منتدى مستقبل العقار
Real Estate Future Forum

The AI-First City:

What City Leaders Can Do Today to Shape Tomorrow's City

Cities are entering a new era, in which AI is shifting from standalone technologies to the core engine that senses the environment, interprets data, and coordinates action across urban systems

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Executive Summary

Cities stand at a defining inflection point. After two decades of "smart city" initiatives, most urban areas have digitized services and expanded monitoring, but few have achieved **cross-domain intelligence or real-time coordination**. While progress has been incremental, fundamental transformation has been hampered by fragmented data, siloed operations, and limited predictive capabilities.

Those barriers are now breaking. Advances in AI, sensing infrastructure, data integration, computing, and governance are enabling cities to operate as **integrated, predictive systems** rather than fragmented and reactive ones. AI is no longer a peripheral tool or strategic add-on; rather, it is becoming the core engine that senses the urban environment, analyzes conditions across domains, and orchestrates coordinated action at scale.

The shift is profound. Whereas smart-city programs improved individual services, the AI-first approach transforms **how the entire city runs.** Cities that embrace this model can unlock step-change improvements in safety, mobility, sustainability, resilience, service delivery, and fiscal performance. Those that do not risk widening inequality, weakening competitiveness, and falling behind in the next era of global urban leadership.

Realizing this potential requires a new, integrated model of city intelligence built on three reinforcing layers: (Exhibit 1)

- **Sense: Building the City's Digital Nervous System**
  The sensing layer creates a unified, real-time view of the city. It integrates physical sensors, digital signals, and legacy systems into a shared, governed data platform, creating the digital nervous system upon which every other layer depends.

- **Analyze: Turning Data into Intelligence and Foresight**
  The analysis layer transforms data into meaningful insight. AI models interpret multimodal data, forecast conditions, simulate scenarios, and provide decision support to planners and operators. Cities can now move from reactive analysis to proactive intelligence.

- **Orchestrate: Enabling Coordinated and Agentic Urban Operations**
  The orchestration layer brings intelligence to life. AI-assisted and increasingly agentic urban operations enable faster, context-aware action, greater local autonomy, and stronger resilience by reducing single points of failure, with human oversight ensuring that operations remain safe and accountable.

Together, these layers allow cities to deploy AI across the four core systems, the Urban Environment & Infrastructure, Economic Prosperity & Competitiveness, Human & Social Services, and Government Services & Citizen Experience, driving measurable improvements in performance, resilience, and citizen outcomes.

But technology alone is not enough. Cities must also establish the institutional foundations for AI-first transformation, including strong governance and institutional alignment, coherent policy and Responsible AI frameworks, robust data governance and interoperability, talent and education systems that build an AI-capable workforce, and partnerships with industry and local innovation ecosystems.

This shows that AI is no longer a technology story; it is the core engine for how cities sense, analyze, and orchestrate to continuously improve livability, resilience, and competitiveness. The opportunity for city leaders is clear: move from ambition to execution and build the next generation of AI-first cities.

Exhibit 1 - How Cities Change When They Become AI-First

Core Engine

1. Sense

Before: Cities rely on fragmented sensors and periodic data collection that provide slow, incomplete, and siloed visibility into urban conditions.

After: Cities operate with unified, real-time sensing that continuously captures multimodal signals across the urban environment, creating a consistent and timely foundation for intelligence and action.

2. Analyze

Before: Insight depends on manual, siloed analysis with limited ability to integrate data or forecast complex urban dynamics.

After: AI delivers predictive, cross-domain intelligence that continuously interprets conditions, simulates scenarios, and supports anticipatory, real-time decision-making.

3. Orchestrate

Before: City operations are coordinated manually across departments, leading to delays, inconsistent responses, and vulnerability to single points of failure.

After: AI-assisted and increasingly agentic urban operations enable faster, locally autonomous decision-making, greater operational resilience, and coordinated real-time action across domains — with human oversight ensuring safe and accountable execution.

Enablers

A. Governance & Institutional Alignment

Before: Ownership of digital initiatives is fragmented, mandates differ across agencies, and decision-making on data and AI is inconsistent and slow.

After: Clear governance structures define ownership, align mandates across agencies, and establish unified decision rights for data sharing, AI deployment and oversight, enabling a coordinated and accountable execution.

B. Policy, Regulatory & Responsible AI Frameworks

Before: Policies for data sharing, privacy, cybersecurity, and AI use are uneven or incomplete, making cross-agency coordination and safe adoption difficult.

After: Standardized data, privacy, cybersecurity, and AI governance frameworks, combined with Responsible AI safeguards such as bias mitigation, explainability, and human oversight, ensure trusted, transparent, and scalable AI deployment.

C. Data Governance & Interoperability

Before: City data is siloed across agencies, inconsistent in quality, and difficult to integrate, limiting its usefulness for real-time sensing, analytics, and planning.

