where population density is rather low (about 600 inhabitants per 1sq km), but certain districts are of compactness features.

**Keywords:** Compact city, Upper Silesian agglomeration, urban planning.

**JEL codes:** R10

### Introduction

*A compact city* is one of many concepts, mental constructs that refer to contemporary urban settlement. Is it possible to talk about it as a certain perfection to which we should aspire? Is a compact city a desired remedy for the inconveniences and contradictions of modern urban life: environmental, economic, social problems, which in a „perfect” compact city could be easier to solve?

For the purposes of this study we assumed that urban sprawl, spillover of cities, is a phenomenon that could be observed for many decades and there are no indications that this process (urban sprawl) could be stopped and that we could return to cities concentrated in terms of area, similarly to historical cities.

The aim of this analysis is thus not to propose any innovative solution, but to consider the methods to achieve compactness in dispersed urban networks so frequent in the modern settlement system.

Therefore, we should assume that compactness can also be achieved in dispersed development systems. In order to confirm this assumption we will analyse the methods of achieving certain compactness properties in dispersed systems, discuss the definition of compactness in historical and modern cities, as well as prove, on the example of cities forming part of the Upper Silesia agglomeration, the possibility to use the historically formed structure to create a compact city in dispersion.

## 1. Historical city as a model of a compact city

Until the end of the 18<sup>th</sup> century, European cities were compact – concentrated, as such form generated benefits: safety, access to the labour market, easier exchange of goods and information. It is not a coincidence that old ideas of perfect cities usually present them in the concentric or polygonal shape. They were depicted as such in the 1898 **Garden-City** concept of Ebenezer Howard, although instead of a dense 19<sup>th</sup> century city it suggested a thinned-down garden-city combining the features of urban and rural areas. Toni Garnier's concept of industrial city (*Cite Industrielle*) of 1904 was a less concentrated arrangement divided into zones, where monofunctional districts were separated by wider areas, but individual zones-districts were compact. The stereotype of a geometrically compact city was finally broken by Frank Lloyd Wright, who in 1932 invented the concept of **Broadacre City**.

In modern debates on city compactness, references are made to those historical, „perfect”, geometrically compact cities. We cannot, however, perceive a modern *compact city* through the prism of old *compact cities*. According to Mironowicz (2016: 89), it is highly probable that analogy with old models would lead to wrong conclusions. After all, perfect urban concepts were not developed *a priori*, but rather by extracting the best features of the already existing cities. Attempts to construct perfect cities, *e.g.* Mazdar (with the proposed population density of ca. 8,000 residents per km<sup>2</sup>) are merely isolated experiments. Therefore, if we were to answer what form of a modern compact city is perfect, it would most probably resemble what we can see around us today. This form would be also highly volatile, as the city undergoes constant transformations adapting to new conditions and needs. Therefore, we might state that the best (best possible) form is still under development and certainly it is not perfect as of this particular moment.

This issue can be illustrated on the example of housing estates built in Poland in 1950-1990. They were supposed to respond to the needs caused by war damage, mass migrations and high birth rate. Between 1945 and 1990, Polish population increased from 24 to 38 m, and population in the cities rose from 8 to 24 m, *i.e.* by about 16 m (Strzelecki and Witkowski 2009). In the same period, the urbanisation rate rose from approximately 33% to about 63%.

Construction of large complexes on the current outskirts of the cities reduced their compactness while increasing the distance, reducing population density and

development density. Even then voices were heard that population density in many of those housing estates is too low. Other properties of those assumptions were also the subject of criticism, *e.g.* the fact that they seldom created a place with which local community could identify itself. Among the concepts emerging at the time to increase the compactness of new districts, two solutions were notable that offered different ways to achieve this objective:

- Ursynów Północny in Warsaw (1970-82) project of Marek Budzyński and his team, who attempted to achieve the structure and the compactness of a big city with the use of classical urban planning forms (such as streets with row housing);
- the project of development of the area surrounding the village of Owińska near Poznań (1981-84) by Jerzy Buszkiewicz and his team, who suggested a dispersed system of smaller compact housing estates, so-called Federation of Small Cities (Gzell *et al.* 2012: 23), where compactness was achieved in a way that was similar to small towns, *i.e.* with “low-and-dense” development.

