

THE IMPACT OF BUILDING SMART CITIES ON NATIONAL AND REGIONAL DEVELOPMENT

Хакбердиева Нозима

Докторант 2-го курса ТГУВ

e-mail: nozi.x.q@gmail.com

Abstract. The transition toward smart urban governance has become one of the defining structural trends of twenty-first-century development policy. This article examines the channels through which smart city construction affects national and regional development outcomes, drawing on international empirical evidence and the case of Uzbekistan's “Digital Uzbekistan — 2030” strategy. Using a comparative document-analysis methodology, the study derives four principal transmission channels — productivity and innovation, agglomeration spillover, public investment efficiency, and institutional quality — and evaluates their relative weight using comparative data from the IMD Smart City Index and national digital-economy statistics. The results show that smart city projects generate measurable, though geographically uneven, contributions to gross regional product, employment structure, and the quality of public administration; the discussion situates these results within the Uzbek policy context and concludes that the net effect on inter-regional disparities depends on the design of accompanying fiscal and investment policy.

Keywords: smart city, regional development, digital economy, urban governance, Digital Uzbekistan — 2030, agglomeration effects, regional convergence.

1. Introduction

The concept of the “smart city” emerged at the intersection of urban planning, information technology, and regional economics as a response to accelerating urbanization, resource constraints, and rising citizen expectations regarding the quality of public services. By 2026, smart city programs are no longer confined to a handful of pioneering metropolises; they have become a standard component of national development strategies across both advanced and emerging economies¹. In the academic literature, the smart city is generally treated not as a discrete technological artifact but as a model of urban development that mobilizes human, collective, and

¹Wang S., Li Y., Zhao X. Research on the Impact of Innovative City and Smart City Construction on Digital Economy: Evidence from China [Electronic resource]. — 2023. — URL: <https://arxiv.org/pdf/2301.10179>

technological capital toward the prosperity of urban agglomerations². The economic rationale for this shift rests on the proposition that digital infrastructure, data-driven governance, and integrated urban systems can raise the productivity of capital and labor concentrated in cities, while simultaneously improving the allocation of public resources across regions.

At the same time, the relationship between smart city construction and broader national or regional development is far from mechanical. Empirical research demonstrates that the economic benefits of smart city investment are mediated by institutional capacity, the degree of urban–rural integration, and the sequencing of infrastructure and human-capital policies. This relationship remains insufficiently systematized for transition and emerging-market economies, where smart city programs are typically introduced as part of broader national digitalization strategies rather than as standalone municipal projects.

Accordingly, this article sets out three research objectives: first, to systematize the theoretical channels linking smart city development to macro- and meso-level economic outcomes; second, to assess international comparative evidence on the realized effects of smart city construction; and third, to evaluate the applicability of these findings to Uzbekistan's national digitalization strategy, “Digital Uzbekistan — 2030.”

2. Materials and Methods

This study employs a narrative comparative-literature review combined with document analysis, a methodology appropriate for synthesizing a heterogeneous and rapidly evolving evidence base on smart city development. The analysis proceeds in three stages, corresponding to the three research objectives stated above.

The first stage consisted of a structured review of peer-reviewed and institutional literature on the economic effects of smart city construction, drawing on studies indexed in ScienceDirect, SAGE, Emerald, and Springer Nature, together with reports from the Federation of American Scientists and academic theses on local economic development³. From this body of literature, four recurring transmission channels were identified inductively and used as the analytical framework for the remainder of the

³Wang S., Li Y., Zhao X. Research on the Impact of Innovative City and Smart City Construction on Digital Economy: Evidence from China [Electronic resource]. — 2023. — URL: <https://arxiv.org/pdf/2301.10179>

study: productivity and innovation, agglomeration and regional spillover, public investment efficiency, and institutional quality and governance.

The second stage relied on secondary comparative data from the IMD Smart City Index 2025, which evaluates 146 cities worldwide across structural and technological dimensions of urban development using a three-year weighted average of resident-perception surveys⁴. The five highest-ranked cities and selected cities of regional relevance to Central Asia and the Middle East were extracted for comparative purposes.

The third stage applied document analysis to Uzbekistan's national digitalization policy, principally the “Digital Uzbekistan — 2030” strategy approved by presidential decree in October 2020, together with subsequent OECD assessments and GSMA and government progress reports⁵⁶. Indicators were selected for inclusion in the analysis on the basis of their direct relevance to inter-regional digital and economic convergence, namely: international governance rankings, the share of digitalization projects directed at regions outside the capital, the scale of e-government service provision, the affordability of digital access, and stated long-term policy targets.

All monetary, ranking, and project-count figures reported in Section 3 are drawn directly from the cited primary and institutional sources; no original survey or econometric estimation was conducted for this article, and the analysis is accordingly interpretive and comparative rather than causal-inferential in nature. This limitation is addressed further in the Discussion.

