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AI 기술의 도시재생 연계·활용을 위한 정책과제

AI in Urban Regeneration: Policy Framework, Challenges, and Recommendations

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Summary

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There are several rationales for undertaking this study. Urban regeneration requires a paradigm shift to address population decline, urban deterioration, inefficiencies in policy implementation, and the accelerating digital transformation. Under low-growth conditions, drivers of decline become more complex and intertwined—demographic change, industrial restructuring, climate risks, and the digital divide increase both the number of factors to consider and the uncertainty surrounding regeneration initiatives. At the same time, rapid advances in artificial intelligence (AI)—including large language models, multimodal models, and generative systems—offer new opportunities to improve policy design and execution through the analysis of large-scale urban data. Governments are also promoting general-purpose AI infrastructure and the integration of smart systems into public administration. Against this backdrop, this research examines how AI can be integrated into urban regeneration. By reviewing domestic and international best practices and comparing them with the current policy framework, the study identifies a mid- to long-term development pathway that embeds AI into urban regeneration, emphasizing responsive, data-driven models rather than technology-led upgrades alone.

Chapter 2 reviews the evolution of AI from deep learning to multimodal

and generative approaches and highlights their expanding adoption in urban planning and governance, infrastructure management, and public service delivery. It then diagnoses key limitations of current urban regeneration practice, including fragmented public data, subjective project selection, weak needs assessment, uncertainty in project feasibility, and insufficient monitoring and evaluation. These constraints have often resulted in piecemeal technology deployment (e.g., sensors and cameras) rather than integrated decision support, reinforcing the need for unified data standards and forecasting-based decision making. Within this context, AI can support the full policy cycle—from objective diagnosis and model validation to improved coordination across sites and rigorous assessment of outcomes.

Chapter 3 summarizes contemporary AI applications relevant to urban regeneration and draws implications for policy and practice. In government administration, AI use cases include robotic process automation, natural language processing, and large language models, illustrated by platforms such as the UK's Consult, Finland's Aurora AI, Korea's Lawbot, and AURI's ALRIS. In urban management, AI and related technologies leverage location-based data to strengthen planning and operational services, while enabling dynamic land-use analysis, feasibility studies through simulation, and real-time monitoring of project implementation. Collectively, these cases point to core application areas for AI in urban regeneration: enhancing objectivity in decline diagnosis and evaluation, strengthening evidence-based decision making, optimizing strategies through AI-driven forecasting and simulation, improving transparency and collaboration through participatory tools, and institutionalizing monitoring and feedback as standard components of regeneration programs.

Chapter 4 proposes methodological approaches to embed AI across all levels of urban regeneration planning and implementation, from short-term actions to long-term capacity building for anticipated changes in urban space. The proposed framework consists of three key

components: Data Cloud, Digital Platform, and AI Model. The Data Cloud synchronizes regeneration-related datasets, prioritizes integrity and consistency, and enhances trust through governance mechanisms, including secure storage within protected data vaults. Building on this foundation, AI-enabled applications generate results that are continuously refined through learning and feedback.

Within this framework, three policy goals are emphasized. First, to improve diagnosis and planning using AI-based analytics, including service-center analysis, feasibility assessment, and support for collective and cooperative initiatives. Second, to strengthen implementation through community engagement—supported by NLP for citizen and non-government initiatives and intelligent agents—while using smart technologies to enhance safety and livability; digital modeling can also improve construction management by reducing delays and risks. Third, to build a responsive decision-support system by integrating machine learning with outcome tracking, centralized progress monitoring, and structured databases of evaluated results, enabling successful approaches to inform future policy design.

Finally, the study proposes a three-phase implementation pathway: (1) adoption based on standardized guidelines, (2) incremental scaling of AI-supported decision making, and (3) advancement toward systems that leverage accumulated outcomes to generate machine-driven insights for policy improvement. A key challenge remains keeping pace with private-sector innovation and deployment. The proposed future direction prioritizes solutions that are deployable in the short term, directly applicable to policy development, supported through pilot demonstrations, and reinforced by timely regulatory updates.

Keywords :

Artificial Intelligence (AI), Urban Regeneration, Learning and Prediction,
Policy Feedback and Virtuous Cycle, Public Sector AI