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*Editorial*

# Editorial for the IJGI Special Issue on "Geo-Information Fostering Innovative Solutions for Smart Cities"

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In 2008, for the first time in history, more people in the world lived in cities than in rural areas. The process of urbanization will continue; for example, the United Nations Population Fund (UNFPA) expects 5 billion city dwellers by 2030. In preparation, an increasing need for successful and sustainable strategic development concepts exists. In this context, Smart City is an umbrella term for such urban planning concepts that do not only consider the infrastructure of a city, but also its intellectual, economic and social capital. Within this holistic planning viewpoint, Information Communication Technologies (ICT) play a central role. More specifically, effective and efficient provision and usage of geo-data and geo-information are of major importance due to the fact that numerous urban structures and processes typically inherit spatio-temporal characteristics.

This Special Issue of the *International Journal of Geo-Information* aims to promote innovative concepts, methods and tools that help solving current and future problems in urban areas from a GI Science perspective. Obviously, only a limited number of spotlights within this broad theme can be presented here. However, there is a clear "overall story" that can be observed: Firstly, modeling entire cities implies usage of geo-data sources that go far beyond conventional and official sources. In particular, open as well as social media data, and advanced point clouds are necessary to describe cities with reasonable information density and depth. Secondly, geostatistical and visual methods (mostly, in a combined manner) have to be customized to these data sources in order to extract significant information and additional values. And thirdly, tailoring these methods and derived tools to the various needs and abilities of different stakeholders in a smart city environment is crucial in order to enable an effective and efficient usage, or even any usage at all.

This user perspective is immediately picked up in the first paper of this issue, presented by Aurol Degbelo *et al.* (Münster, Germany; Castellón de la Plana, Spain; Lisbon; Portugal). Focusing on the citizen-perspective, various challenges such as engagement or literacy are addressed. It is argued that GI Science is able to tackle these challenges by using open standards, persuasive interfaces, *etc.*

Stephan Nebiker *et al.* (Muttenz, Switzerland) describe an alternative way to create 3D city models: They use true color imagery and depth data derived from multi-view stereo mobile mapping systems that have been acquired on street level. They show that with the application of advanced methods it is possible to obtain increased georeferencing accuracy and to easily handle resulting 3D image spaces of entire cities.

Gloria Re Calegari *et al.* (Milano, Italy) show that adjusted knowledge discovery approaches applied to open data sources are able to extract urban land use on a moderate spatial resolution for very large regions.

Thorsten Förster and Agnes Mainka (Düsseldorf, Germany) present a method to analyze networks based on the social media platform, Twitter. From 40 million tweets they derive trends that can be observed for single cities (revealing significant changes among these) and for connections between

pairs of cities. It is envisaged that such social media data flows can be applied to important and more specific spatio-temporal topics.

Li Yin and Robert Mark Silverman (Buffalo, NY, United States) show how geo information can describe urban developments, with the example of housing abandonment and demolition in the city of Buffalo. The authors investigate the spatio-temporal correlation of these phenomena with various parameters such as proximity to other vacancies, lot front sizes, *etc.*

Finally, Natalia Andrienko *et al.* (St. Augustin, Germany; Pisa, Italy) follow the goal of improving traffic simulations based on abstracted transportation networks. Those are built up from dependency models that have been derived from real traffic data with the help of visual analytics methods.

Although this Special Issue can deliver only a very limited and patchy view, it also becomes clearly evident the huge potential geo-data and geoinformation have in the context of the holistic planning viewpoint of smart cities. However, there is still a need to sew these (and more) patches together and, in particular, to promote the potential additional value to the various stakeholders. This Special Issue can certainly serve this purpose.