

# Infographic: Artificial Intelligence Use-Case Prism for Smart Cities

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**FOUNDATIONAL** This research is reviewed periodically for accuracy.

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Initiatives: [CIO Leadership of Innovation, Disruptive Trends and Emerging Practices; Artificial Intelligence](#)

AI offers stakeholders in smart cities and intelligent urban ecosystems the opportunity to innovate using AI. This prism provides prominent use cases based on feasibility and business value. CIO must compare these use cases against regulations and societal acceptance to establish an AI roadmap.

## Additional Perspectives

- [Summary Translation + Localization: Infographic: Artificial Intelligence Use-Case Prism for Smart Cities](#)  
(07 April 2021)

## More on This Topic

This is part of 2 in-depth collections of research. See the collections:

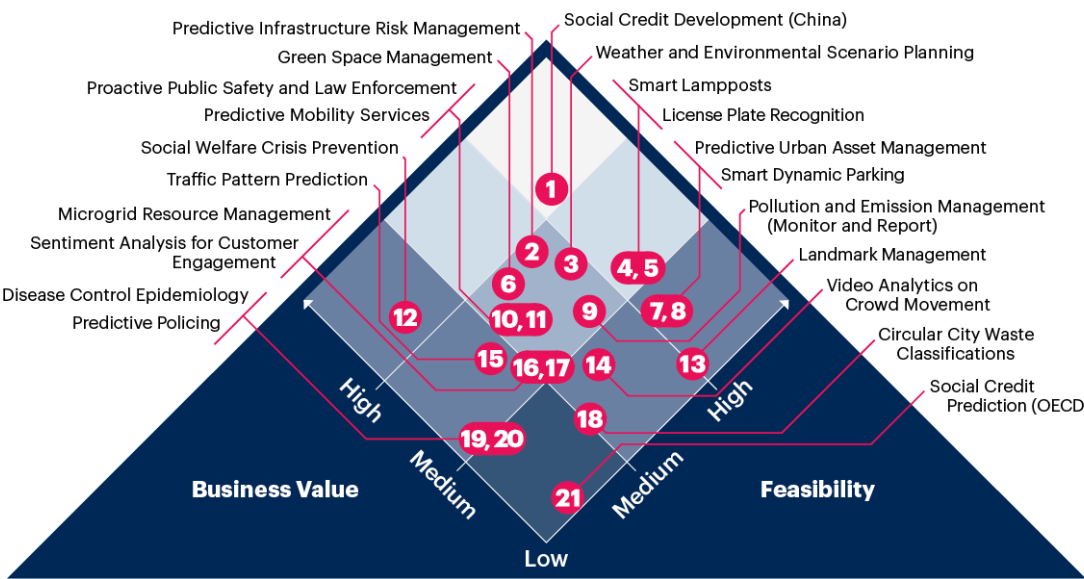
- [Applying AI in Industries](#)
- [Applying AI in Business Domains](#)

This research is part of a larger collection on the Gartner use-case prisms (see [Uncovering Artificial Intelligence Business Opportunities in Over 20 Industries and Business Domains](#)).