Commuter districts generated massive traffic. Low availability of public services also generated additional traffic towards the city centre in order to satisfy the basic needs of residents. Today these housing estates are not perceived as examples of dispersed, non-compact development. They are modernised, to a great extent equipped with social infrastructure, trade and recreation facilities, which significantly improved the standard of living of residents. Traveling to the city centre or farther is still related to commuting, higher-standard services, or social reasons. What changed for the worse is the means of traveling: nowadays it is done by private cars instead of public transport. After 2000, less developed areas of those housing estates or around them were gradually filled with new residential and service buildings, thus improving the compactness of those parts of the cities; voices were even heard requesting a more intense housing development so as to connect those estates with the city centre (Gruszecka *et al.* 2009).

In the discourse on compact cities, housing estates composed of „blocks” were replaced by suburban single-family housing estates, in particular the so-called “field-like” development, *i.e.* using the agricultural geodetic division and characterised by high dispersion, stylistic chaos, poor transport services, failing infrastructure, lack of public services or public space. In many cases, residents of those areas raise their standard of living measured by the area per one person and the distance from the forest wall, at the same time lowering that standard by the lack of access to services or deteriorated environmental conditions *e.g.* due to low emission.

The example of „block” housing estates and modern dispersed development shows that the main problems are related to transport, and, at the first stage of their existence, low effectiveness of area use and unsatisfactory quality of life. However, if we follow the development of housing estates from the second half of the 20<sup>th</sup> century, it is clear that they became more compact in the course of the development lasting several or even several dozen years. However, it should be noted that there is a significant difference between “block” housing estates and the poorly organised modern suburban development. The former were fully planned and gradually implemented or modified; the latter seem rather chaotic in the most part. Nevertheless, new housing estates are built, albeit very rarely, away from city centres

and developed according to the plan, equipped with appropriate infrastructure, quite compactly built up – in other words, compact. One example could be the currently developed town of Siewierz-Jeziorna in Śląskie voivodeship.

## 2. Definition of a compact city

Compact city is generally defined as a compactly developed city, as the term *compactness* evokes closeness, focus, continuity, concentration. Buildings and components of technical and social infrastructure should be close to each other, concentrate around public space, which reduces the distance and facilitates access to all functions of the city. Those features are emphasised in many definitions of the compact city (Bradecki 2009: 14; Stangel 2013: 8; Ogrodnik 2015: 37). The compactness, as well as the diversity and the neighbourhood, are essential for a city to convert as a complex adaptive system and to adjust to the changing conditions (Mironowicz 2016: 213).

In a compact city, land should be used intensively. This may mean multi-storey buildings and reduction of the surface of open areas. One should ask whether the compactness measures most often applied in urban planning, *i.e.* population density, built area and housing density, as well as the number of apartments per ha or km<sup>2</sup> (Bradecki 2009: 19) fulfil all criteria of a compact city. Perhaps a compact city is the one whose territory produces most added value? In such case, compactness would be measured by a high land allowance, and not necessarily by the greatest density. One can imagine the extremely concentrated slums which generate little income, and a less intensively developed land generating higher added value; or the extremely compact slums and a loosely developed exclusive residential district. Such comparisons prove that we should refer the compactness to different purposes of land and different methods of its development. If we discuss a city within its administrative borders, its compactness according to the above criteria can only be approximated. Therefore, assessment of compactness applies to individual parts (districts) which should be effectively developed. However, one more question remains: how do you live in a compactly and densely developed city? – perhaps there is more nuisance, such as the noise, pollution *etc.*, than in a less compact city? We have thus the next criterion, not applying to compactness as such, but rather to its assessment. What level of compactness is the best to live with?

## 3. The concept of a compact city, market economy and social needs

If we assume that there is a free market on which supply and demand for such goods arranged in space as apartments, services, public space, infrastructure *etc.* develop, we should assume that both compact and dispersed spatial structures are the result of operation of the market economy. If there was no supply of plots situated on

distant suburbs and no buyers for those plots, there would be no urban sprawl. Doesn't the compact city meet the conditions of market economy?

