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Development of settlement systems: From ideas on centrality to dispersion

1. Introduction

The title itself ***Development of settlement systems: From ideas on centrality to dispersion**,** points out the basic idea of the article with which we tried to show the gradual transition of urban patterns from concepts of centrality to concepts of urban dispersion.

The whole structure of the research follows this idea, of course subject to methods of scientific research work. The first part presents the hypothesis, based on the already stated idea about transition of urban patterns into concepts of centrality and dispersion. It is followed by the main body, where fundamental rules of restructuring processes in settlement patterns are shown, their basic elements identified and directions for further management proposed. The last part contains a review of professional terms, literature and sources and an appendix of graphic supplements.

The introductory remarks are followed by goals and results, that can be expected on the theoretical and practical level. The theoretical level will enable: understanding of particular settlement patterns and their elements; definition of areas where different settlement patterns occur; a theoretical approach to management of settlement patterns and settlement systems. The practical level, presented on a real example, will help in: defining criteria for evaluation of settlement patterns; designing plans for managing settlement patterns; designing guidelines/directions and conditions for action in particular areas within a settlement system.

The main body of the thesis begins with a historical review and analysis of settlement models from the industrial revolution onwards, with emphasis on garden city models. Since we assessed particular phenomena in the context of the time they were created, we can establish, that any new proposal - a model, utopia or theory - brought a new quality to urban planning theory.

In the third chapter, the historical review is followed by analysis of the existing situation in Slovenia and in selected examples from Austria, Germany, Switzerland, Italy and Croatia. This analysis or rather comparison further promotes the case, that settlement patterns are losing their dependency on national and territorial boundaries.

The results of theoretical contemplation and analytical work are combined in the fourth chapter, were the concept for development of the settlement system in Slovenia is presented, followed by four proposals for managing settlement patterns on real examples.

The fifth chapter concludes the main body, where certain possibilities for further influencing settlement development are emphasised under ever more complex conditions of developed, Western societies. These possibilities are directed into strengthening the role of particular actors, participating in planning and decision making processes concerning spatial development. At this point, a new question arises: what are the roles of professionals and the state in these processes?

The role of professionals is basically in enabling realisation of planned development and changes, whereby they have to offer answers or rather information, necessary for discerning and solving problems of the system. Therefore, it is not enough to provide those solutions and information, that a client/investor wants and often doesn't know how to use them.

The role of the state is to provide participation of particular actors, meaning, that the state can no longer play the role of unquestionable arbiter, but has to equally represent its own interests and promote co-operation.

2. Definition of the most important terms

As we stated in the introduction, the main body of the thesis focuses on recognition and understanding of exiting settlement patterns. For their understanding in the context of this research, some of the most important terms had to be defined:

- concentration, diffusion and dispersion, understood in the spatial sense; understood as terms, that help in understanding the dynamics and complexity of settlement patterns;
- settlement system and settlement pattern are the key terms of this article.

For easier understanding of the dynamics and complexity of settlement patterns, we will first explain the difference between concentration, dispersion and diffusion, as understood in the spatial sense:

- Concentration can be understood as a method of spatial organisation of activities, that still operate under principles of central planning. Its spatial manifestation is pronounced concentration of activities in larger urban centres and hierarchical organisation of settlements in the settlement system.
- As its opposite we deal with diffusion, meaning total restructuring of built structures. Activities are not concentrated in one spot, but particular cores are equally distributed in space. It implies a completely different organisation of growingly complex structures based on principles of self-direction.

The intermediate state between the two described extremes is dispersion, occurring when various activities move from centres outwards. Thus the level of centrality of a certain settlement diminishes, spatial structures self-organise following momentary needs and demands. Its most important aspect is, that causes and consequences are not tightly connected. A certain input doesn't cause a predictable output; the actual response to external stimuli cannot be predicted.

The starting point for explaining settlement was extracted from definitions on settlement systems by V. Kokole. We understand settlement as a set of settlements, connected into settlement networks. The term includes certain "physical" patterns of settlement placement in geographic space, their characteristics and functional ties between various types, an

expression of different types and (spatial) shapes of interaction. They are derived from various (all) types of activities; work, dwelling and recreation.

On these findings we derived our own definition, thus defining a settlement system as a system, where a high dynamism of changes prevails and a high degree of complexity of particular physical structures. Through identity we can identify its particular parts, that act independently and differ from the others. They can be defined as settlement patterns, creating homogenous (physical) structures in space. However, these structures are also dynamic and change through time, but we can still use them to make settlement systems easier to understand.

