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## **CHANGES IN THE SPATIAL FORM AND STRUCTURE OF CITIES AND CRITERIA FOR SUSTAINABLE DEVELOPMENT**

This article considers the ecological aspects of various models of the spatial development of cities. Taking into account the main directions of urbanisation processes, we attempt to indicate which traits of urban spatial structure are closest to the criteria of sustainable development.

### **1. Spatial centralisation and decentralisation within the process of urbanisation**

Cities have a very long history as a form of human settlement and the present layout of many of them depends on their historical development over the centuries. For a long time the area occupied by a city tended to be relatively small, being adapted to the needs of inhabitants moving around the city by foot, and clearly bounded by the city walls dividing the city from the surrounding countryside.

Cities always carried out a set of functions, which were of fundamental importance for the inhabitants of the region. However, the majority of the population lived in the countryside. At the beginning of the 20<sup>th</sup> century about 14% of the world's population lived in cities. Fifty years later this proportion had already increased to 29%. The dynamism of the industrial revolution caused an accelerated concentration of the population into urban areas. By the end of the 20<sup>th</sup> century about 50% of the ever increasing world population lived in cities. In countries character-

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ised by the highest levels of urbanisation more than 75% of the population live and work in urban areas. In the majority of Western European countries, this proportion is above 80% and sometimes even above 90%.

Urbanisation, in terms of space and the landscape, means an increase in the surface area of terrain used in a way typical to cities. An urban area is characterised by, amongst other things, a very high degree of transformation of the natural environment, the character and high concentration of buildings, as well as technical infrastructure and the spatial layout of residential areas. In the past few decades the spatial aspect of urbanisation has been far more apparent than in earlier phases of urbanisation.

The course of these processes in the countries where urbanisation is most advanced indicate that the first phase of urbanisation, connected with the industrial revolution, was clearly marked by a very high concentration of people migrating to the city into a relatively small area. The maximisation of the population density in the centre of the city and the surrounding districts and the fall in population density in the surrounding countryside are characteristic of this phase.

The spatial expansion of urban settlements and changes in their internal structure are becoming more and more important. The proportion of people living in urban areas has been increasing rapidly. This has, however, been followed by a dynamic process of lowering the concentration of urban areas, resulting from the development of terrain surrounding the city, this terrain now carrying out a range of important functions. The accelerating development of the outskirts of cities has been described as **suburbanisation**. The United States is an example where it is possible to trace the course of suburbanisation, as well as other recent courses of the urbanisation process. The most marked acceleration of the suburbanisation process in the United States took place after the Second World War, during the fifties.

In general, the processes of spatial decentralisation of urban areas and the development of areas surrounding the city have interrelated causes. Suburbanisation was expressed in the localisation of production, and thus of places of work, localisation of places of residence and in the sphere of localisation of trade and services. The development of transport played a huge role in this spatial expansion of cities.

As a result large cities, which originally were compact and concentrated on a relatively small area, have become expansive settlements. This process has been referred to as the spatial explosion of cities.

In the latter stages of this process, together with the spatial development of urban areas, metropolitan areas or regions have come into being. These regions contain an increasing percentage of the population of

a given country. It should be stressed, based on the example of the United States, that the centres of metropolitan areas have developed markedly slower than the outskirts. An analysis of the causes of this shows, amongst other things, that the increasing level of suburbanisation connected with an increase in the living standards of urban residents is creating an increasing number of communication problems. The number of people, who have to travel to their place of work or to services located in the centre of the city, is constantly increasing. Access to the city centre is becoming more and more difficult, despite the enormous funding connected with the modernisation of communication and transport systems. This situation is an incentive for service organisations to consider localisation outside the city centre within the suburban area. Trade and services demand more and more space in order to carry out their activities, which also stimulates the creation of trade-service centres outside the city centre.

Many organisations deciding to leave crowded and non-functional city centres are beginning to look for localisations not just in suburban areas, but more and more commonly in non-urban areas in other parts of the country. The drift of residents and economic activity from the traditional city centres has been described as **deurbanisation**. An expression of deurbanisation is the creation and development of multi-centred metropolitan regions. Unlike a clearly defined city, this form is spread out over a wide area and is composed of various centres, which are able to attract residents, workers and clients.

The critical state of the centres of certain cities has led to action in order to revitalise them, increase their role and attract richer inhabitants. These phenomena are treated as symptoms of a reurbanisation phase.

Research regarding various European countries in the period 1950–1981 confirm the phenomenon that urban regions have passed through various stages of development<sup>1</sup> [Grzeszczak, 1996]. In France, the largest group of regions had entered the suburbanisation stage. In the other countries researched, the largest group of regions had entered the advanced suburbanisation stage. The number of regions entering into the deurbanisation stage was increasing in each country. These processes continued in the next decade. From other analysis, covering only larger agglomerations, it results that in Italy and France half of the agglomerations were in the urbanisation stage in the sixties. However, by the seventies the majority of these agglomerations were in the phase of suburbanisation or of advanced suburbanisation. In West Germany, a half of the agglomerations were in

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<sup>1</sup>This research covered the Benelux countries, France, Germany, Great Britain and Italy.

the suburbanisation phase and 1/3 in the advanced suburbanisation phase in the sixties. In the next decade, half of these agglomerations were already in the advanced suburbanisation phase, whereas 1/3 had passed on into the deurbanisation and reurbanisation phases.

