

Challenges to Smart City and Regional Development: Insights from Slovakia

The smart city concept represents an integrated approach to urban development that extends beyond a narrowly technological interpretation focused solely on digitalisation and innovative tools. In its contemporary understanding, it constitutes a comprehensive model of urban and regional development in which information and communication technologies and data infrastructures function as enabling instruments for achieving broader societal goals. These goals include improving quality of life, fostering social inclusion, enhancing environmental sustainability, and strengthening effective public governance. A pivotal role is played by smart governance, which creates the institutional conditions necessary to connect technological innovation with integrated strategic planning and coherent public policies.

The development of smart cities is closely linked to data-driven decision-making and the incorporation of functional territorial relationships into planning processes. As many urban and regional challenges transcend administrative boundaries, smart cities must be understood within the wider framework of smart regions and multi-level governance. The successful implementation of smart solutions therefore depends less on isolated technological initiatives and more on the institutional capacity to coordinate stakeholders, align policies across levels of government, and build analytical and administrative capabilities at both local and regional levels.

The paper examines the key challenges associated with the development of smart cities and regions, illustrated through the case of the Slovak Republic. The analysis draws on research outputs from the STICS project and combines a systematic review of strategic and policy documents with empirical evidence. The main research methods include qualitative content analysis of national and regional strategic documents, complemented by case studies of selected Slovak cities and structured interviews with representatives of local municipalities. Based on the research findings, the chapter proposes an ideal model for smart city and regional development, with a particular focus on overcoming the identified obstacles.

The study further focuses on verifying the definition of the smart city concept through various dimensions of smart spatial development. A key precondition for effective implementation is interconnected governance that addresses institutional and structural challenges significantly shaping smart city development at the regional level. Evidence from Slovak cities and regions reveals persistent fragmentation of governance arrangements, manifested in weak horizontal coordination across policy sectors and insufficient vertical alignment between national, regional, and local levels of government. This fragmentation limits the capacity of public authorities to formulate and implement integrated smart city strategies that reflect functional territorial realities, as administrative boundaries often do not correspond to socio-economic, mobility, or labour-market linkages.

Another critical dimension concerns the integration of functional territorial relationships into regional planning and decision-making processes. Smart city initiatives should be grounded in a strategic approach supported by targeted, performance-oriented actions. In Slovakia, however, such initiatives are frequently limited to individual or pilot projects that lack coordination at the level of functional urban areas and regions. Consequently, the potential of smart solutions to address cross-boundary challenges—such as mobility management, energy systems, environmental resilience, and public service provision—remains underutilised.

The development of smart cities and regions in Slovakia is further influenced by broader socio-demographic and economic factors, which shape both the demand for smart solutions and the capacity of cities and regions to adopt and scale them in an equitable manner. Limited institutional and administrative capacities at the level of self-governing regions constrain the systematic integration of smart technologies and approaches into economic development strategies, social policies, environmental management, and spatial planning frameworks.

Overall, the analysis indicates that the successful development of smart cities in the Slovak regional context depends less on isolated technological interventions and more on the transformation of governance and planning systems, understood as soft innovations. Strengthening multi-level governance mechanisms, improving data governance and evidence-based decision-making, and adopting adaptive, integrated, and territorially sensitive planning instruments emerge as key prerequisites for enabling inclusive, resilient, and sustainable smart city development across regions.

Keywords: smart cities; smart regions; multi-level governance; data-driven planning; Slovakia