After: Cities establish clear data ownership and stewardship roles, unified quality and metadata standards, and interoperable architectures that enable seamless, high-quality data exchange across all domains.

D. Talent, Education & Capability Building

Before: Public-sector teams rely on manual workflows and lack the skills to interpret AI insights, supervise automation, or redesign processes; education systems are slow to prepare future talent.

After: Cities build AI-literate workforce through upskilling and reskilling, establish specialized roles in data and AI operations, and partner with schools and universities to embed digital and AI competencies into curricula for future generations.

E. Partnerships & Innovation Ecosystems

Before: Innovation is limited to isolated vendor-led pilots that rarely scale or integrate into the wider city system.

After: Strategic partnerships with technology providers, academia, startups, and research labs — supported by sandboxes, outcome-based contracting, and co-development models — accelerate innovation and enable safe, scalable adoption of AI across the city.

CORE ENGINE ENABLERS:

02

Why Now Is the Time: The Moment for AI-Driven Urban Transformation

Cities are confronting growing complexity. By 2050, nearly 70% of the world's population will live in urban areas[1], intensifying pressure on infrastructure, mobility, public services, and climate resilience. Rising service expectations and demands for transparency and equity are pushing traditional operating models to their limits. At the same time, fiscal pressures and persistent workforce shortages are forcing city governments to deliver more with fewer resources while maintaining reliability and quality.

These pressures are converging at the exact moment when the technological and institutional environment has fundamentally shifted. While AI itself has been present in cities for years, until recently it existed largely as a set of narrow, domain-specific tools. What is different today is the combination of far more capable AI models, particularly multimodal and generative systems, alongside richer and more pervasive sensing networks, integrated urban data platforms, and affordable compute that can support real-time analytics at city scale. Crucially, governance and policy frameworks around AI, data, cybersecurity, and responsible use have matured, giving cities a clearer foundation for safe, confident adoption. Together, these advancements make it possible to create a unified, continuously updated view of the urban environment and to apply predictive intelligence across multiple domains simultaneously —something earlier smart-city programs could not achieve with the technology available at the time.

While technological advances are crucial, what is emerging now goes far beyond. Indeed, it enables a fundamentally different way of operating a city. The ability to sense urban conditions continuously, analyze them through advanced AI, and orchestrate coordinated action across agencies enables a shift from reactive, siloed service delivery to integrated, predictive, adaptive management. Realizing this potential requires an intentionally designed AI-enabled engine built around the sensing, analysis, and orchestration layers. To be effective, it must be supported by strong governance, clear policy and Responsible AI frameworks, robust data governance, an AI-ready talent pipeline, and a vibrant network of partnerships and innovation ecosystems.

Taken together, rising urban pressures and unprecedented technological readiness create a clear inflection point. For a time, cities could realize marginal benefits by "adding AI" to individual services. The opportunity now, however, goes well beyond these incremental changes and has shifted to a fundamental redesign of how cities function. By using this powerful engine with AI at its core, urban leaders can deliver higher performance, greater resilience, and better outcomes for residents (Exhibit 2).

1. UN DESA, World Urbanization Prospects, 2018

Exhibit 2 - Impact Generated Through AI

Quality of Life & Resident Outcome KPIs

		Impact example
Improved Service Reliability and Citizen Experience[2]	60%	Decrease in permit processing times" in Canada through the use of AI for application scanning
Improved Mobility Performance & Quality of Life[3]	~15%	Reduction in congestion in China due to deployment of AI city wide platform
Increased Community Safety & Resilience[4]	~25%	Reduction in crime rate in Dubai, UAE due to AI crime prediction and policing
Increased Climate Resilience[5]	Seconds	In spotting fires through AI wildfire detection cameras in California, USA

Operational KPIs

		Impact example
Greater Infrastructure and Resource Efficiency[6]	20%	Reduction in water leakage in Sweden due to AI leak detection
Enhanced Government Productivity & Fiscal Efficiency[7]	$10M	In new property taxes in France due to ML image analysis to find undeclared property
Increased Operational Agility[8]	2.5X	Faster emergency response in Denmark due to AI enhanced emergency response

2. NLC (National league of cities) - Use of AI to Transform City Operations, 2025
3. City brain: Practice of large-scale artificial intelligence in the real world, 2019
4. Arabian business - Dubai Police using AI to predict crime; serious crime rate down 25%, 2025
5. AI bot eye - AI Wildfire Detection Cameras: How California Spots Fires in Seconds, 2025
6. AI certs - AI-Driven Water Management Cuts Urban Losses, 2025
7. The Guardian - French tax officials use AI to spot 20,000 undeclared pools, 2022
8. European emergency number association - Detecting out-of-hospital cardiac arrest using artificial intelligence, 2020

03

Sense: Building the City's Nervous System

The first step toward an AI-enabled city is to establish the sensing layer, which continuously perceives activity across the urban landscape to create an integrated data foundation upon which the other layers depend. Sensing is not entirely new — indeed, for more than a decade, smart-city programs have deployed sensors, opened data portals, installed CCTV and IoT devices, and built early command centers. Yet these efforts largely developed in silos, resulting in partial and inconsistent coverage that rarely produced a comprehensive, real-time operating picture of the city.