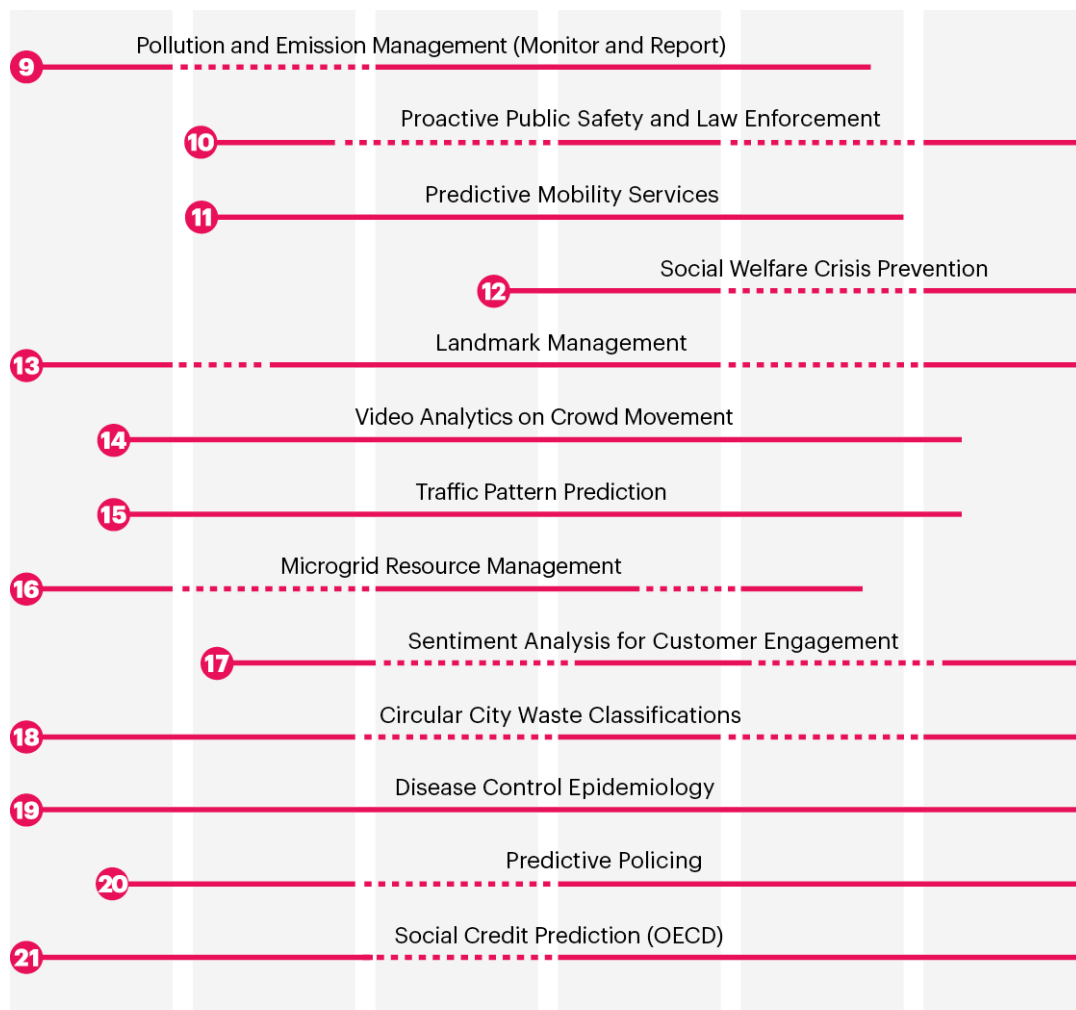
Figure 1: AI Use-Case Prism for Smart Cities

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# AI Use-Case Prism for Smart Cities



Environmental Protection	Public Safety	Infrastructure and Utility	Economy	Transportation and Mobility	Government and Human Services
1	Social Credit Development (China)				
2	Predictive Infrastructure Risk Management				
3	Weather and Environmental Scenario Planning				
4	Smart Lampposts				
5	License Plate Recognition				
6	Green Space Management				
7	Predictive Urban Asset Management				
8	Smart Dynamic Parking				



--- Business case is intermittent and doesn't apply to the process spanning the dotted line.

Note: The above diagram denotes a smart city ecosystem as opposed to a pipeline, which is showcased in other prisms. The diagram denotes the applicability of use cases and not a linear path of use-case implementation.

		Business Value			Feasibility		
		Finance Optimization <sup>1</sup>	User Attractiveness <sup>2</sup>	Business Competitiveness <sup>3</sup>	Technical Feasibility <sup>4</sup>	Internal Readiness <sup>5</sup>	External Readiness <sup>6</sup>
1	Social Credit Development (China)	🟡	🟢	🟢	🟡	🟡	🟡
2	Predictive Infrastructure Risk Management	🟡	🟡	🟡	🟡	🟡	🟡
3	Weather & Environmental Scenario Planning	🟡	🟢	🟡	🟡	🟡	🟡
4	Smart Lampposts	🟡	🟢	🟡	🟢	🟡	🟡
5	License Plate Recognition	🟡	🟡	🟡	🟢	🟡	🟡
6	Green Space Management	🟢	🟢	🟡	🟡	🟡	🟡
7	Predictive Urban Asset Management	🟡	🟡	🟡	🟡	🟡	🟡
8	Smart Dynamic Parking	🟡	🟡	🟡	🟡	🟡	🟡
9	Pollution and Emission Management (Monitor and Report)	🟡	🟡	🟡	🟢	🟡	🟡
10	Proactive Public Safety and Law Enforcement	🟢	🟡	🟡	🟢	🟡	🟡
11	Predictive Mobility Services	🟢	🟡	🟡	🟡	🟡	🟡
12	Social Welfare Crisis Prevention	🟢	🟢	🟡	🟡	🟡	🟡
13	Landmark Management	🟡	🟡	🟡	🟡	🟡	🟡
14	Video Analytics on Crowd Movement	🟡	🟡	🟡	🟢	🟡	🟡