3. Methods of identifying existing settlement patterns

At first we asked ourselves several basic questions, after which we analysed existing settlement patterns. The questions were:

- Which elements of built structures form settlement patterns?
- Where do these elements appear?
- How do they connect?

By answering these questions, the elements of built structure were at first sorted, according to selected spatial criteria: their physical or typological phenomena (other criteria, such as social, economic, natural, geographic ..., weren't dealt with, because their influence manifests itself in physical structures). For easier presentation they were further sorted into three groups that simultaneously define levels of discussion, according to scale of observation. These three groups or levels were:

- settlement patterns in the landscape
- settlements and objects in settlements
- objects as individual units in space

In this way, three layers of settled space were derived. They were graphically presented in three separate transparent layers (scale 1:50000) in colour. This allowed good discernment and identification of particular layers, all three layers intertwined so we could establish their interrelated connections. Far better clarity and easier understanding, separate layers were named after their common characteristic feature: **growth around urban centres** [1]; here elements of settlement were shown, pertaining to cities and other urban centres.

Compact city and other urban centres

These are closed urban buildings with designed streets, squares, parks and other places, predominantly defining historic urban cores and in some cases even new closed areas. Their feature is the inclusion of numerous and varied activities offering possibilities for daily and occasional provision for their inhabitants and the wider hinterland.

Suburban areas

From the closed city built-up area, forming the core of an urban settlement, settlement moves outwards, because of the development of activities and migrations into the hinterland. Here more or less expansive areas have been created, and covered the existing (former) settlement structures (integration of villages and hamlets into cities; their only memory are their names, remaining in everyday use). At the same time, cities cause faster development of surrounding settlements, that are getting closer to these areas, following their own development. Thus we have a dual growth effect, causing even faster expansion of cities outwards. The main feature of these areas is that they are predominantly mono-functional (sub-urbanised areas of sleeping blocks, industry, manufacturing and commercial zones).

Growth around other urban centres

In this case the effect is similar to larger urban centres, except for the physical dimensions. The fringe of these settlements, the image and also the functions of this so called periphery features are largely rural.

Patterns, tied to compact settlements, represent the second layer and/or - concerning development - the other more or less dynamic settlements, whose shape and structure are still tied to rural ways of life (meaning living in a high quality natural environment, not necessarily or existentially tied to rural production and economic exploitation of agricultural land):

Settlements with preserved historical shapes

In most cases these are settlements that have a preserved image in the wider landscape and dilapidated inner structure (dereliction of the built-up areas, poorly managed outer surfaces), a consequence of lagging behind in development in the last decades. Confirmation of such a state is also represented by poor economic power (agriculture is not bringing in adequate revenue, no employment possibilities) and the age structure (emigration to larger centres for better salaries). Only in certain valleys has the shape of settlements been preserved, following internal restructuring. Settlements didn't expand outwards, but inwards, as densening of existing structures. Other than that, new buildings were built on the sites of demolished old ones (and not next to them). Thus, the image of the internal structure of these settlements is becoming similar to suburban areas.

Settlements that have changed their shape because of development

These are settlements, that can be discerned as separate units, but their volume is greatly changed because of development. Growth took place in all the stated varieties (growth along communications^ - the settlement physically joins surrounding hamlets and/or separate farms, growth along the edge and cutting of economic paths or redesigning the image of the settlement in the landscape - the old structure is captured by the new one).

Spilling of structures along communication routes

An extreme variety of growth appeared when settlements started joining along roads, a consequence of growth and building of particular objects between them. When the quantity of these objects is large enough, there are no more distinctions between them and the former settlements. In some places, between particular built structures there are empty spaces, but in most cases they can be identified only by detailed morphological analysis of separate settlements.

Patterns of individual objects and hamlets represent the last layer. They appear mainly in hilly areas, where the natural-geographic limitations prevent densening and evolution of compact settlements:

The hamlet pattern

Are formed by smaller, developmentally unperspective hamlets, basically containing farms. They have similar problems as settlements with historical layout lagging behind in development.

Individual objects

All remaining territories are settled by individual buildings, differing in content, shape, size and density of appearance.

