

## Qualitative analysis of smart city concept in Hungary

*Ádám Szalai<sup>1</sup>*

The smart city has become a leitmotif of urban development in the last two decades, rooted in the eco-city concept and the sustainable urbanism paradigm, placing technology and big data at the core of urban research and policy. Understandings of the smart city have largely centred around the idea that the embedding of ('smart') information communication technologies (ICTs) into the urban fabric will help tackle urban management issues (Kitchin, 2014; Grossi, Pianezzi, 2017), and improve cities' environmental and economic performance, as well as residents' quality of life. In addition, the use of technology-based tools has also been presented as a promise for the improvement of public administration and urban planning (Jiang et al., 2019), as well as for creating more inclusive forms of governance (Kleinhans et al., 2015; Joss et al., 2017).

Smart city developments are also high priority development issue for the European Union. The EU created the Smart Cities Information System in 2012 to promote smart city developments, share good practices and disseminate knowledge on smart city developments, and the European Innovation Partnership for Smart Cities and Communities, a professional organisation to facilitate stakeholder cooperation on flagship projects. In the current programming period, the implementation of '100 Climate-Neutral and Smart Cities' mission is the main project considering EU-wide urban policy.

The involvement of the Hungarian government in the development and support of smart cities is increasing, with government regulations including the development of a central smart city platform service, running pilot project in the coming years. On the municipality level, some bigger cities also took steps to become smarter, trying to make their domains more well-functioning.

In addition to the urban scale, the application of innovative solutions in rural areas has also become a hot topic with the advancement of EU initiatives and digitalisation policies. Cooperation programmes and tenders generated by international project networks, as well as the shift in regional policy towards smart specialisation, have introduced the concept of the smart village into the vocabulary of EU spatial development policy over the last few years. Consequently, relatively few smart village projects have been implemented so far, but a national strategy for future smart village projects is already in place (Digital Village Programme).

However, there is limited knowledge about how the smart city model is reshaping Hungarian urban development and planning practice so far, what is its role in the long-term development of municipalities and what are the limitations of its application.

Still, in professional discourse, the smart city concept is often only brought to the forefront in relation to major cities. There is a plethora of studies discussing generations of smart cities, citing Cohen 2015 (e.g. Lados 2017; Szarek-Iwaniuk 2020), and (what researchers are also doing for smaller cities), the creation of smart city rankings based on quantitative composite indicators. However, these studies based on free access databases, often define their rankings for their own sake, and such rankings do not provide information on the key factors, incentives, and drivers of long-term smart city development, nor on the qualitative differences between the development of each municipality.

In spatial research, qualitative analyses based on a subjectivist approach have become more and more prominent, focusing on the role of different stakeholders and the interactions between them. The qualitative approach is closer to my research goals, because in contrast to positivist thinking, I do not seek to prove theory with data through large sample sizes, but rather to focus on understanding the underlying factors (Cresswell, Clark 2011, Denzin, Lincoln 2008).

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<sup>1</sup> Junior researcher, Centre for Economic and Regional Studies, Great Plain Research Department, Kecskemét, Hungary

PhD Student, University of Szeged, Department of Economic and Social Geography, Szeged, Hungary

I deepened the data processing through computer-assisted qualitative data analysis (CAQDAS). This makes the qualitative data corpus of texts easier to analyse in a tangible state, compared to traditional manual analysis (Kuckartz, Rädiker, 2019). The coding was performed using MAXQDA qualitative text analysis software, which allows the retrieval of textual (even multimedia) sources, the parallel display and analysis of documents, codes, and coded lines of text. The data can be treated together as a group of documents or analysed separately.

In this presentation, the following research questions are addressed:

1. How has the smart city concept been shaped in academic discourse?
2. How can the adaptation of the smart city concept be investigated using qualitative methods?
3. What policy lessons and recommendations for development can be drawn from smart city initiatives in Hungary?

To answer the research questions, I examine the related literature and policy documents to get further insight in smart city development both on EU and Hungarian scale. Case-study approach and discourse analysis is applied, in order to find out what aspects are considered to be important in smart city development, what underlying factors influence the Hungarian course of smart development policy. The main aim of the presentation is to reveal the Hungarian way of smart city development and give policy recommendations. Findings broaden the general understanding of smart-city development not just in the case of urban, but also in rural areas.

Keywords: smart city, Hungary, Qualitative analysis, MAXQDA, policy recommendations