

**Ph.D. Thesis title: The idea of Smart City and the urban form on selected examples**

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### **Abstract**

The subject of the Ph.D. Thesis is the correlation between the idea of Smart City and the urban form. The thesis is: 'Urban form is a key component both of the adaptation of existing cities towards Smart City; and of the creation of new Smart Cities.' The correlation between these terms is understood as a possibility of mutual and equal interaction between them. In this Ph.D. Thesis, the idea of Smart City is treated holistically - as a process or a method of building or adapting cities. The work consists of a theoretical and a practical part. At the theoretical level, the extensive semantic frames of the two key terms 'Smart City' and 'urban form' were narrowed. This allowed detailed research of possible correlation forms between the individual components of both terms. As a result, the specific factors of the urban form and the Smart City idea, vital in the context of the correlation between them, were crystallized. Furthermore, the theoretical basis enabled identifying three important gaps in the understanding of the Smart City phenomenon. These are the issue of urban form, the need for considering the context of a city, and the need for the preservation of a city's identity.

A crucial element of the work is the practical part. It includes case studies of three different implementations of the Smart City concept: the Songdo IBD district (the flagship greenfield Smart City), the Aspern Seestadt district in Vienna (as an example of a city undergoing a transformation towards Smart City), and the Aker Brygge and Tjuvholmen districts in Oslo (a non-obvious case, which on the one hand is outside the frame of the Smart City concept, but on the other hand is strongly connected to 'smart' values). The practical part aims to concretize the idea of Smart City in the practice of urban design. During case studies, the correlation between the urban form and the idea of Smart City was examined, analyzed and demonstrated by each selected realization. The basis of the examination was an original research method based on the correlation of specific components of urban form and the idea of Smart City (crystallized in the theoretical part of the dissertation). The research material was discussed according to the same scheme, which facilitated an objective assessment of the obtained level

of correlation between the idea of Smart City and the urban form. The case studies present methods of creating 'smart' value in specific economic, topographic, ownership, legal and planning conditions. Furthermore, they show the methods of establishing and strengthening the identity of a city in terms of existing cities and the methods of creating a new identity of a place in terms of greenfield projects. A significant element of the practical level is the evaluation of the undertaken planning strategies, investor and participatory models and specific implemented elements of the urban form.

The most important goal of the thesis is the application possibilities of the obtained research results. The need to take into account the role of the urban form in the process of implementing the idea of Smart City creates a potential opportunity of erecting a good, functional, harmonious and useful 'smart' urban space. The research results are divided into three categories: conclusions from the theoretical research, conclusions from the empirical research and application conclusions. In the theoretical part, not only were specific factors needed for a comprehensive Smart City approach indicated, but also the features distinguishing a 'smart' urban space from the strict paradigm of sustainable development. Conclusions from empirical research include typical criteria (e.g. features of scale, participants, spatial and functional conditioning, ownership structure, planning and implementation procedures), specific elements and principles of building an urban form and possible ways of generating 'smart' value. The research results were divided into five elements characterizing Smart City projects: basic characteristics; three stages of implementation of the idea of Smart City (1. preparation, 2. implementation and 3. exploitation), and evaluation of the impact of correlation between the idea of Smart City and the urban form. The application conclusions may serve as actual inspiration or an example for developing a participation model in the process of shaping the urban form; developing a planning and workshop process for creating a Smart City urban spaces, as well as ways of creating a specific 'smart' urban form features.