This challenge has grown as cities generate exponentially more data. The proliferation of IoT devices has transformed the urban environment into a dense, continuous data ecosystem. Globally, connected IoT devices are projected to exceed 40 billion by 2030.[9] These devices, ranging from traffic cameras and air-quality monitors to utility sensors, drones, satellite feeds, connected vehicles, and citizen devices, produce high-frequency, multimodal data every second. For cities, this translates into tens of thousands of signals per square kilometer and a level of environmental visibility unimaginable just a few years ago.

The scale and diversity of this data make an integrated sensing layer essential. Instead of treating each sensor network as an isolated asset, AI allows cities to unify and interpret vast amounts of video, imagery, environmental readings, mobility patterns, utility data, satellite inputs, and citizen-reported information within a single, coherent data fabric. Modern integration platforms harmonize these streams in real time, applying shared standards for quality, security, and interoperability. Coupled with responsible data-governance frameworks, cities can ensure that information is ethically managed, appropriately shared, and protected from misuse.

This sensing infrastructure becomes the foundation of the city's intelligence stack, fueling the **analysis** layer with high-quality, real-time data and enabling the **orchestration** layer to act consistently and effectively across domains. In essence, the sensing layer transforms the city into a continuously aware system, rich in data, aligned across agencies, and primed for AI to unlock its full potential.

Case Example: Seoul's Real-Time Integrated Sensing Infrastructure

Seoul offers a compelling example of a matul're urban sensing layer. Over the past decade, the city consolidated thousands of sensors, CCTV feeds, environmental monitors, and transportation systems into a unified urban data platform managed by its digital operations center. This foundation has been expanded with AI-enabled video analytics and real-time flood and air-quality monitoring, giving the city a single, continuously updated view of conditions across all 25 districts.

The integrated sensing architecture allows Seoul to detect anomalies earlier, identify emerging risks, and maintain a far more comprehensive understanding of activity across the urban environment than was previously possible.

Impact

Following the integration of its CCTV control centers across all 25 districts, Seoul saw a **180%** increase in real-time incident responses[10], dramatically improving citywide responsiveness.

9. IoT Analytics, Insights Release: Number of Connected IoT Devices, 2021

10. Seoul Solution, Keeping Citizens Safe: Seoul CCTV – Integrated Control Center, 2017

04

Analyze: Turning Data into Intelligence and Foresight

If the sensing layer provides city leaders with a real-time view of their environment, the **analysis** layer transforms that data into useful intelligence that offers foresight and supports planning, operations, and real-time decision-making. This is the pivotal layer that takes a city from smart to AI-driven. While cities accumulated vast volumes of data, they often lacked the analytical engines capable of interpreting it at scale or converting it into actionable insights. As a result, promising data streams remained underused, valuable, but not yet catalytic.

This layer becomes the "brain" of the AI-enabled city by bringing together AI models, domain expertise, and human judgment to generate predictions, optimize outcomes, and recommend or automate actions where appropriate. It sits at the center of the Sense–Analyze–Orchestrate model, transforming the digital nervous system into predictive intelligence. With the right data governance, domain expertise, and human-in-the-loop safeguards, **Analyze** allows cities to move from reactive service delivery to anticipatory, adaptive urban management, improving reliability, safety, and citizen experience across all core systems.

With the role of Analyze defined, the next step is understanding where this intelligence creates the greatest value. The following four domains — Urban Environment & Infrastructure, Economic Prosperity & Competitiveness, Human & Social Services, and Government Services & Citizen Experience — comprise a practical framework for applying AI across the city's highest-impact systems and designing future-ready engines.

3.1 Urban Environment & Infrastructure

Urban Environment & Infrastructure encompasses the physical systems that determine how cities grow, move, and operate, from land-use and mobility networks to public assets, utilities, and climate-resilience infrastructure. These systems shape a city's spatial footprint, infrastructure reliability, mobility performance, and overall preparedness for environmental risk.

Deep-dive: AI in Real Estate

Real estate is among the sectors most fundamentally reshaped by AI-first city capabilities. Predictive intelligence across land use, mobility, infrastructure demand, climate exposure, and service accessibility allows developers, investors, and operators to make more informed decisions at every stage of the asset lifecycle.