Traditionally urban development processes have been most advanced in Great Britain. In the sixties the majority of British agglomerations were in the advanced suburbanisation phase and in the following decade almost a half of these agglomerations were in the deurbanisation and reurbanisation phases.

## **2. Ecological aspects of centralised and decentralised urban structures**

In the discussion about the possibilities of implementing the bases of the sustainable development of cities, many researchers state that, from an environmental point of view, spatially compact cities are much more favourable than the decentralised forms common in the United States, Great Britain and Australia. Researchers point out that in spatially smaller cities, containing multi-functional districts, the level of access is higher, which as a result leads to decreased petrol consumption [Hall, 1998, p. 179]. Increased population density enables lowering the unit costs of water supply. Concentration of production and consumption enables organising a more effective system of collecting and recycling waste materials. A centralised city leads to a decrease in the level of conflict between the needs connected with the development of the city and the need to protect agricultural land. It is simpler and cheaper to develop public transport systems in spatially smaller cities, which decreases the pollution level and other problems caused by motorisation. Such cities enable a higher level of access to social services e.g. health care and education.

Simultaneously, problems and threats to the environment connected with the development of decentralised cities are stressed. These include such problems as:

- extensive use of land;
- an increase in the need for the use of private transport, which results in increased petrol consumption and air pollution;
- markedly worse conditions for the organisation of an effective and efficient system of public transport;
- an increase in energy consumption resulting from a higher proportion of detached buildings, which are characterised by worse thermo-insulation parameters;

- increased water consumption e.g. for watering lawns;
- decreased efficiency in waste collection and recycling.

The arguments presented above are given by the supporters of the development of centralised cities. Although they are closer to the theoretical criteria for sustainable development, they are not readily acceptable to the majority of inhabitants. Increasing the population density of cities contradicts the concepts of the spatial planning of cities, which developed in the 20<sup>th</sup> century as a reaction to the bad housing conditions, which dominated in crowded cities during the first phase of industrialisation. Life in suburban, detached housing with a garden is a significant element of the value system in many cultures [Carley, 2000, p. 137].

Taking into account the expectations of society and economic constraints of suburbanisation processes, a return to the centralised model seems highly unlikely. The level of savings in energy and petrol consumption connected with an increased population density also seems debatable. Positive attributes of decentralised urban forms, from the ecological point of view, can also be pointed out. These include: the positive influence of the large area occupied by gardens on the micro-climate, the possibility of producing extra sources of food on allotments, the retention of rain water, space for devices which make use of solar energy.

### **3. Spatial development of cities according to the bases of long-term, sustainable development**

Amongst the general aims in the process of managing the urban environment one should mention: the optimal use of non-renewable natural resources, increasing biomass and biodiversity, the use of renewable resources rather than non-renewable resources, waste control and promotion of recycling [Peški, 1999, p. 34]. Projects connecting the natural and social environments are important, in order to create a sustainable urban environment.

Spatial planning is a fundamental factor in the shaping of a city. As laid out in the New Charter of Athens, containing the bases for urban planning passed by the European Council of Town Planners (ECTP) in 1998, long-term and sustainable development became a prime consideration in urban planning in the nineties. It was declared that the bases of sustainable development must become an integral element of urban planning.

Urban areas emit pollution into the atmosphere and produce large amounts of waste, which leads to a decline in the quality of the environment. This means when developing a city, it is necessary to counteract

any decline in the natural environment and protect the most important elements in the cultural environment. The conservation of biodiversity and wise use of energy resources are crucial.

Within the new bases of spatial planning, it is thought that the concept of a multi-centre structure, the city as a group of towns, is most appropriate, in order to fulfil the vision of the long-term and sustainable development of a city. This is an important opinion in the discussion regarding the relative attributes of centralised and decentralised cities. However, these two models are based on single-centred cities. On the other hand, it seems that in the 21<sup>st</sup> century the development of multi-centred cities, rather than single-centred cities, will dominate. Urban regions, which will be made up of more centres commonly carrying out a whole range of necessary functions, could prove to be a more favourable model from the environmental point of view. By localising work places, housing, as well as attractive trade and service centres with access to the social services in these various centres, transport demand will be decreased, leading to a lower consumption of petrol per inhabitant. Powerful, although relatively small, centres would enable the solution of communication problems by the use of public transport. In general, the multi-centred model seems to be a logical solution for the development of cities, satisfying the criteria of sustainable development.

Contemporary planners are strongly in favour of multi-functional use of the given regions of a city. This means moving away from the bases of segregating the city into monofunctional areas. The only functions, which should not be located in these multi-functional centres, are functions which are a threat to health or safety. The designation of recreational and green areas should be a particularly important element in city planning. It is necessary to aim towards creating and conserving so called „ecological corridors” connecting the inner city area with the open land around the city.

