

Japan's Initiatives on “Architectural and Urban DX”

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of Urban Living and the Built Environment

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1. Increasing Complexity of Societal Challenges

→The Need for Optimal Solutions

Population decline, aging infrastructure, disaster prevention and response, decarbonization, and strengthening industrial competitiveness are increasingly interconnected challenges on the ground. With budgets and human resources constrained, there is a need to achieve cross-sector, system-wide optimization in addressing these increasingly complex urban challenges

2. Severe Labor Shortages

→Labor-Saving Measures and Automation are Essential

As a result of population decline, the number of skilled workers is decreasing across sectors such as construction, transportation, healthcare, and retail. There is a need to visualize worksites in 3D and leverage technologies such as robotics, autonomous driving, and drones to enable remote support, labor-saving operations, and automation.

3. Advances in Information and Communications Technology

→A Realistic Cost Environment

Advances in:

- sensor technology
 - 5G and high-speed communications
 - AI and data analytics
 - cloud technology
- and other areas have created an environment in which digital twins can be operated continuously.

4. Crossing Organizational and Industry Boundaries

→Breaking Down Barriers through Digital Technology

In the digital realm, anyone can freely cross the boundaries between organizations, industries, and fields. This has the potential to break down siloed structures and lead to the reconstruction of physical space.

5. Engagement of Diverse Stakeholders

→Expectations for a “Common Language”

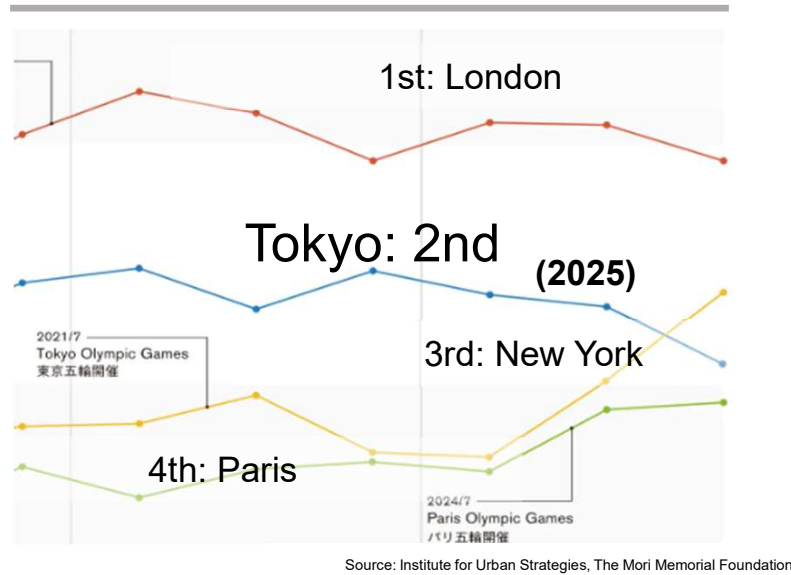
Achieving the well-being of each individual requires the involvement of diverse stakeholders, including government, businesses, and residents. Digital twins, which anyone can share and understand intuitively, can serve as that foundation.

Digital twins must be established not as a one-off DX initiative, but as a foundation for day-to-day operations—linked to the real world, continuously used, and directly reflected in decision-making and consensus-building.

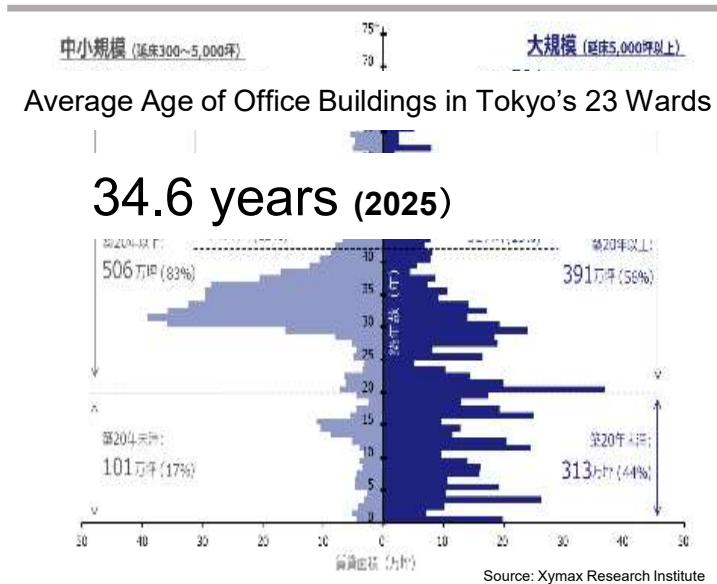
Challenges Across a Wide Range of Fields Related to “Architectural and Urban DX”