AI-first cities enable:

- **Smarter land-use and zoning decisions** through digital twins and scenario simulations
- **Faster, more predictable approvals and permitting** via AI-enabled workflows
- **More accurate demand forecasting** for housing, commercial, and mixed-use development
- **Better asset and infrastructure planning** through predictive maintenance and stress modeling
- **Improved portfolio risk assessment** through climate, mobility, and service-access analytics
- **Enhanced place competitiveness** through AI-informed mobility, public realm, and amenities planning

As cities adopt the Sense–Analyze–Orchestrate model, real estate becomes both a beneficiary of improved urban systems and a critical partner in shaping the next generation of high-performance urban districts.

Cities face mounting pressures across all these areas. Estimates from UN-Habitat suggest congestion costs could rise by 50% by 2030 without intervention,[11] while the IEA reports global grid losses of roughly 8% due to aging infrastructure in recent years[12]. Meanwhile, extreme weather is amplifying stress on drainage networks, coastal defenses, utilities, and road systems, heightening the need for predictive, integrated urban planning. Traditional planning tools, static models, periodic surveys, and siloed datasets can no longer keep pace with the scale, speed, and complexity of these challenges.

AI enables a fundamentally different approach. Instead of analyzing infrastructure systems in isolation, cities can integrate multimodal data from a range of sources including IoT sensors, satellite imagery, mobility flows, environmental monitors, zoning rules, and demographic trends into dynamic, continuously updated models of how physical systems behave under real-world conditions. Predictive intelligence allows cities to identify emerging infrastructure stress points, simulate development or climate scenarios, and guide capital investment decisions with greater precision. Digital twins extend this capability further by visualizing the impacts of density, zoning, land-use changes, or major capital projects before they are implemented, shifting planning from reactive and deterministic to predictive, adaptive, and evidence-based (Exhibit 3).

11. OECD, Decongesting Our Cities, 2021
12. International Energy Agency, Electricity Grids and Secure Energy Transitions, 2023

Exhibit 3 - Urban Environment & Infrastructure AI Use Cases

Predictive Infrastructure Health & Asset Renewal

AI analyzes sensor data, asset age, weather exposure, and usage intensity to predict degradation of roads, bridges, pipelines, and electrical networks, enabling targeted and cost-effective renewal strategies.

- Reduce unplanned failures
- Optimize O&M and capital spending
- Extend the life of critical assets
- Improve infrastructure reliability

Land-Use, Zoning & Spatial Development Simulation

Digital twins simulate the long-term effects of zoning changes, density shifts, and new developments on congestion, emissions, infrastructure load, housing distribution, and service demand.

- Improve capital planning efficiency
- Reduce congestion and emissions
- Support sustainable spatial development
- Accelerate planning cycles (months weeks)

Long-Term Utility & Service Demand Forecasting

AI models integrate demographic trends, mobility flows, climate variables, and economic activity to forecast future demand for electricity, water, cooling, waste, and public amenities.

- Avoid over- or under-design of infrastructure
- Allocate capital more efficiently
- Improve service reliability
- Match long-term capacity to demand

Climate & Environmental Risk Modeling

AI predicts climate-related risks such as flooding, heat stress, stormwater overflow, and air- quality degradation, enabling cities to prioritize resilience investments based on granular, real-time exposure analysis.

- Reduce climate-related losses
- Prioritize adaptation investments
- Optimize drainage and cooling networks
- Strengthen citywide climate preparedness

Mobility Network Simulation & Optimization

AI models multimodal flows, forecasts congestion, optimizes traffic-signal timing, and simulates disruption scenarios to improve the reliability and resilience of mobility networks.

- Reduce congestion and travel times
- Lower transport-related emissions
- Improve multimodal network performance
- Enhance resilience to events and disruptions

AI-Enabled Land Value Forecasting

AI models combine historical data, mobility accessibility, demographic shifts, infrastructure investments, zoning changes to forecast land values and identify emerging high-potential districts.

- Identify emerging high-potential districts earlier
- Improve accuracy of long-term land valuation and investment decisions
- Support more transparent and evidence-based dialogue between cities and developers

Impact/benefits

Case Study: Shanghai's AI-Enabled Urban Planning and Growth Simulation Platform

Shanghai has developed one of the world's most advanced AI-driven urban planning systems to support rapid growth, optimize real estate land use, and guide long-term infrastructure investment. The city integrates satellite imagery, zoning regulations, transportation and mobility data, demographic trends, environmental indicators, and building footprints into a unified, AI-powered planning platform.

This system enables planners and real estate developers to simulate alternative development scenarios, assess infrastructure stress points, and test the implications of zoning or density changes before implementing decisions. By replacing manual, document-heavy processes with dynamic, data-driven modeling, Shanghai has improved cross-agency coordination and ensured that capital investments align with real-world patterns rather than static assumptions.