Settlement patterns above the boundary of permanent settlement (800 m)

An exception in presentations of the whole system are areas above the boundary of permanent settlement, determined according to the appearance of separate elements of settlement. In these areas we can identify shepherds settlements, occupied during the Summer, hunters lodges and other observation posts, military and other objects. A predominant feature are tourist areas (ski resorts, mountain lodges, alpine lakes ...), the problem being excessive, occasional or constant (massive) pressure by users.

These presentations were followed by covering separate layers and discerning settlement patterns. We can imagine that such combination gives an illegible variety of combinations. The thesis presents six combinations that represent the "clearest" shapes. This means that one of the elements prevails. According to these elements separate settlement patterns were named. These combinations were joined into separate groups.

The first group are **areas of growth of urban settlements,** that feature expansive areas of urban concentration. Larger towns and other developed urban centres are dominant, as well as areas of growth of smaller urban settlements. In the latter similar processes are taking place, although on a smaller, regional or even local territory, since they are not joining into conurbation's.

The second group are **settlement patterns, tied to homogenous settlements.** These are expansive, usually in valleys, suitable for agricultural activities. Because of natural circumstances larger settlements have developed in these areas.

Besides these we can discern **areas tied to homogenous patterns of smaller settlements,** that in most cases represent quite the opposite of the previous group. They developed on relatively flat lands in hilly areas and have no true potential for developing agricultural activities.

The last group are **areas of pronounced dispersed built structures,** that can be further subdivided into densely or thinly dispersed settlement patterns. They developed under specific climatic and other natural circumstances, also facilitating specific economic development.

This method of identifying settlement patterns points out the variety of possibilities, that can emerge from interconnected joining of particular elements of built structures.

4. Illustration and comparison between settlement systems selected from some European countries

Often one can hear the notion, that only in Slovenia we have certain settlement patterns and pertaining problems. That is why we decided to present a number of patterns which exist on the other side of the national border. Hear we wish to point out that the surplus of possibilities in all areas cannot be controlled any more, often it cannot even be predicted. Thus, particular national governments are no longer at the top of a hierarchically organised society, that could effectively control their spatial development. We can observe settlement patterns that have in a certain territory (not necessarily within national boundaries) specific development perspectives and particular methods of rational organisation.

For our comparison we selected six European countries. All the presentations were originally done in the scale 1:50000. In this article they have been decreased evenly, so that comparisons are still possible. From each country we selected a territory based on administrative division. In this way we could show that in these areas we are in fact speaking about settlement systems (or subsystems), where the mentioned elements and settlement patterns intertwine.

In Slovenia we selected three municipalities that form the Posavje region. On the map we can see a mix of various settlement patterns, predominantly formed on differing natural systems. A characteristic feature is the transition from the valley to the hills (figure 2).

In Austria we selected the Muehlviertel province, on its Southern side touching the Danube river. This is a much more unified, slightly hilly area where an almost homogenous settlement pattern of smaller settlements and hamlets was formed. Between them are individually standing buildings (figure 3).

The German example was the political district Ober and Un- ter Allgaue, where despite similar natural conditions as in the Austrian case, larger centres developed. An important factor was probably the local economy. Settlement is not as homogenous. By detailed analysis, we could discern various settlement patterns (figure 4).

Switzerland is divided into cantons. We chose part of the Graubunden canton, lying next to the Austrian and Italian border. It is high Alpine area, where settlement could develop only in the narrow valleys. Therefore, there aren't any larger settlements. Today we can speak about two different settlement patterns: one at the bottom of the valley, forming a pattern of smaller urban settlements, the other higher up on the rising land, formed predominantly by individual buildings, i.e. pronounced dispersed settlement (figure 5)

The Italian province of Bergamo in Lombardia is a typical example of settlement, also seen in the river Po valley. Settlement has practically spread into all the possible fissures. Unfortunately the map we received from Italy was in a smaller scale (1:100000), that doesn't show individual buildings. Anyway, even the given map illustrates dispersed settlement, at least on the regional level (figure 6)

In Croatian Istria, mainly because of unfavourable natural circumstances, a settlement pattern of hamlets and small settlements emerged, that still preserve the historical form. Larger urban centres are rare in this pattern. They appear only next to main cross-roads (today losing in significance) or as ports (figure 7).