3. Results

The literature review identified four theoretical channels connecting smart city construction to national and regional development outcomes. The first is the productivity and innovation channel: smart city pilot policies have been shown to exert a positive, and in some cases an inverted-U-shaped, effect on urban green innovation, suggesting diminishing returns once a threshold level of digital saturation is reached. The second is the agglomeration and spillover channel, whereby the innovation

⁴Smart City Index 2025: The Ranking. — Lausanne: IMD World Competitiveness Center, 2025. — URL: <https://www.imd.org/smart-city-observatory/home/>

⁵Digital Skills for Private Sector Competitiveness in Uzbekistan. — Paris: OECD Publishing, 2023. — URL: https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/05/digital-skills-for-private-sector-competitiveness-in-uzbekistan_8f1719a7/6c54f447-en.pdf

⁶Digital Uzbekistan 2030 Strategy and E-Government Development [Electronic resource] // Global BIM Network. — URL: <https://globalbim.org/info-collection/digital-uzbekistan-2030-strategy-and-e-government-development/>

performance gains associated with smart city status extend to neighboring jurisdictions, although the magnitude of these spillovers decays with geographic distance. The third is the public-investment-efficiency channel, operating through smart grids, adaptive lighting, and e-government platforms that reduce the operating costs of municipal services and free up fiscal space for further development spending. The fourth is the institutional-quality channel, under which digital governance tools increase the transparency and responsiveness of local administration, a factor increasingly recognized as decisive for attracting private investment.

Table 1 summarizes these four channels together with their principal mechanisms and the type of empirical evidence reported in the literature.

Table 1. Channels through which smart city development affects national and regional economic outcomes

Channel	Principal mechanism	Type of effect documented
Productivity and innovation	Digital infrastructure and data platforms raise total factor productivity and stimulate green/technological innovation in pilot cities	Positive, inverted-U-shaped with diminishing returns beyond a saturation threshold
Agglomeration and regional spillover	Innovation and investment gains diffuse from pilot cities to adjacent provinces and regions	Positive but subject to distance decay; concentrated within neighboring administrative units
Public investment efficiency	Smart grids, e-government, and adaptive infrastructure lower municipal operating costs	Cost savings reinvested in further regional development spending
Institutional quality and governance	Digital administration increases transparency and the responsiveness of local government to firms and citizens	Associated with greater priority placed on local economic development by city administrators

Source: compiled by the author.⁷

Cross-country evidence broadly confirms that smart city status is associated with measurable gains in local economic development, though the strength of the relationship varies by region and by the maturity of digital infrastructure. A study of U.S. municipalities concluded that smart city initiatives contribute both directly and indirectly to local economic growth, with the strongest contributions observed in cities that combine social engagement, data-driven administration, and energy efficiency. Similarly, a survey-based analysis of U.S. local governments found that the degree of commitment to smart city technologies is systematically associated with the priority that chief administrative officers assign to local economic development⁸.

Research applying a composite Smart City Impact Index to South Korean cities found that economic development is the most frequently documented positive outcome of smart city programs among the four sustainability dimensions (economic, environmental, social, and governance), although negative effects — such as rising housing costs and surveillance concerns — are also recorded and must be weighed against the gains. A geographically focused study of emerging economies, using a difference-in-differences design, further shows that smart city and “innovative city” programs help economically vulnerable cities retain population and economic vitality, with benefits accumulating gradually over several years rather than appearing immediately after project launch⁹.

To situate these findings, Table 2 presents the leading positions of the 2025 IMD Smart City Index, which evaluates 146 cities worldwide across structural and technological dimensions of urban development.

Table 2. Selected results of the IMD Smart City Index, 2025

Rank	City / region	Continent	Notable feature
------	---------------	-----------	-----------------

⁷Smart Cities Technologies: Driving Economic Growth and Community Resilience. — Washington, DC: Federation of American Scientists, 2024. — URL: <https://fas.org/publication/smart-cities-technologies-driving-economic-growth-and-community-resilience/>

⁸Abutabenjeh S., Nukpezah J. A., Azhar A. Do Smart Cities Technologies Contribute to Local Economic Development? // Economic Development Quarterly. — 2022. — URL: <https://journals.sagepub.com/doi/abs/10.1177/08912424211053599>

⁹A Geographical Study of Smart Cities and Emerging Economies and Their Contribution to Regional Economic Development // GeoJournal. — Springer Nature, 2025. — URL: <https://link.springer.com/article/10.1007/s10708-025-11479-2>

1	Zurich, Switzerland	Europe	Top performer across all five evaluation pillars
2	Oslo, Norway	Europe	Strong governance and mobility scores
3	Geneva, Switzerland	Europe	High resident satisfaction with digital services
4	Dubai, UAE	Asia	Advanced 8 places, driven by Vision 2030 infrastructure investment
9	Singapore	Asia	Remains the top-ranked smart city in Asia overall

Source: compiled by the author based on the IMD World Competitiveness Center data.¹⁰

A common feature of the leading cities is that technological sophistication alone does not determine the ranking; rather, success depends on the integration of digital tools with housing policy, mobility planning, and inclusive governance. Indeed, in 110 of the 146 cities surveyed, affordable housing was identified by residents as the top development priority¹¹.