Impact

Shanghai deployed a 200 km² digital twin in the new Lingang smart district that shortened planning approval cycles by approximately **40%**[13], allowing the city to accelerate development while improving the sustainability and resilience of growth decisions.

3.2 Economic Prosperity & Competitiveness

Economic Prosperity & Competitiveness encompasses the systems that fuel a city's economic vitality — business formation, Small and Medium Enterprise (SME) productivity, labor-market performance, tourism, talent attraction, innovation ecosystems, and investment flows. High-performing cities create conditions that enable firms to grow, attract global capital, build resilient industries, and deliver broader opportunity for residents. As economies become more digital and knowledge-driven, cities must shift toward agile, data-informed, innovation-led development models to remain competitive.

Yet economic systems are under pressure. Global competition for talent and investment is intensifying; SMEs, the backbone of most urban economies, face rising operating costs and supply-chain volatility; tourism flows remain highly sensitive to global events; and skills mismatches continue to constrain productivity. Globally, 67% of SMEs report they are "fighting for survival,"[14] while cities that fail to adapt to the digital economy risk erosion of competitiveness, declining investment, and talent outmigration.

AI provides the intelligence backbone for a more adaptive, resilient, and opportunity-rich urban economy. By forecasting demand, identifying early warning signals, uncovering growth opportunities, and enabling data-informed interventions, AI allows economic development teams to move from reactive policy-making to proactive, targeted, and evidence-based action (Exhibit 4).

13. Qianjia, Smart City, 2023
14. World Economic Forum, Future Readiness of SMEs and Mid-Sized Companies – A Year On, 2022

Exhibit 4 - Economic Prosperity & Competitiveness AI Use Cases

Strengthening SME Resilience & Productivity

AI analyzes financial patterns, footfall data, sector dynamics, and supply-chain signals to identify at-risk SMEs and uncover productivity opportunities.

- Reduce preventable SME closures
- Target support programs with greater precision
- Improve productivity and operational resilience across the SME base
- Strengthen economic stability and local job retention

Forecasting Tourism Demand & Optimizing the Visitor Economy

AI integrates mobility flows, spending behavior, global travel indicators, event calendars, and sentiment data to generate accurate, forward-looking tourism forecasts.

- Increase tourism revenue through better demand anticipation
- Optimize staffing, infrastructure, and marketing spend
- Improve visitor experience and reduce congestion at hotspots
- Increase resilience to volatility in travel patterns

Modeling Economic & Investment Impacts for Planning & Infrastructure Decisions

AI-driven economic simulators evaluate how zoning changes, major developments, innovation districts, and transit investments affect job creation, productivity, business formation, and capital attraction.

- Improve ROI and prioritization of public investments
- Strengthen investment promotion strategies with evidence-based insights
- Support formation of innovation clusters and high-growth districts
- Enable proactive, data-driven economic development planning

Impact/benefits

Case Study: Barcelona's AI-Enabled Economic Intelligence Platform

Barcelona has built one of Europe's most advanced AI-enabled economic intelligence platforms to strengthen competitiveness and guide economic strategy. The system integrates business registry data, labor-market dynamics, startup and innovation metrics, tourism flows, real-estate activity, and public-service usage into a unified analytics environment.

Predictive models identify SMEs at risk of closure, forecast emerging skills shortages, detect early formation of innovation clusters, and anticipate tourism demand. These insights inform targeted support programs, shape workforce development initiatives, guide zoning and innovation district planning, and improve investment promotion by aligning policy with real-time economic signals.

Impact

Barcelona has strengthened its position as a leading European innovation hub. In 2024, the city hosted **160** technology hubs generating **€2.879** billion in economic impact and **34,800** jobs (a **22%** increase in employment compared to 2023) demonstrating the city's ability to leverage data-driven intelligence to accelerate economic growth and resilience.[15]

15. Barcelona International Welcome, Barcelona Ranks Third Worldwide in Attracting Foreign Investment in AI, 2025

3.3 Human & Social Services

Human & Social Services covers the systems that shape well-being, safety, education, accessibility, and human development, health, social care, public safety, emergency response, and community services. These systems determine equity, social cohesion, and long-term population outcomes, forming the human foundation of a prosperous city.

Urban environments today face growing pressures: aging populations, chronic disease, rising mental health needs, widening skills gaps, and increasing social vulnerability. Fragmented service delivery, manual case management, and limited visibility into emerging risks contribute to inefficiencies and inequities. Early-intervention opportunities are often missed, leading to higher long-term costs and poorer outcomes for vulnerable communities.

AI enables cities to move from reactive, siloed services toward predictive, integrated, people-centered systems. Models can identify at-risk individuals or neighborhoods early, optimize interventions, and coordinate responses across agencies. AI streamlines administrative processes, enhances the targeting of social programs, and helps allocate resources where they deliver the greatest impact. As a result, cities can improve well-being, reduce crisis-driven spending, and deliver more equitable services at scale (Exhibit 5).