We know that the real estate market is imperfect, thus certain regulations governing it may foster compactness or not. The law effective in Poland has been gradually defining the concept of compactness. In subsequent acts on spatial planning we may observe the evolution of the rules of developing new areas. In the Act on spatial development of 1994 (Ustawa ... 1994), the rules of development in support of compactness were basically not formulated. The same applied to the Act on spatial planning and development (2003) in its original wording did not refer to the issue of compactness. However, since 2003 many negative situations have been observed, *e.g.* allocating too large quantity of agricultural lands to housing development, which led to an uncontrolled, chaotic dispersal of development. After amendments, the current version (2017) of the Act in Article 1(4) formulates five rules of planning and developing new buildings:

- minimisation of transport absorptivity;
- maximum use of public transport;
- facilities for pedestrians and cyclists;
- locating new buildings in areas with fully fledged compact spatial and functional structure, in particular by complementing the existing buildings;
- locating new buildings in undeveloped areas exclusively where the existing buildings cannot be complemented and only on areas equipped with appropriate infrastructure (Ustawa ... 2003). However, these are rules rather than specific requirements *e.g.* in the form of indicators. Therefore, it is clear that their application in specific places is hard to check. The matter of compactness understood as development density is subject to local law, *i.e.* local spatial development plan, where the minimal and maximum values of this rate are determined.

Does the compact city respond to social needs? The answer to this question is more difficult. If we ask *e.g.* about the fair division of building and infrastructure maintenance costs in areas with compact and dispersed development, it turns out that residents of the former are subsidising residents of the latter. If we ask about access to public services, possibility to use the attractive public space, the compact city is better suited to social needs than the dispersed city. Finally, if we ask against the physiognomy of those areas and their assessment by residents, the dispersed city is often assessed worse than the compact city.

One should suppose that the real estate market created by economic calculation, availability of free areas, lifestyle models etc. will be forcing further development of open areas. Thus, the main problem to be solved is improvement of the characteristics of existing and newly built buildings so that it becomes more effective. What specific solutions can be applied to offset or limit weaknesses of the dispersed city?

#### 4. Methods of obtaining compactness in dispersed systems

Reference literature lists many groups of instruments used for regulating the compactness of cities, *e.g.* strategic, planning, fiscal, or investment ones. With reference to existing dispersed systems, it is also possible to mention organisational and technological (technical) instruments. The simplest action is to increase development density (infills, superstructures, secondary division of plots and their development).

Another direction is strengthening peripheral districts which can be an alternative to the suburban or rural location for those seeking the place to settle. For example in Zabrze an attempt was made to determine how to strengthen peripheral districts with low public investments. In 2015 and 2016, the Department of Urban and Spatial Planning of the Faculty of Architecture at the Silesian University of Technology carried out a study entitled *A more local Zabrze*. Its aim was to identify possible revitalisation measures in peripheral districts of Zabrze in order to enhance their concentration and compactness. Larger public projects stimulating more intense development and improvement of spatial order are more important in dispersed peripheral areas. They are usually public service facilities around which the activity of residents of the surroundings focuses. It improves the quality of life, as well as reduces traffic to the city centre.

The abovementioned measures lead to increase building density and then to an increase in population. However, certain organisational or technical measures may to a certain extent offset the negative sides of dispersed development (Table 1), although they do not increase its compactness.

Table 1. Selected methods of limiting the weaknesses of a dispersed city

Selected weaknesses of a dispersed city		
Problem	Description	Solution
Weak neighbour relationships	Prevailing single-family and dispersed development and little public space do not support interactions	Forming housing communities (owners') also on dispersed development areas to manage them
Ineffective infrastructure	Roads, sewage system, power grids etc. handle too few users	New technologies: dispersed energy, own water supply coordinated with rain water and grey water management, individual removal or neutralisation of waste and wastewater
Long and burdensome commuting	Distance from the city centre, poor availability of public services, dispersed development result in the need for commuting by individual or public transport	Teleworking and teleservices <i>e.g.</i> e-learning, small centres of e-services, development of local economy <i>e.g.</i> neighbourhood services.

Selected weaknesses of a dispersed city		
Problem	Description	Solution
Waste and closure of land	Low housing density, ineffective road infrastructure that occupy too much area	Permeable surfaces, permanent or periodical diverse use <i>e.g.</i> car park used as football pitch in specific hours
Lack of the appropriate public space	Public space is not very busy, which makes them poorly equipped and maintained	Location and integration of different activities <i>e.g.</i> trade, catering, administration, sports, culture <i>etc.</i> in the vicinity of a traffic node.
Weak availability of public services	For economic reasons public services are not located on areas with lower population density	Mobile or temporary services <i>e.g.</i> medical advice, some educational services (courses). Public e-services, <i>e.g.</i> administrative services.