I. Urban Development

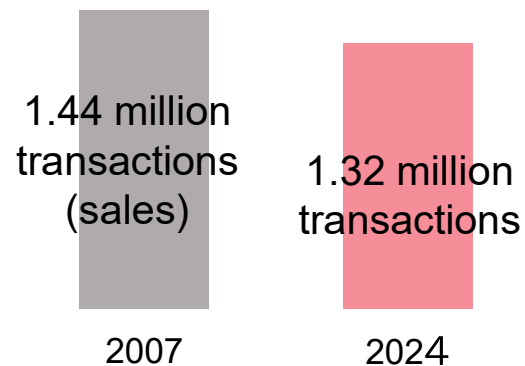
Urban Competitiveness



Increase in Aging Buildings

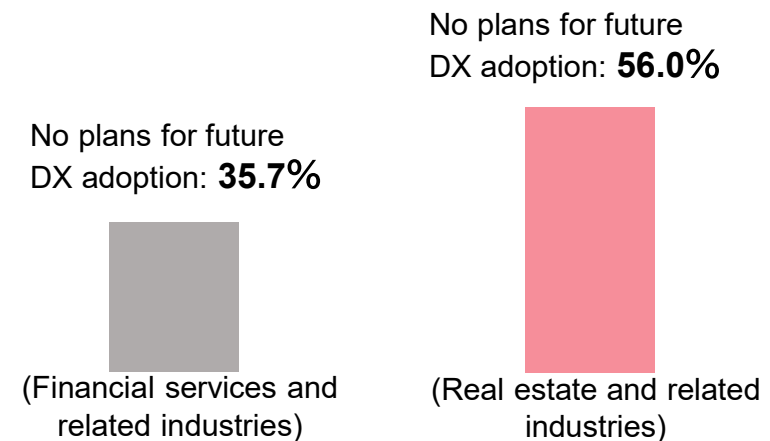


Revitalization of Real Estate Transactions



Digital Transformation (DX)

DX Adoption Status (2021)

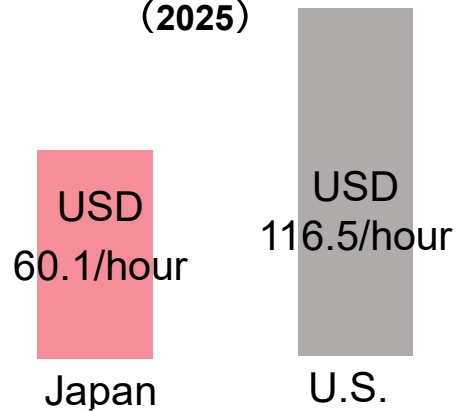


II. Creation of New Industries

Stagnant Labor Productivity

Ranked 28th among OECD countries

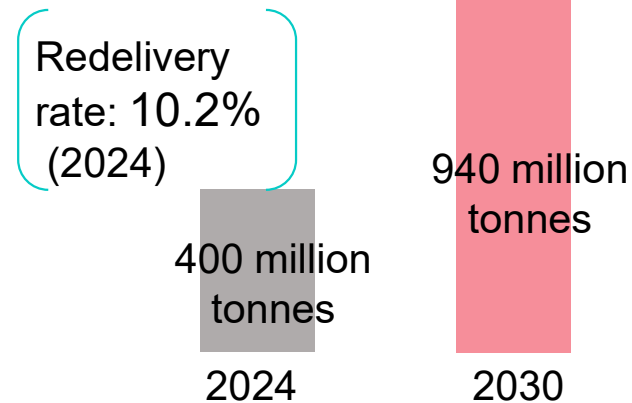
(2025)