Exhibit 5 - Human & Social Services AI Use Cases

Predicting Social Vulnerability and Targeting Early Interventions

AI identifies households at heightened risk of homelessness, financial hardship, or health declines, enabling cities to intervene early and prevent crises.

- Allocate social services more efficiently to areas of greatest need
- Improve long-term community stability through proactive support

Optimizing Emergency Response and Public Safety Workflows

Predictive analytics forecast emergency call demand, identify high-risk locations, and recommend resource allocation, resulting in faster response times and improved safety outcomes.

- Improve emergency response times through better resource planning
- Enhance public safety by pinpointing high-risk locations

Forecasting Public Health Trends and Supporting Preventive Care

AI analyzes clinical data, environmental factors, mobility patterns, and demographics to predict outbreaks or chronic disease hotspots, enabling proactive public health action.

- Enable more targeted, proactive public health interventions
- Strengthen early detection of disease outbreaks or health hotspots

Impact/benefits

Case Study: London AI-Driven Ambulance Demand Forecasting

London Ambulance Service (LAS) has implemented an AI-based system to forecast 999 call demand using advanced machine learning (e.g., gradient-boosted models and time-series methods) combined with geospatial risk mapping of incident "hotspots." Official evaluations and studies indicate significant improvements in forecast accuracy, operational efficiency, and patient care outcomes since deployment of these AI models.

Impact

In August 2025, LAS achieved an average response of **6 minutes 40 seconds** for Category 1 (life-threatening) calls, the fastest in over three years[16].

3.4 Government Services & Citizen Experience

Government Services & Citizen Experience covers the systems that determine how residents interact with their city and how effectively government operations run. This spans a range of contexts, including service delivery, licensing, permitting, digital channels, and administrative workflows. These systems shape trust, transparency, responsiveness, and the quality of everyday citizen interactions.

Many city governments face challenges such as manual processes, slow service delivery, legacy IT systems, and fragmented digital channels. Residents often navigate complex, siloed pathways to access services. Meanwhile, governments struggle to anticipate demand patterns or personalize services. With rising expectations for digital experiences, traditional service models are no longer sufficient.

AI helps governments transition to proactive, personalized, and efficient service delivery. Models can predict service demand, automate routine tasks, streamline licensing workflows, and improve resident communication. Digital assistants and natural language processing tools provide real-time guidance and reduce administrative burden. By embedding AI across service journeys, cities can deliver more human-centered, accessible, and equitable experiences (Exhibit 6).

16. BBC, London Ambulance Service Sees Improved Response Times, 2025

Exhibit 6 - Government Services & Citizen Experience AI Use Cases

Automating Administrative Workflows and Licensing Processes

AI accelerates permit approvals, document verification, and case routing, reducing processing times and improving overall service quality.

- Reduce processing times for permits, applications, and case handling
- Improve service quality through more consistent and accurate administrative decisions

Enhancing Citizen Engagement Through AI-Driven Digital Assistants

Conversational AI provides personalized information on services, reducing confusion and improving resident satisfaction.

- Reduce call-center volume and administrative burden
- Increase resident satisfaction through more accessible and user-friendly service interactions

Detecting Service Bottlenecks and Improving Experience Design

AI identifies where residents struggle within service journeys, enabling governments to redesign interactions and reduce friction.

- Identify friction points in service journeys with greater precision
- Improve overall service experience by reducing delays and user frustration

Streamlining Development Approvals Through AI-Enabled Permitting

AI automatically checks submissions against zoning rules, building codes, environmental requirements, and safety standards and recommends the appropriate approval pathway.

- Accelerate development approval timelines
- Increase transparency and predictability for developers and property owners
- Improve compliance with zoning, building, and safety requirements

Impact/benefits

Case Study: Estonia's AI-Powered Digital Government Services

Estonia has implemented AI across more than 70 government services, including proactive benefits, automated licensing, digital identity verification, and real-time citizen assistance. AI predicts service needs (such as when families become eligible for childcare benefits) and triggers automatic notifications or payments. The result is a government that is responsive, easy to navigate, and significantly more efficient, reducing administrative workload and improving resident trust.

Impact

Estonia's digitized (and increasingly AI-assisted) public services save the country about **2%** of its GDP each year[17]

17. OECD, Seizing the Productive Potential of Digital Change in Estonia, 2020

05

Orchestrate: Enabling Coordinated and Agentic Urban Operations

The orchestration layer represents the culmination of the AI-first city engine. While **Sense** provides the real-time data foundation and **Analyze** generates predictive intelligence, **Orchestrate** turns these insights into coordinated, real-time actions across the entire urban ecosystem. This is the capability that most first-generation smart city programs were unable to unlock: true cross-domain operational integration.