Source: Own study.

## 5. Compact cities in Śląskie voivodeship

If we measured the “voivodeship compactness” by population density, Śląskie voivodeship is certainly the most compact in Poland, with population density of 371 compared to Polish average of about 123 persons per sq km. This results from its degree of urbanisation. However, measurement of population density in individual cities of Śląskie voivodeship within their administrative border generates surprising results. Out of cities with powiat status in the Upper Silesia agglomeration (the largest urban complex in Poland with population exceeding 2 m residents – Fig. 1) only two – Świętochłowice (3,829) and Chorzów (3,302) are in the first ten of most densely populated cities of Poland. There are as many as 5 cities from Mazowieckie voivodeship, among others Warsaw (3,372), Legionowo (4,001) and Piastów (3,980). However Jaworzno and Dąbrowa Górnicza located in the Upper Silesia agglomeration belong to the most scarcely populated powiat cities in the country with indicators of 608 and 650 persons per sq km, accordingly, since their administrative borders host large unbuilt areas, bodies of water, industrial or post-industrial land. As it can be seen on these examples, measurement of the compactness by population density within the administrative limits can be disrupted by large share of unoccupied areas. A test of compactness of morphological units, *e.g.* housing or city centre areas, offers more reliable results. It is also possible to measure the compactness of individual housing estates or quarters. If we apply such an attempt, we must recognise that cities of the Upper Silesia agglomeration, even the more scarcely populated ones, as compact cities. The majority of them are a conglomeration of old cities and towns, villages, factory housing estates. Especially a location of mine housing estates was significant, as it resulted from dispersal of mining plants on the area of the entire mining land. As a result of further consolidation several large cities were created

from a few hundred of such units. Many of those small units retained their distinct morphological or social identity, and some are isolated from city centres and other districts of the same city.