5. A proposal of a development system for settlement in Slovenia

Development trends point out the growing complexity of settlement patterns. Any settlement pattern is composed of different elements/layers. Only knowledge of all layers and modes of their activity and connections can enable the creation of guidelines and proposals for further spatial management. Interventions, such as illegal housing or excessive drives into certain areas can quickly cause the balance existing in these places to collapse. Individual buildings change their function, settlements restructure and lose their identity, in settlement patterns there are ongoing processes of transformation, causing them to change their form and thus role in an area. Settlement systems are ever more in an uncertain and unstable transitory state.

Even the comfortable image of market forces and politics taking care of optimal placement of activities is deceiving. Problems with employment and housing, adapting to technological changes, international competitiveness and ecological catastrophes, because of complex social, cultural, economic and societal ties in time and place, demand anything but simple, one-dimensional solutions.

Because of the mentioned and even other problems (which have to be identified and qualitatively evaluated first, and then, based on adopted stands, solutions found) of further management of settlement patterns, we cannot propose, without a previously defined concept a settlement system. Since Slovenia doesn't have such a document (although it is being prepared for quite some time and will probably be definitely formulated by the end of this year as an expert supplement to the Spatial plan of Slovenia), our concept is one of the possible solutions for directing settlement and integrating Slovenia into the wider European arena. We based our proposal on existing domestic examples by Slovene authors: V. B. Mušič, I. Vrišer, M. Ravbar, I. Piry and others, and contemporary trends in designing concepts for settlement development in developed European countries.

In general, our concept for the settlement system in Slovenia can be described as one, which will enable design of suitable concentration of urban culture, preserve a high level of diversity and variety of settlement patterns and at the same time provide necessary settlement of all the national territory, following principles of sustainable development (Agenda 21, Habitat, etc.). The main goal is provision of high quality and equal living conditions for all inhabitants.

The design of the concept for developing the settlement system, was based on the fact, that Slovenia still doesn't have such a document. Since any further design of guidelines and norms for managing settlement patterns and separate settlements is practically impossible without one, we were forced to think about it.

First we designed some possible variations of settlement development [2]. Since none of them was realisticfi.e. corresponding to the present spatial conditions in Slovenia) without radical measures and interventions, we devised another concept, that to a much greater extent respects the existing conditions and proposes corrections, so that according to principles of sustainable development in Slovenia we could:

- provide suitable concentration of urban culture,
- preserve a high level of diversity and variety of settlement patterns,
- provide settlement of all the national territory.

In the conclusion to the main part of the thesis, four examples of management in particular parts of settlement patterns were shown, scale 1:5000. These examples show possible solutions to particular settlement patterns, identified from the analytical part of the research. The example for presenting guidelines for further management of areas of growth in a wider urban area was Novo mesto, the example of distinctly dispersed structure, Mestni vrh near Ptuj and Semič in Bela krajina, while the example of a homogenous settlement pattern was the Tržaško-Komenski Kras.

Despite the presented case studies, design of guidelines and norms for managing settlement patterns on the national and regional level, still remains a challenge for future work.

6. Conclusion

Settlement has been in its territory, despite constant changes and tendencies for always wider dispersion, a stable system for centuries and in the "global structure" an unchanged system. What does the statement, ... functions of particular objects and whole settlements are constantly changing, mean ... or the appearance of new elements of built- up structures ...

The answer lies in recognition, that order in a particular system of settlement/settlement pattern has changed, from simple to complicated, which we tried to prove by studying the development of ideal settlement models, from the industrial revolution onwards and by analysing existing structures in space. Even proposals for future guiding of interventions in different settlement patterns are only some of the possible solutions. Their intent is mainly to cause doubt, even disagreement and then establish possibilities (interdisciplinary and disciplinary) for comparison, leading to productive ingenuity. In fact, this means that solutions could also be different and numerous.

A whole palette of possible answers opens to perceived spatial problems, none of which can be taken for granted. All of them have to provide their rationale and legitimacy. We could say: more possibilities, less feasibility, or more precisely: since a lot is possible, not much is probable (Wilke, H., 1993). We are therefore faced with the fact that in contemporary post-industrial and technologically developed societies anything is possible. The level of complexity and thus the formation and legitimacy of spatial order are increasing, because various forms of order are possible and feasible in the same territory. Nevertheless, in certain areas we still wish to achieve selected goals, such as: prevention of illegal construction, prevention of emigration, provision of suitable housing standards, directing traffic with realities, especially land, etc., whereby it is more or less clear, that hierarchical and direct

relations of dependency and directing have become unreal and unattainable. We have to find "alternative forms of order", meaning that the role of government and politics as the highest instance of decision making and directing, has to be limited. Within this changed role of governments and politicians it is of utmost importance that they first recognise spatial problems and want to solve them. Professionals can help only if asked how to realise a planned change, by taking the role of "invited intruder", operating as a catalyst of change. The conditions for adequate self-directing is therefore, that the professional doesn't offer only the information, that the client asks for and generally doesn't know what to do, but information necessary for identifying and solving problems of a system (one of the methods is adopting legally binding documents defining conditions for interventions in a place, rather than real solutions for real sites).