Historically, cities have operated through separate command centers — for traffic, utilities, public safety, or the environment — each optimizing its own domain. Even with improved sensing and dashboards, coordination remained manual and sequential, dependent on phone calls, radio communications, and human judgment under pressure. Complex events, from extreme weather to grid failures or mobility disruptions, exposed the limits of this centralized approach and often resulted in fragmented or delayed responses.

AI fundamentally changes this paradigm. Modern Command and Control Centers are evolving into agentic, AI-enabled operations platforms that:

- Fuse multimodal data from all domains into a unified, real-time situational picture
- Interpret changing conditions through predictive and prescriptive analytics
- Coordinate responses across transportation, utilities, safety, environment, and city services
- Trigger automated or AI-assisted actions with human supervision
- Continuously learn from outcomes to refine future operational responses

Increasingly, orchestration is becoming **distributed rather than solely centralized**. Agentic AI systems provide **local agency**, enabling context-specific adjustments, from retiming signals to reallocating field crews or rebalancing infrastructure loads, directly at the point of need. This shift toward distributed, point-of-need intelligence dramatically increases responsiveness and ensures interventions reflect real-time local conditions.

Distributed orchestration also enhances **resilience and redundancy**. By reducing dependence on a single coordination hub, cities avoid single points of failure. For example, if an extreme weather event or infrastructure disruption affects one district, localized agentic systems ensure that other parts of the city continue to operate smoothly.

The value of distributed models is especially evident in **energy and utilities**. As cities face growing intermittency from solar rooftops, EV charging, distributed storage, and micro-generation, agentic systems can autonomously balance loads, optimize grid performance, and stabilize local micro-grids in real time, capabilities that centralized models alone cannot achieve.

Throughout this evolution, **humans remain at the center** of orchestration. Operators supervise system behavior, set escalation thresholds, review AI-led actions, and override decisions where policy, ethics, or public expectations require judgment and context, symbolizing the importance of the human-in-the-loop approach in agentic systems, above all when the safety of citizens is at stake.

Through orchestration, cities move from reactive management to **coordinated, adaptive intelligence** systems that not only monitor but predict, optimize, and act across mobility, utilities, safety, public services, and city administration. This integrated, and increasingly distributed, layer is what unlocks whole-of-city performance gains and enables the next generation of resilient, responsive urban operations.

Case Example: Singapore's Smart Nation Operations Centre (SNOC): A Scaled Model for Integrated, AI-Assisted Citywide Orchestration

Singapore's Smart Nation Operations Centre (SNOC) is one of the world's most advanced multi-agency command environments, designed to integrate sensing, analytics, and coordinated operations across the entire city. SNOC consolidates live data from transportation systems, environmental sensors, CCTV networks, flood and drainage systems, emergency services, municipal operations, and public digital platforms into a single, citywide situational picture.

SNOC enables agencies, including the Land Transport Authority (LTA), the National Environment Agency (NEA), the Public Utilities Board (PUB), the Singapore Police Force (SPF), and the Singapore Civil Defence Force (SCDF), to coordinate decisions and actions using a common operating view, supported by AI-enabled analytics such as incident detection, anomaly alerts, and predictive risk forecasts. While Singapore is still scaling toward full agentic orchestration, SNOC represents a real-world example of how **AI-augmented command** centers can support faster, more consistent, and better-aligned citywide responses.

Impact

SNOC has already generated tangible reduction in incident response time. According to GovTech, SNOC responds to all sensor or system incidents within **15** minutes of detection, far quicker than the disparate response times agencies had on their own[18]

18. Singapore Government Developer Portal, Smart Nation Operation Centre (SNOC): One-Stop Service for Smart Nation Sensor Platform (SNSP) Service, 2019

06

Making It Work: Enablers for AI-First City Transformation

Cities can now sense their environment in real time, analyze complex, multimodal data at scale, and orchestrate coordinated action across domains. However, unlocking the full value of this AI-first model requires more than technology. It demands a redefinition of the institutional foundations that govern how cities plan, operate, and collaborate. Cities that scale AI successfully share five core enablers (Exhibit 7) that translate ambition into safe, consistent, and whole-of-city execution.

5.1 Governance & Institutional Alignment: Clarifying Ownership and Decision Rights

AI-first cities require clear institutional structures that define ownership of the transformation, how mandates align across agencies, and how decisions are made about data sharing, model deployment, and automation oversight. Governance clarity ensures accountability, prevents fragmentation, and enables coordinated execution of AI across the urban system. Integrated governance further accelerates adoption by giving Sense–Analyze–Orchestrate a single point of strategic leadership.

