Citiverse Initiative

Global Initiative on AI and Virtual Worlds - Discovering the Citiverse

AI-Enabled Citiverse: A Strategic Blueprint for Cities in the Age of AI

Foreword

This publication was developed within the framework of the Global Initiative on AI and Virtual Worlds – *Discovering the Citiverse*, which is a global multistakeholder platform launched by the International Telecommunication Union (ITU), the United Nations International Computing Centre (UNICC), and Digital Dubai, and supported by more than 70 international partners.

The Initiative advances the development of the AI-enabled citiverse, where artificial intelligence, spatial intelligence, digital twins, and immersive systems converge to deliver real-world impact. It aims to ensure that this transformation is inclusive, trusted and interoperable, and that it serves people, cities and communities.

By connecting cities, governments, industry, academia, and the UN system, the Initiative supports the transition from vision to implementation – empowering leaders to harness these technologies to improve quality of life, strengthen resilience, and drive sustainable and inclusive development.

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Disclaimers

The opinions expressed in this publication are those of the authors and do not necessarily represent the views of their respective organizations, Executive Committee members or Steering Committee members of the Initiative. The findings presented in this report are based on a comprehensive review of existing literature and voluntary written contributions submitted by a diverse range of stakeholders.

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Abbreviations and acronyms

3D	Three-dimensional
AI	Artificial intelligence
BIM	Building Information Modeling
EDIC	European Digital Infrastructure Consortium
IGO	Intergovernmental Organization
ITU	International Telecommunication Union
ITU-T	ITU Telecommunication Standardization Sector
OASC	Open & Agile Smart Cities
UNICC	United Nations International Computing Centre
WeGO	World Smart Sustainable Cities Organization
XR	Extended Reality

Executive summary

The AI-Enabled Citiverse: A Strategic Blueprint for Cities in the Age of AI is designed for urban decision-makers navigating the next era of city governance. It decodes the convergence of AI, spatial computing, digital twins and immersive environments into actionable civic capabilities, and makes the case for why cities must act now to shape, rather than inherit, the intelligent urban systems being built around them. It is intended for mayors, ministers, city administrators, and policy advisors seeking to understand the strategic opportunity, assess the cost of inaction, and identify a concrete path toward building future-ready, human-centric cities.

Who should use this report?

- mayors and city leaders;
- ministers and senior policymakers;
- national regulatory authorities;
- city administrators and public sector leadership teams;
- policy advisers and urban strategy teams;
- digital, innovation, and transformation offices;
- consultancy firms supporting technical, commercial, and strategic decision making;
- public officials responsible for planning, infrastructure, service delivery, and civic engagement.

How can this report help?

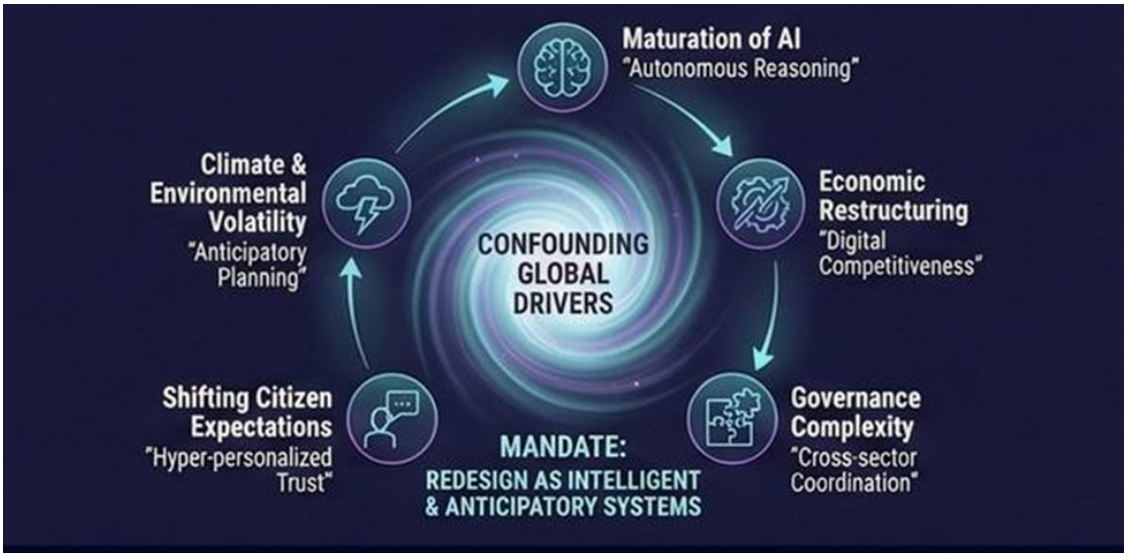
This report is intended to help readers:

