2TaLL – scientific background, achieved results and further prospects

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Recently, we have witnessed a tremendous increase in the number of tall buildings erected in major urban agglomerations of the world. The same phenomenon has been observed in many European cities as well. While comparing the historical process of urban structure transformation and current changes in the urban space, the latest development seems to be particularly significant. Transformation of the urban space involves rather qualitative than quantitative changes. During their growth period, the majority of cities underwent far-reaching transformation or expansion. However, the impact of the then changes on the perception of urban space was smaller than it is today. When new facilities were built, they had rather limited impact on the urban landscape, since new buildings were more or less similar regarding their scale, proportion and architectural form to those already existing. In the case of tall buildings, the spatial situation of the city structure changes dramatically. A single tall building may have a major impact on the arrangement of the entire city.

Traditional urban analysis methods seem sufficient while examining the potential impact of new buildings that have similar height to those situated in their vicinity or facilities that play the role of sub-dominants. The situation changes when we examine the impact of tall buildings on the existing urban development. Such buildings make a versatile impact on the spatial composition of a city. They can be seen at far ends of streets or stand out in the interior urban development, be exposed at the foreground, and in particular instances influence the skyline of a city. Therefore, protection or possibly evolution of the historical city space should be carefully considered.

While analysing the impact of tall buildings on the spatial structure of a city, it is necessary to develop new research methods that support the investment decision making process and facilitate multifaceted analyses. It seems obvious that particularly complex spatial relations between tall buildings and their surroundings as well as existing buildings should be considered in the context of the entire city. Thus, without a support of digital techniques, the implementation of a reliable study is virtually impossible. Results of this study extend beyond our imagination and even the best intuition of an urban planner is insufficient.

On the one hand, the authors of the exhibition, doctors Klara Czyńska, Paweł Rubinowicz and Adam Zwoliński, use latest digital analytical tools in their research, tools which simulate the earth surface and facilities located there, while on the other the three researchers develop new scientific theories and expand the variety of digital urban analysis methods by adding their own, such as VIS (Visual Impact Size), VPS (Visual Protection Surface), and public space 3D negative. It is worth emphasizing that the new methods are genuine and based on advanced software originally developed by the authors virtually from scratch. Their research topic is interdisciplinary and requires a combination of professional knowledge and skills in urban planning and digital city imaging, GIS, geoinformatics and informatics.

The position of the research team strengthened in 2014 with a grant from the Norwegian Financial Mechanism for implementation of the 2TaLL project on the 'Application of 3D virtual city models in urban analyses of tall buildings', a project headed by dr inż. arch. Klara Czyńska. In the group of 200 project applications competing for grants, the 2TaLL project received the largest number of points. The high project assessment confirmed significance of the research topic for the contemporary science!

The exhibition crowns the novel research on the urban space as well as tremendous dedication of the research team to solving real project issues. Since 2005, the research has been based on close relationship between architectural science and practice. The best example of its practical applicability are studies on the urban space of such Polish cities as Szczecin, Lublin and Warsaw. Scientific achievements and project findings provide a major contribution to developing innovative methods used for analysing urban structures.

The 2TaLL Project, implemented in 2014-2016 by a team headed by Klara Czyńska and involving doctors Paweł Rubinowicz and Adam Zwoliński, was crucial for the scientific development of the team. In particular, this applied to the project leader (Czyńska), but also individual team experts responsible for specific interactions in the project (Rubinowicz, Zwoliński).

The attainments presented in the exhibition are a major contribution to innovative urban structure analysis methods so much valid and important for the contemporary development of cities in Europe. The research implemented and methods developed enable: a) better forecasting of spatial consequences of certain planning decisions as regards the development of tall buildings, b) defining their significance for the public structure in a city and c) examining the capacity of a city as regards tall buildings, while taking into consideration its historical landscape.

Findings of the 2TaLL project have a European dimension. This has been proved by the scope of activities under the project implemented in various cities in Europe. Considering project statistics (list of trips), activities such as in-situ landscape studies, scientific conferences, training courses, lectures, presentations, and exhibitions on the 2TaLL project took place in as much as 20 European cities (in alphabetical order: Amsterdam, Berlin, Białystok, Brussels, Dresden, Frankfurt, Gdańsk, Innsbruck, Köln, London, Milan, Munich, Nürnberg, Paris, Szczecin, Świnoujście, Warsaw, Weimar, Vienna, and Wrocław).

The strong position of the team has been confirmed by their participation in major conferences of diverse scientific profiles (ISGG16, SSS10, and ISRSE36), and numerous contacts with research centres (e.g. Bauhaus University of Weimar), planning centres (Croydon and Dresden) and the commercial sector (e.g. VCS Berlin). Landscape in-situ studies were implemented in several European cities, whereas 3D modelling focused on such cities as Berlin, Delft, Dresden, Frankfurt, Lörrach, Rotterdam and Warsaw. Methods developed by the research team are universal and can be applied in various virtual city models (from simple LiDAR/DSM 'point clouds' to semantic CityGML models).

Findings of the research presented by the exhibition put the authors in the group of people who promote experimental science at the global scale. I should congratulate the team and cross my fingers for their future success!