5.2 Policy, Regulatory, & Responsible AI Frameworks: Setting the Rules for Safe and Trusted AI

Cities need coherent policies and regulations that establish clear rules for data access, sharing, privacy, cybersecurity, and automated decision-making. These frameworks enable interoperability and provide the regulatory certainty needed for AI to scale. Embedding Responsible AI principles — including bias mitigation, explainability, model validation, and human oversight — ensures systems remain safe, fair, transparent, and aligned with public values. Together, these policies create the guardrails for responsible citywide AI deployment.

5.3 Data Governance & Interoperability: Establishing a Trusted, Integrated Data Foundation

AI-first operations depend on high-quality, trustworthy, and interoperable data. Cities must define data ownership and stewardship roles, set standards for data quality and metadata, and establish protocols for security, lineage, and lifecycle management. Interoperable data architectures and shared data platforms allow departments to exchange information consistently and in real time. Strong data governance transforms raw sensing inputs into reliable fuel for analysis and orchestration.

5.4 Workforce & Organizational Capability: Equipping City Teams to Operate with AI

AI-first cities invest in both their current workforce and the next generation. This includes broad AI literacy across government, targeted upskilling and reskilling programs for operators, and specialized roles in data and AI operations. Cities must also partner with schools, universities, and vocational institutions to embed digital and AI competencies into curricula and strengthen local talent pipelines. Together, these capabilities enable cities to operate AI-enabled systems today while preparing the workforce required for tomorrow.

5.5 Partnerships & Innovation Ecosystems: Accelerating Adoption Through Collaboration

Cities cannot build or maintain the full AI stack alone. Strategic partnerships with technology providers, academia, industry, and startups bring compute power, models, platforms, and applied research at speed. Innovation mechanisms, such as regulatory sandboxes, outcome-based contracting, shared-risk models, digital testbeds, and joint development programs enable experimentation and help cities scale solutions safely and efficiently. A vibrant innovation ecosystem keeps cities at the frontier as AI capabilities evolve.

Exhibit 7 - Key Enablers for AI-First City Transformation

 **Governance & Institutional Alignment**	Defines who owns the AI-first transformation, aligning mandates and decision rights across agencies to ensure coordinated, accountable execution
 **Policy, Regulatory & Responsible AI Frameworks**	Establishes clear, trusted rules for data, privacy, cybersecurity, and automated decision-making, ensuring AI is deployed safely, transparently, and at scale
 **Data Governance & Interoperability**	Creates a unified, high-quality, interoperable data foundation by defining ownership, standards, stewardship, and sharing protocols across the city
 **Talent, Education & Capability Building**	Builds the skills needed for an AI-first city through workforce upskilling and reskilling, AI literacy, and education partnerships that prepare future generations
 **Partnerships & Innovation Ecosystems**	Accelerates adoption by leveraging strategic partnerships and local innovation ecosystems to bring compute power, models, experimentation, and co-development at speed

Together, these enablers allow cities to move from isolated pilots to safe, scalable, whole-of-city AI operations. They are not sequential steps; cities strengthen them in parallel as they progress along the transformation roadmap. Establishing these foundations is essential for embedding the Sense–Analyze–Orchestrate engine into daily governance and realizing the full potential of AI-first cities.

07

Bringing It All Together: From Vision to Value

Cities advance toward an AI-first future by applying a coherent framework that brings together the foundational enablers and the operating model. The enablers form the essential building blocks for AI-first cities, from governance and policy frameworks to data governance, talent and capability development, and partnerships with industry and local innovation ecosystems. These create the conditions for AI to be safe, scalable, and effective. Sitting above this foundation is the AI-First City model (Exhibit 8) itself, where cities repeatedly Sense, Analyze, and Orchestrate across their systems to operate more proactively, intelligently, and efficiently.

Exhibit 8 - Bringing It All Together

08

Conclusion: The AI-First City

Cities are entering a new era in which AI is not an add-on to existing systems but the foundation of a new urban engine.

The opportunity for city leaders is no longer to pilot isolated use cases, but to redesign how the city operates. Cities that invest in strong governance, clear policy, Responsible AI frameworks, trusted and interoperable data foundations, AI-ready talent, and vibrant innovation partnerships will unlock meaningful gains in mobility, safety, sustainability, infrastructure performance, and economic competitiveness.

Ultimately, this will enable them to deliver more reliable, equitable, and resilient services for their residents.

The next generation of urban leaders will be those who act decisively. The tools now exist, the engine structure is clear, and the framework is achievable. AI-first cities will define the next era of global urban leadership, not because they deploy more technology, but because they build the institutions, capabilities, and operating systems that allow technology to improve everyday life.

The moment to begin that transformation is **now**.

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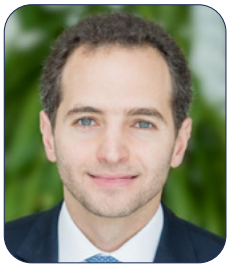

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