- understand the strategic opportunity of the AI-enabled citiverse for future-ready city governance;
- assess the risks of delayed action and the cost of inaction;
- connect emerging technologies with practical governance, policy, and implementation choices;
- identify how leadership, data sovereignty, and cross-sector collaboration can shape better urban outcomes;
- support more human-centric, inclusive, trusted, and future-ready city development.

1 The great convergence and the confounding trends

We are navigating an era of unprecedented systemic complexity. To govern effectively, city leaders must understand the myriad global drivers reshaping our urban reality. Collectively, these technological, economic, and social forces create a transformative mandate for cities to address growing complexity through more intelligent, immersive, anticipatory and human-centred systems that can better respond to labour volatility, equitable growth challenges, economic concentration, and geopolitical instability:

Figure 1: The Great Convergence and the Confounding Trends



- **Climate and environmental volatility**: Unpredictable environmental shifts demand a transition from reactive disaster management to strategic foresight. Cities require anticipatory planning and resilient, adaptive infrastructure to safeguard their populations.
- **The unprecedented progress in artificial intelligence**: AI is rapidly transitioning from basic analysis to complex autonomous reasoning, generative modelling, and real-time decision support.[1] This shift fundamentally alters what a city can "understand" and how it can act.
- **Economic restructuring and digital industries**: The global economy is undergoing a massive realignment. Digital industries and services are reshaping employment, redefining local economies, and dictating the new terms of global digital competitiveness. Cities must adapt by embedding AI-driven and immersive digital capacities into urban development to attract capital and talent.
- **Shifting citizen expectations and trust**: Constituents now expect the same seamless, personalized, and responsive experiences from their governments as they receive from the private sector.[2] Bridging this gap can help build trust and delivering effective, people-centred public services.
- **Governance complexity**: Solving modern municipal friction points such as housing affordability, integrated mobility, and public health requires dynamic cross-sector coordination and agile policy-making which legacy systems are often not equipped to support.

2 The opportunity: Enabling the political and civic agenda

For city leaders, mayors and ministers the core mandate remains resolute: foster economic vitality, ensure public safety and city resilience, enhance sustainability, and tangibly improve the daily lives of all constituents. The AI-enabled citiverse serves as a key enabler of this political and civic agenda.

Historically, urban technology has focused narrowly on optimizing physical infrastructure-making grids more efficient or traffic lights more responsive. The AI-enabled citiverse shifts this focus toward optimizing human potential, strengthening civic engagement, and enabling data-driven decision-making, and enhancing public value.

Figure 2: The Opportunity: Enabling the Political and Civic Agenda

It provides leadership with enhanced strategic foresight. Governments can now model policies, simulate macroeconomic shifts, and stress-test infrastructure in highly accurate virtual environments prior to physical implementation. Although the effectiveness of these tools depends on data quality, institutional capacity and regulatory safeguards, this capability can help reduce political and financial risk while supporting positive civic outcomes. By transitioning toward cognitive and autonomous city models, leaders can ensure evidence-based policymaking, strengthen transparency, and deliver a responsive governance experience that builds profound public trust.

3 Decoding the frontier: From technologies to civic capabilities

Technology alone does not transform cities; *capabilities* do. To harness this opportunity, we must demystify the underlying technologies, positioning them for city administrators not as abstract technology concepts, but as novel, deployable civic capabilities.