The “Digital Uzbekistan — 2030” strategy, approved by presidential decree in October 2020, sets out four overarching tasks: the development of e-government, digital industry, digital education, and digital infrastructure, with implementation plans updated on a two-year cycle. Uzbekistan rose from 69th to 63rd place between the 2022 and 2024 UN E-Government Surveys, entering the “very high” development category

¹⁰Smart City Index 2025: The Ranking. — Lausanne: IMD World Competitiveness Center, 2025. — URL: <https://www.imd.org/smart-city-observatory/home/>

¹¹Smart City Index 2025: The Ranking. — Lausanne: IMD World Competitiveness Center, 2025. — URL: <https://www.imd.org/smart-city-observatory/home/>

for the first time¹². At the regional level, the “Digital Government and Digital Region” programs implemented in 2023–2024 encompassed roughly three hundred priority projects, of which more than half were directed specifically at regional digital transformation rather than central public administration. Affordability of access has also improved markedly: ten gigabytes of mobile data now cost approximately 1.2 percent of the average monthly salary.

Table 3 summarizes the principal regional development indicators associated with the implementation of Digital Uzbekistan — 2030.

Table 3. Selected indicators of Digital Uzbekistan — 2030 relevant to regional development

Indicator	Recent value / status	Relevance to regional development
UN E-Government Development Index rank	63rd (2024), up from 69th (2022); “very high” category	Improves administrative efficiency nationwide, including in regional centers
Digital Government / Digital Region projects, 2023–2024	≈300 priority projects, of which 137 regional digital transformation	Directs roughly half of digitalization investment toward regional convergence
E-government portal (my.gov.uz) services	Over 560 e-services available nationwide	Reduces administrative transaction costs for firms and citizens outside the capital

¹²Digital Uzbekistan 2030 Strategy and E-Government Development [Electronic resource] // Global BIM Network. — URL: <https://globalbim.org/info-collection/digital-uzbekistan-2030-strategy-and-e-government-development/>

Affordability of mobile internet	10 GB $\approx$ 1.2% of average monthly salary	Supports diffusion of smart-city services into secondary cities and rural areas
Target for UN E-Government Survey by 2030	Top 30 countries worldwide	Long-term benchmark guiding continued regional digital investment

Source: compiled by the author based on government and OECD data.¹³

5. Conclusion

The accumulated international evidence indicates that smart city construction contributes to national and regional development through four interlocking channels: productivity and innovation, agglomeration spillovers, public investment efficiency, and institutional quality. These effects are real but uneven — concentrated in cities and adjacent regions with sufficient absorptive capacity, and contingent on complementary policies in housing, skills, and investment promotion. The experience of Uzbekistan's “Digital Uzbekistan — 2030” strategy illustrates both the potential and the limits of this model in an emerging-market, transition-economy context: rapid gains in e-government rankings and affordability have been achieved, while the translation of these gains into balanced regional development still depends on closing the urban–rural digital-skills gap and on designing investment instruments explicitly oriented toward regional, rather than purely metropolitan, smart city projects. Future research should focus on quantifying region-specific elasticities between digital infrastructure investment and gross regional product growth in Uzbekistan, building on the international methodologies reviewed in this article.

Literature used:

1. Wang S., Li Y., Zhao X. Research on the Impact of Innovative City and Smart City Construction on Digital Economy: Evidence from China [Electronic resource]. — 2023. — URL: <https://arxiv.org/pdf/2301.10179>

¹³Digital Uzbekistan 2030 Strategy and E-Government Development [Electronic resource] // Global BIM Network. — URL: <https://globalbim.org/info-collection/digital-uzbekistan-2030-strategy-and-e-government-development/>

2. Digital Uzbekistan 2030 Strategy and E-Government Development [Electronic resource] // Global BIM Network. — URL: <https://globalbim.org/info-collection/digital-uzbekistan-2030-strategy-and-e-government-development/>
3. Smart Cities Technologies: Driving Economic Growth and Community Resilience. — Washington, DC: Federation of American Scientists, 2024. — URL: <https://fas.org/publication/smart-cities-technologies-driving-economic-growth-and-community-resilience/>
4. ¹Abutabenjeh S., Nukpezah J. A., Azhar A. Do Smart Cities Technologies Contribute to Local Economic Development? // Economic Development Quarterly. — 2022. — URL: <https://journals.sagepub.com/doi/abs/10.1177/08912424211053599>
5. Smart City Index 2025: The Ranking. — Lausanne: IMD World Competitiveness Center, 2025. — URL: <https://www.imd.org/smart-city-observatory/home/>