The problem of creating order in any highly complex systems, such as settlement, doesn't depend only on the government or politics, relying on professional knowledge. The government has to adapt to non-hierarchical relations within a horizontal network of actors, from particular social groups, political parties, private companies, the bureaucracy, local communities, various societies and individuals with interests in a place. Even more, to accomplish its legal-formal obligations, it has to facilitate co-operation of these actors. Participation of different actors in designing policies is a risk in the game, where common gain is possible, but not assured (Wilke, 1993). A contradiction appears between criteria for rational use of space by particular activities (individuals, organisations) and criteria for system rationality of the whole society. Therefore, compatibility between particular interests in space or at least non-destructive relations, have to be provided. Instead of hierarchically oriented central planning, meaning generally compulsory legislature or an evolving, unconditioned mutual adaptation, that doesn't permit suitable responses to long-term risks and endangerment, a much more demanding and complex principle of contextual directing has to be established. It is a method of negotiation based on unforced communication. The government doesn't have the role of arbiter any more, but equally represents its own interests and promotes co-operation. This means, that communication/negotiation is based on expectations, that all the participating autonomous actors have enough capabilities for reflection on their mutual interrelatedness and from this fact derive conclusion, that it is in their own interest (mid-term or long-term) to diminish the surplus of options to those, that the development capacity of a society can allow (here we understand settlement as one of the subsystems of societal organisation, manifested physically in space). This method of spatial management could enable control and participation of all actors.

Establishing non-hierarchical relations in society and the cooperation of autonomous and equal partners decreases the significance of spatial placement of particular functions in a hierarchically organised settlement system. Since contemporary/developed societies have just begun establishing these relations, processes of de-hierarchisation have only pointed out possible activities, which were formerly placed strictly in urban centres of an adequate level, that are now moving to the periphery thus completely separating themselves from centres.

Developed information technology, that enables communication between places and people living in these places, negates the real physical space. On one hand it lessens the hierarchic role of cities by connecting them into supranational communication networks, and on the other hand it strengthens the hierarchy between private and public. On a new, different level of organisation, again dilemmas of concentration and dispersion, differentiation and integration, order and chaos, individuation and globalisation arise ... Based on present experience and behaviour, we know the answer. In this time it presents itself as a necessity for decreasing control, manipulation, directing, use of force and in tendencies for strengthening capabilities of decentralised self-organisation.

Who would dare to predict, what the answer to the same question will be in twenty years or even a moment from now, that a new, until recently unknown cognition, will change?

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Endnotes

[1] All illustrations in this chapter were originally done with colours, scale 1:50000 based on topographic maps of Slovenia

[2] Different concepts of settlement development in Slovenia were first created for the settlement policy of Slovenia (Gabrijelčič, P.: The Settlement Policy of Slovenia, for the Agency for physical planning, 1995) and then defined in the research project Gabrijelčič, P et al.: Spatial management from the Viewpoint of Dispersed Development (commissioned by the Ministry for environment and physical planning) and the presented masters thesis.

Explanation

* The article presents the masters thesis Development of settlement systems: From ideas on centrality to dispersion, accomplished at the Faculty of civil engineering and geodesy, in the Interdisciplinary postgraduate course on spatial and urban planning, before the committee prof. dr. Andrej Pogačnik (president), prof dr. Zdravko Mlinar and doc. Dr. Anton Prosen (members) and prof. mag. Peter Gabrijelčič (mentor). The thesis consists of 151 pages, 6 chapters, divided into 14 subchapters, 135 quoted units and 129 graphic illustrations (maps, diagrams, tables).

List of figures

Figure 1: *Evolution of spatial structures and organisation (Milles et al., 1976), using innovation and telecommunications (Mlinar, Z.: Inviduation and globalisation in space, SAZU, Ljubljana 1994)*

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