- **Virtual worlds enabling immersive environments**: Technologies like the spatial Internet and advanced 3D rendering translate complex urban data into intuitive, immersive environments. This capability allows urban planners, citizens, and policymakers to virtually "step inside" future developments, enabling participatory urban design, operational

planning, engineering review, cross-departmental decision-making and seamless spatial collaboration across municipal departments.

- **Artificial intelligence enabling reasoning and autonomy**: Advanced AI provides cities with the capability of complex reasoning, predictive modelling, and rapid autonomous response. This transforms static urban grids into cognitive networks capable of anticipating crises – from optimizing energy distribution during peak loads to rerouting emergency services around traffic bottlenecks – and adapting in real time.
- **Digital twins enabling systems intelligence**: The capability to dynamically simulate policy impacts, resource allocation, and infrastructure stress across interconnected municipal systems with real-time data. It is the ability to foresee the ripple effects of a single policy change across the entire urban ecosystem.
- **Robust data foundations enabling AI sovereignty**: Underpinning these capabilities are secure digital infrastructures, federated data spaces, and scalable system architectures.[3] These foundations ensure that a city maintains data sovereignty, protecting citizen privacy while enabling the interoperability required for a true AI-enabled citiverse.

4 Human-centric by design

The true measure of the AI-enabled citiverse is not its technological sophistication, but its capacity for human empowerment.[4] This vision rejects technology for technology's sake; it is fundamentally anchored in human-centricity:

Figure 3: Human-Centric by Design

- **Human language as the ultimate interface**: Complex digital services will no longer require technical literacy or the navigation of cumbersome municipal portals. Citizens will interact with their city through natural human language, breaking down bureaucratic and accessibility barriers to ensure truly inclusive governance.
- **Human-level intelligence for civic challenges**: By combining AI-rich city context data and citizen feedback with advanced reasoning capabilities, cities can address complex, multilayered challenges with unprecedented nuance, empathy and speed. It brings the analytical power of thousands of experts to bear on localized neighbourhood issues.

- **Augmentation over replacement**: The AI-enabled citiverse is designed to amplify human intelligence and strengthen civic agency. It aims to elevate the municipal workforce, freeing public servants from repetitive administrative burdens. This shift allows the city workforce to focus their energy on high-value, empathetic citizen care, complex problem solving, and strategic innovation.

5 Envisioning the AI-enabled citiverse ecosystem for cities

A forward-lookingcity anticipates change rather than merely reacting to it. The transition to an AI-enabled citiverse fundamentally redefines the experience and outcomes for all major urban constituents:

Figure 4: Envisioning the AI-Enabled Citiverse Ecosystem for Cities

5.1 For the city government

- **From reactive management to strategic foresight**: Leadership transitions from responding to past data to governing based on highly accurate predictive modelling and data-driven decision making.
- **Autonomous operations and rapid response**: Enabling autonomous responses to routine municipal friction points, streamlining service delivery, and protecting critical infrastructure with predictive maintenance and intelligence.
- **Risk-free policy simulation**: Utilizing immersive digital twins to test urban policies, climate adaptation strategies, zoning changes and disaster response protocols safely before committing public funds to major capital investments.

5.2 For the city economy and workforce

- **Strengthening local industries**: The AI-enabled citiverse serves as an immersive innovation sandbox, actively boosting the local economy's digital competitiveness. It creates an environment that attracts global talent, venture capital and frontier industries.
- **Scalable skill augmentation**: Utilizing immersive virtual environments for rapid, scalable workforce training. Cities can actively prepare their local labour market, public servants, and municipal operators for the profound transitions of an AI-driven economy, so ensuring that no worker is left behind.

5.3 For the citizens

- **Hyper-personalized civic services**: Moving away from generic service delivery to civic services meticulously tailored to the specific needs, context, language, and accessibility requirements of the individual citizen.
- **Immersive civic participation**: Allowing communities to visualize, engage with, and participate meaningfully in neighbourhood planning. Citizens can experience the impact of proposed developments such as parks or transit systems through accessible virtual platforms, thereby fostering a stronger sense of ownership, belonging and engagement.
- **Expanding civic inclusion**: Empowering people with accessibility needs and limited digital literacy to engage with city services through assisted, and human-centred digital experiences.