#### **4. The spatial form and structure of cities developing under the conditions of real socialism**

The processes of urbanisation are less advanced in the countries of Central and Eastern Europe than in the most highly developed countries. An acceleration of urbanisation occurred in the period of the planned market, an expression of this being the massive migrations from the countryside to cities connected with the process of industrialisation. It is accepted that cities are in the concentration phase or at the beginning of the suburbanisation phase.

In the past few decades, elements arising from the bases of the planned market have interplayed with the historically formed spatial structure. As a result, cities and districts were built from scratch. "Socialist cities", began to be differentiated as a specific type of city.

The following traits of the spatial structure of cities developing under the conditions of real socialism should be mentioned (amongst others):

- An exaggerated drive to segregate functions, which lead to large mono-functional districts /industrial, residential/ whilst other functions remained underdeveloped. The underdevelopment of services in residential areas on the outskirts of cities was particularly severe.
- An illogical approach to land management, which as a result lead to the development of large tracts of countryside for the use of the cities, despite the fact that there was land still unused in the already urbanised areas.
- A lower proportion of land occupied by residential areas in the urban structure than in Western European cities and a higher population density in these areas, which was a result of the housing policy of building large blocks of flats rather than developing single-family homes.
- One trait of the large residential areas was monotony and uniformity as a result of the technology used in the housing industry/ housing factories/ and centrally defined norms.
- The increasing degradation of large built-up residential areas built at the end of the 19<sup>th</sup> and beginning of the 20<sup>th</sup> century.
- The development of large industrial complexes without the necessary technology to protect the environment, which lead to a decrease in the quality of the urban environment.
- A larger proportion of industrial land within the general structure of developed land than in Western Europe, which resulted from a more extensive use of land due to a lack of a land rent mechanism.
- The domination of public transport in cities, together with a low degree of development of motorization. Concentration on access to work and the domination of the public transport system stimulated the spatial development of large cities in the form of bands of ever increasing length along the main communication routes.

The new political, economic and social factors in the former socialist countries gave rise to the spatial transformation of cities. At present, researchers are debating the degree to which and the speed at which the political changes and return to a market economy will effect the formation of new spatial structures within cities in Poland and other Central and Eastern European countries. The questions are what will be and what should be the future direction of this process from the point of view of balanced development.

## 5. Directions in the change of spatial use within cities in the former socialist countries

The new economic and political conditions, as well as new systems of municipal government in Central and Eastern European countries set in motion a process of spatial transformation. The changes observed regard the urban landscape, the structure of land use, the spatial distribution of social groups and directions in the spatial expansion of cities.

These processes are clearly bringing the spatial structure of cities in Poland and other countries within the region more and more in line with the structures developed within Western European cities. As well as desired and favourable processes, disadvantageous phenomena, from the point of view of society or of sustainable development, have appeared.

- The previously accelerated processes of urbanisation and concentration of the population in cities slowed down. The demand of industry for workers quickly grew in the period of the so called 'socialist industrialisation, all the more so because its development was of an extensive nature and any increase in production was a result of increased employment and not of increased efficiency. The present restructuring of industry and laying off of excess workers has meant that cities do not offer work to rural inhabitants and migration to the cities has clearly fallen. It has been noted in some of the Polish regions characterised by a high percentage of urban inhabitants, that this percentage has fallen in recent years. This is especially case in regions dominated by traditional industry, which is presently undergoing restructurisation or even liquidation.
- The territorial expansion of cities into rural areas is occurring at a slower rate than during the period of the centrally controlled economy. However, projects are now being carried out, which are connected with the more efficient and intensive use of land suitable for development within the city. This is a desired change in direction, however only under the condition that the increase in the intensity of land use is not carried out at the cost of diminishing the amount of green areas.
- The construction of blocks of flats has decreased, however the construction of single-family homes has increased, particularly in suburban areas. In the long term, this could lead to a reduction in the population density in residential areas and suburbanisation, which is acceptable to society, although some judge that this is not in agreement with ecological goals.
- A sudden and dramatic development of motorization has occurred after a period of underdevelopment of private transport. In many cases



the provision of public transport has been cut back, e.g. the liquidation of minor railway lines. However, the increasing numbers of private cars are certainly not accompanied by the appropriate extension and improvement of urban communication systems and of the road network at the national level. This is difficult to regard as a desirable change from the point of view of sustainable development.

- Large monofunctional districts in cities are being gradually developed into multifunctional districts. The development of services and trading in large housing estates is of particular importance. The introduction of attractive centres of trade and services to housing estates should decrease the need for transport to such centres in the city centre.
- Industrial estates are being transformed. The land in the city centre formerly occupied by factories is now used for other functions. Old estates now have an excess of post-industrial terrain, which is difficult to make use of. New businesses and firms are locating on the outskirts of the city, rather than in the city centre.

As a result of observing the changes occurring within the cities of Central and Eastern Europe, it is debatable whether it is necessary to copy the processes which took place during the development of Western European cities. For example, is there an alternative to the explosive growth in the development of private transport. It seems that, taking into account the criteria of long-term sustainable development, one should attempt to modify the processes taking place, taking advantage of the conclusions made when overcoming problems in the various periods of the development of cities under market conditions.

## Literature

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