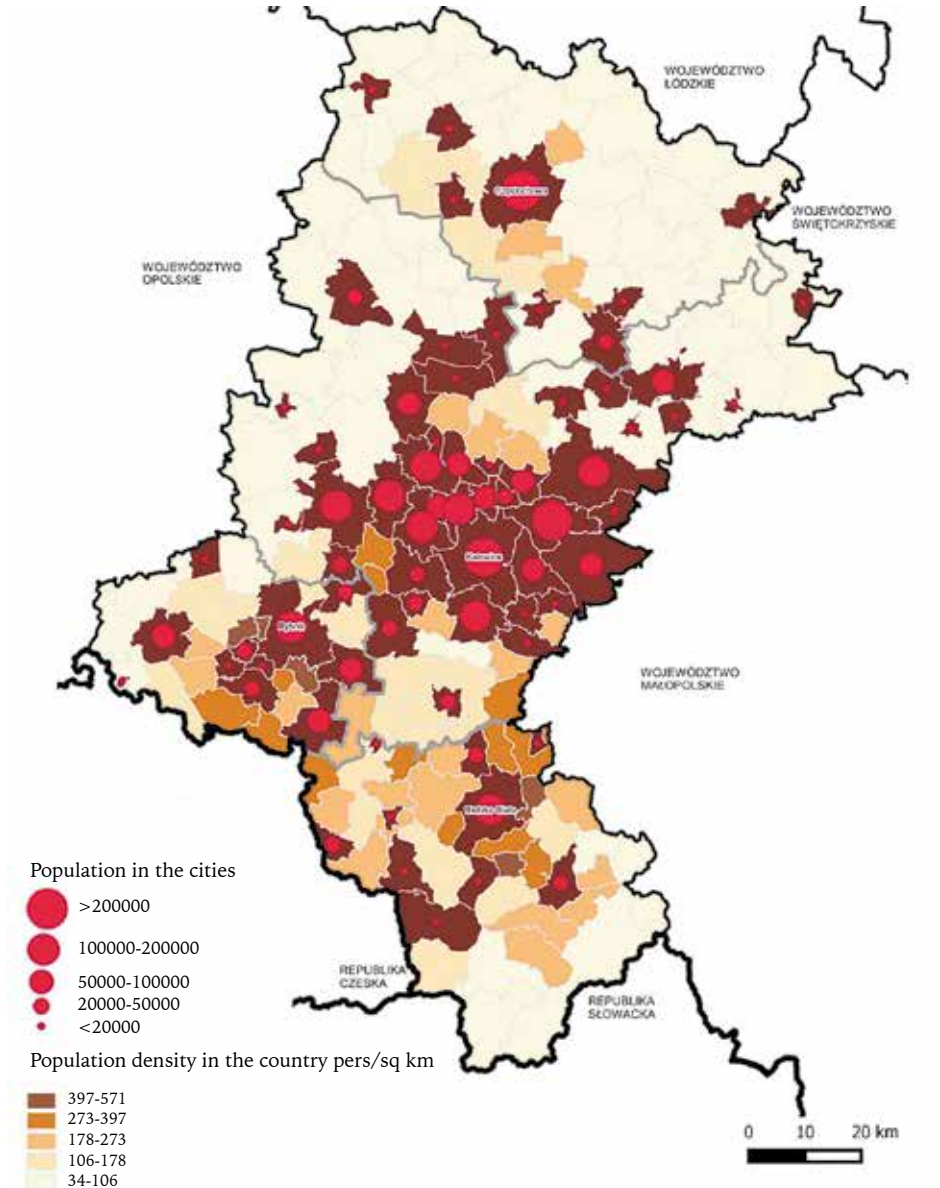


Fig. 1. Location of population in Śląskie Voivodeship  
Source: (Plan... 2016:11, on the basis of Local Data Bank GUS 2014).



Jezenicka (2011) distinguished about 260 such housing estates in the area of the Upper Silesia Metropolis constituting the central area of the Upper Silesian agglomeration. Some of them have the character of small towns, *i.e.* have an appropriate structure and equipment with basic services. They are compactly developed and densely populated, although the cities to which they belong are not perceived as particularly compact (Fig. 2).

Thus it can be stated that in the Upper Silesia agglomeration we can observe the system of compact settlement subdivisions dispersed in greater urban structures created as a result of the development of mining and processing industry.

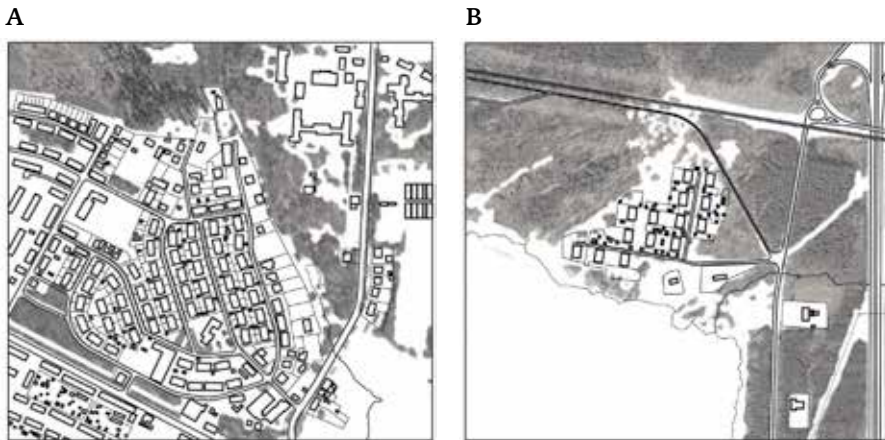


Fig. 2. Examples of compact but dispersed units (districts) in the urban structure  
A. Ballestrema estate in Zabrze; B. Pogoria estate in Dąbrowa Górnicza  
Source: (Jezenicka 2011: 71 and 74).

## Conclusions

Shaping the compact city cannot be based on historical models but it should include the existing conditions and processes in modern cities.

It is possible to obtain compactness features in existing dispersed systems by investment, organisational and technical actions.

The Upper Silesia agglomeration is an example of a settlement complex, in which in the course of development a system of small, compact units dispersed in structures of bigger cities was created. Spatial policy of the emerging metropolis gathering cities from the Upper Silesia agglomeration should be focus on supporting compact cities with the use of their existing structure.

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