

# ABSTRACT OF DOCTORAL DISSERTATION

## *Topic*

Selected non-planning contexts and determinants influencing the processes of forming urban structures.

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## *Abstract*

The subject matter of the dissertation relates to the non-planning aspects of the processes of forming urban structures – i.e. not resulting from deliberate, conscious, top-down, planning-type activities. The research topics have been analyzed from the perspective of their systemic nature and origin.


Research, comparative and logical tools are being provided by selected elements of science disciplines and theories, such as thermodynamics, cultural transmission, game theory, cellular automata and agent systems, fractal geometry, network theory. The criterion for the selection of particular areas of scientific knowledge is their relevance in the context of understanding the processes of shaping urban structures.

Within each of the reference disciplines, the range of concepts and phenomena relevant to the city were indicated, as well as specific references, concerning, among others: basic principles of order generation, development of forms, cooperation in large groups, mechanics and massive parallelism in discrete, distributed systems, handling of metabolism and growth, geometric characteristics of urban processes, connectivity and network properties, urban system physics.

The research carried out in the dissertation allowed to demonstrate that non-planning factors, being closely related to the generative processes of the city, are constantly present in the process of shaping its structures. They also have specific, unique properties, distinct and independent from those present in the planning domain. The conclusions of the dissertation include: issues of dynamics and stability in urban processes and structures; the role of objective mechanisms and systemic properties - resulting from the nature of the city system, non-anthropogenic; the relationship between the process and the structures it generates; the impact of ordering and random factors in the phenomena of structure formation; predictability and controllability; manifestations of emergence and complexity.

## *Keywords*

City, system, structure, space, distributed system, dynamics, organization, randomness, thermodynamics, cultural transmission, game theory, cellular automata and agent models, fractal geometry, networks, emergence, complexity.

  
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