6 Contextual priorities – Harnessed for actual city needs

While the underlying technological frameworks of the AI-enabled citiverse are global, their application must be intensely local. The AI-enabled citiverse fundamentally rejects the "One-Size-Fits-All" fallacy. Technology must be harnessed to solve *actual* urban friction points, ensuring that every investment yields tangible, localized civic value.

Priority use cases[5] must be dictated by the specific political mandate, economic reality, and geographic context of the city:

- **The coastal metropolis**: A city grappling with rising sea levels requires advanced predictive capabilities for flood modelling, resilient infrastructure planning, and real-time environmental monitoring.
- **The industrial hub**: A rapidly transitioning industrial centre may prioritize the AI-enabled citiverse for mobility optimization, workforce upskilling, supply chain simulation, and aggressive emission – reduction tracking.
- **The rapidly urbanizing centre**: A city experiencing explosive population growth may leverage the AI-enabled citiverse to simulate scalable housing developments, optimize new utility grids, and deploy autonomous public transit networks.

The AI-enabled citiverse provides the architecture, the ethical framework, and the capabilities; the city defines the sovereign mission.

Figure 5: Contextual Priorities – Harnessed for Actual City Needs

7 The opportunity window: Why act now?

We are currently in a brief, critical **Opportunity Window**. AI capabilities and spatial computing are advancing exponentially, and the rules of the new digital economy are being written today.

- **The staggering cost of inaction**: Cities that delay adoption risk falling into a widening digital divide. They face diminished economic resilience, brain drain, and an inability to attract the industries of the future. Delay guarantees technological dependency and fragmented, inefficient public services.
- **The advantage of early architecture**: By acting early, city leaders can actively shape the governance, data sovereignty, and ethical frameworks of their local AI-enabled citiverse. Waiting means eventually importing generic, external standards dictated by private entities. Acting now allows leadership to craft sovereign solutions aligned with their own local cultural, ethical and political values. Early adopters will set the global standard.
- **The imperative of early capacity building**: By investing early in AI-enabled citiverse and AI capacity building, city leaders can develop the institutional skills, talent and operational maturity needed to govern and operate with confidence. Early action helps build internal capability, reduce dependency, and ensure that cities are prepared to lead rather than follow.

Figure 6: The Opportunity Window: Why Act Now?

8 The catalyst: The global initiative on AI and virtual worlds

To support cities in capturing this extraordinary opportunity, and to translate international dialogue into actionable, city-level transformation, the Global Initiative on AI and Virtual Worlds – *Discovering the Citiverse* was launched by the International Telecommunication Union (ITU), the United Nations International Computing Center (UNICC) and Digital Dubai, in collaboration with global experts.

This initiative is designed to fill the critical gaps between visionary intent and practical, on-the-ground execution. It serves as a multilateral coalition, bringing together the world's foremost technological expertise, policy frameworks and investment models.

It provides mayors and ministers with the necessary blueprints, capacity-building resources, and collaborative networks to successfully architect their sovereign AI-enabled citiverse while promoting inclusive and ethical development.

Figure 7: The Catalyst: The Global Initiative on AI and Virtual Worlds

9 The AI-enabled citiverse journey: Why partner with us?

Embarking on the creation of an autonomous, future-ready city is a monumental institutional undertaking. By joining our AI-enabled citiverse journey and aligning with the Global Initiative, cities gain a decisive, de-risked advantage.

- **Accelerated results**: Leverage our proven strategic foresight frameworks and ready-to-deploy architectural patterns to move rapidly from abstract vision to scaled pilot, delivering quick wins to your constituents.
- **A "glocal" approach**: Benefit from global best practices, frontier research, and international standards, meticulously tailored and adapted to your local cultural and civic realities.
- **Do not re-invent the wheel**: Access a shared, vetted repository of tools comprised of guidelines, frameworks, interoperability standards, and proven priority use cases relevant to XR, digital twins, BIM, and urban data ecosystems. We provide the foundational scaffolding for implementation confidence and reduced vendor lock-in.
- **Institutional capability building**: We help your national, regional and local government develop strategic coherence across AI, virtual worlds, digital twins, and public policy, thereby empowering your leadership team to focus on localized innovation and high-impact governance.