Source: Japan Productivity Center

Labor Shortages in the Logistics Sector

Shortfall in transport capacity: 34%



Rising Insurance Claim Payments

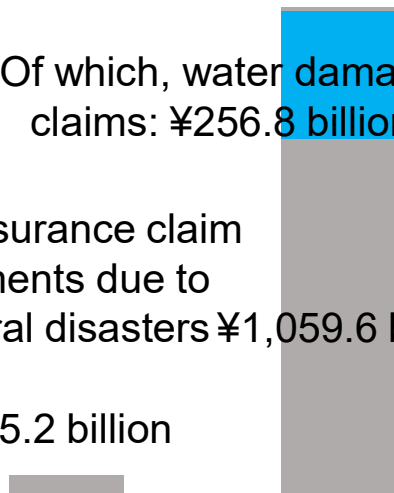
Of which, water damage claims: ¥256.8 billion

Fire insurance claim payments due to natural disasters ¥1,059.6 billion

¥5.2 billion

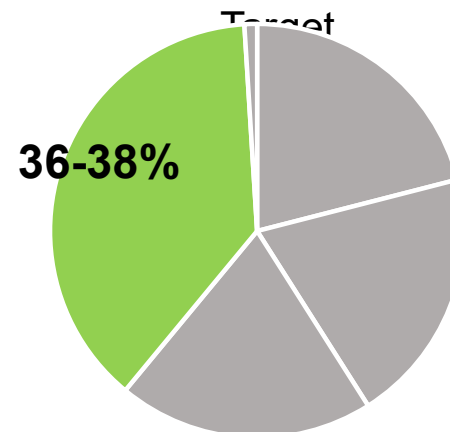
2010

2019



Maximizing the Deployment of Renewable Energy

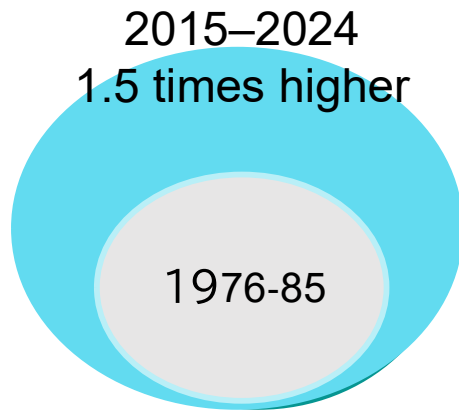
2030 Power Generation Mix



Challenges Across a Wide Range of Fields Related to “Architectural and Urban DX”

III. Advancing Regional Policy

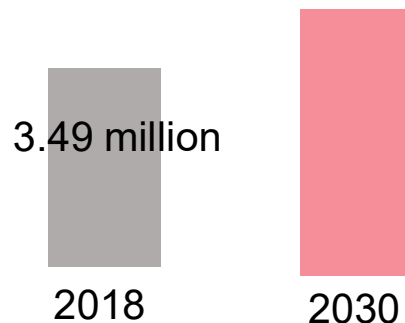
Increasing Severity of Natural Disasters



Number of occurrences of hourly rainfall exceeding 50 mm

Vacant Housing Issue

Vacant homes not intended for occupancy: 4.70 million



Regional Mobility

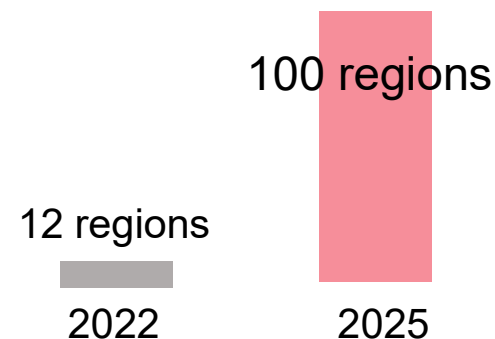
Bus routes Discontinued (2013–2023):
15,962km

“Transportation Gap” Areas (2025):
2,057 areas

“Digital Revitalization”
Rural and Mountainous Areas (by 2027):
150 areas

Regional Revitalization

Creation of sustainable tourism destinations:



Urban Population and Industry Concentration

- Urban Planning Areas Nationwide:
1,352 municipalities (FY2024)
- Population Living in Urban Planning Areas:
Approximately **90%** of the population

Construction and Redevelopment

- Building Confirmation Applications Nationwide:
Approximately **500,000** per year (FY2023)
- Development Permit Applications Nationwide:
Approximately **18,000** per year
- Urgent Urban Renaissance Development Areas:
55 areas (approximately 9,811 ha)

Land and Buildings

- Land and Buildings Nationwide:
Land: approximately **180 million** parcels
Buildings: approximately **59 million** structures
- Share of National Wealth Represented by Land and Buildings:
Approximately **53.8%** (approximately ¥2,235 trillion)

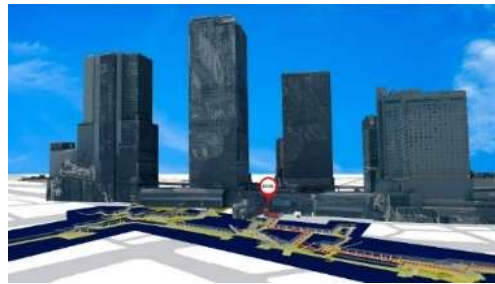
A digital twin built using data obtained from surveys under the City Planning Act and data on building structures created under the Building Standards Act provides a foundation for recreating the primary stage on which most of Japan's economic and social activities take place.

By linking various types of data on the digital twin, it will be possible to help solve a wide range of urban challenges.

- By linking diverse sources of information, we hope to accelerate the resolution of challenges in fields such as urban development, disaster prevention and mitigation, and green transformation (GX), improve productivity in an era of labor shortages, and create new business opportunities.

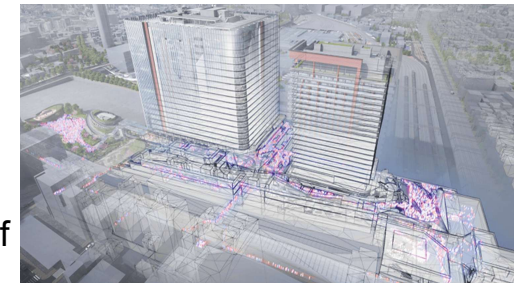
Example: 3D Visualization of Accessible Routes

- By linking BIM and 3D city model data, a system has been developed that can easily display accessible routes that avoid stairs at terminal stations and similar facilities.
- Accommodates diverse mobility needs, including those of wheelchair users and people with strollers.



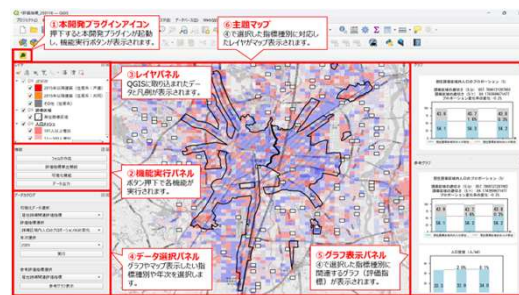
Example: Phase-Free Use of 3D City Models

- By linking BIM and 3D city models, movement simulations can be conducted for major stations and surrounding areas, enabling hazardous locations to be identified in advance and effective guidance and wayfinding methods to be evaluated.
- The system can be used routinely for applications such as event management and can also support the safe evacuation and guidance of people during disasters.



Example: Urban Structure Assessment

- A tool has been developed that enables local government officials to visualize statistical data and 3D city models and generate indicators to track changes in urban structure over time.
- The tool is being used by local governments as reference material for the formulation and review of urban planning policies and related initiatives.



Example: Supporting Resident Participation in Urban Development

- By combining 3D city models with visualization technologies such as VR and AR, residents can intuitively experience future urban development scenarios.
- This enables residents, as well as local governments and experts, to participate more actively in discussions on urban planning and development concepts.



- We hope that digital twins, continuously updated through public–private collaboration and used in a phase-free manner in both everyday situations and emergencies, will create **resilient cities** and become a social foundation that fosters **well-being** and **innovation**.