Figure 8: The AI-enabled Citiverse Journey: Why Partner With Us?

10 Call to action: Architecting tomorrow, today

The cities of tomorrow will not be defined merely by their physical infrastructure, their steel, concrete and glass. They will be defined by their responsiveness, their immersive connectivity, and their unwavering dedication to human potential.

The confounding trends of our era demand bold, anticipatory leadership. The technologies to build inclusive, resilient, sustainable, and deeply competitive future-ready cities are in our hands. The transition from legacy smart cities to cognitive, anticipatory urban ecosystems is the defining governance challenge of this decade.

The question is not whether the AI-enabled citiverse will emerge. It already is emerging.

The question is: Will your city lead, or will it follow?

Figure 9: Call to Action: Architecting Tomorrow, Today

The window to lead this transformation is now open. We invite you to step into this new frontier, to join the Global Initiative on AI and Virtual Worlds, and to partner with us on the AI-enabled citiverse journey.

Let us move beyond the smart cities of the past and boldly construct the AI-enabled citiverse. Let us govern the future, together.

11 Conclusions

The AI-enabled citiverse is not a future scenario, it is an emerging reality. Cities that treat it as speculative will find themselves governing systems already shaped by others.

The convergence of AI, spatial computing, digital twins and immersive environments has reached a threshold of civic deployability. The technological foundations are ready; what is required is leadership.

The cost of inaction is concrete and compounding. Delayed adoption leads to technological dependency, brain drain, loss of economic competitiveness, and an inability to attract the industries and talent of the future.

Technology must serve human potential, not replace it.[6] The AI-enabled citiverse succeeds only when anchored in human-centricity, inclusive access, natural language interfaces, augmentation of the civic workforce, and meaningful democratic participation.

Data sovereignty is non-negotiable. Cities that act early define their own governance, ethical and data frameworks. Cities that wait will import standards set by private actors without their values or their citizens' interests.

No city needs to start from scratch. The Global Initiative on AI and Virtual Worlds provides the blueprints, peer networks, and capacity-building resources to move rapidly from vision to scaled delivery.

The defining governance question of this decade is not whether to build future-ready cities but who will lead the building.

12 About the Global Initiative on AI and Virtual Worlds – Discovering the Citiverse

Launched by ITU, UNICC and Digital Dubai, the Global Initiative on AI and Virtual Worlds – *Discovering the Citiverse* is a multistakeholder platform dedicated to shaping the next generation of AI-enabled citiverse.

A global coalition of more than 70 partners, including cities, governments, UN agencies, standards bodies, industry, academia and civil society, the Initiative is building the governance architecture of the AI-enabled citiverse.

The Initiative ensures that these technologies evolve in ways that are inclusive, interoperable, and human-centric, while contributing to the implementation of the Pact for the Future and its Global Digital Compact.

Serving as a neutral and action-oriented platform, it brings together public and private stakeholders to advance the responsible development and deployment of the AI-enabled citiverse. It provides blueprints, capacity-building resources, and a global peer network to support cities in moving from vision to scaled implementation.

The Initiative advances its mission through three strategic pillars, supported by dedicated tracks addressing key challenges and opportunities. This structure enables both high-level global guidance and practical implementation across cities worldwide.

For more information, please visit: https://www.itu.int/metaverse/virtual-worlds/.

Meet the Champions

Champions are entities that demonstrate leadership by providing financial contributions in support of the Initiative. This may include funding for events, challenges, research outputs, communication activities, trainings, travel grants, or other related efforts.

Meet the Founding Partners

Founding Partners are the organizations that launched the Initiative. They serve as the core convening entities and contribute to shaping its long-term vision. The Founding Partners are:

ITU · UNICC · DIGITAL DUBAI

Meet the Supporters

Supporters are organizations that have expressed endorsement of the Initiative and actively participate in its activities. This includes, but is not limited to, participation in tracks, contribution of use cases, co-organization of events, provision of expertise, or public advocacy of the Initiative.

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