15	Traffic Pattern Prediction						
16	Microgrid Resource Management						
17	Sentiment Analysis for Customer Engagement						
18	Circular City Waste Classifications						
19	Disease Control Epidemiology						
20	Predictive Policing						
21	Social Credit Prediction (OECD)						

<sup>1</sup> Includes cost optimization and new sources of revenue (e.g., data monetization).

<sup>2</sup> Includes social and demographic sustainability.

<sup>3</sup> Includes efficiency to be more targeted at a lower cost, leading to new service possibility.

<sup>4</sup> Includes includes standards, interoperability of systems, cloud vs. edge, data governance, machine learning and algorithm improvements, training capabilities, computing power, edge computing power, and infrastructure availability on the network.

<sup>5</sup> Includes regulations and compliance to GDPR, cybersecurity and data protection.

<sup>6</sup> Includes trust in the compliance and adherence to laws, ethics and regulations (e.g., data protection and privacy).

○ None  
 Low  
 Medium  
 High  
 Very High

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## Use-Case Glossary

The infographic highlights the following use cases for smart cities:

- Circular city waste classifications — Beyond predictive analytics, waste weighing, analytics on bin safety, food waste and recyclable materials (for example, [Sidewalk Labs](#)).
- Disease control epidemiology — Data learnings from different health and environmental data repositories to predict health threats, such as dengue fever, applying infection curves, especially in emerging economies.
- Green space management — Autonomous green space monitoring and maintenance for irrigation, tree trimming, lawn mowing and growth predictions (Singapore, Montreal). It contributes to sustainability and green goals of the city, as well as efficiency in space management.
- Landmark management — Based on circumstantial information and events, this will support maintenance, care and advertisement for historical monuments; preventing cars from parking too close, destruction from tourists and visitors, and environmental damage; ensuring value for tourism and culture.
- License plate recognition — Recognition of license plates and accessing authority to location, VIP status, and traffic enforcement for districts and campuses, for security and personalized access in cities. It also enables contactless entry management to restricted parking areas.

- Microgrid resource management — Aggregates data from intelligent resource generation and management by buildings, district heating, waste to energy, solar and photovoltaic, rainwater harvesting, and brown water recycling. It contributes to next-generation utilities, renewable resource management and green buildings.
- Pollution and emission management (monitor and report) — Emissions, pollution and CO<sub>2</sub> monitoring and management based on targets and KPIs with decision making on citizen notification, mobility restriction.
- Predictive infrastructure risk management — Describes the use of condition-based monitoring via video and other data to allow for predictive and risk maintenance of urban infrastructure, utility grids, rainwater runoff and storm drains, water pipes, sewage, and bioswales. This not only reduces costs and risks, but also has the potential to connect to other assets using the infrastructure.
- Predictive mobility services — Real-time alignment of travel and mobility options, based on travel data, velocity of vehicles, CO<sub>2</sub> emissions and air quality, as well as journey mapping, and includes gamification for different mobility options.
- Predictive policing — Law enforcement and public safety activities that are based on predictions of crime hotspots and historic event data.
- Predictive urban asset management — IoT and AI to develop algorithms that predict asset performance, such as waste bins, parking meters and fire hydrants, to understand outages and the impacts on the infrastructure and environment. It reduces costs and shortens maintenance cycles.
- Proactive public safety and law enforcement — Law enforcement and public safety activities that are based on predictions of crime hotspots, buildings and locations, and emergency response calls leading to corrective actions.
- Sentiment analysis for customer engagement — Analysis and visualization of citizen opinions, ambience and perceptions, including financial optimization and transparency. This is deployed to encourage citizen engagement and feedback.
- Smart dynamic parking — Dynamic pricing based on real-time insights and analytics from events, such as conferences, air pollution and traffic congestion.
- Smart lampposts — The large-scale use of such lampposts can collect sensor information to optimize traffic control, parking, air quality monitoring, digital kiosks, gun shot controls and so on. This turns out to be a use-case enabler (such as self-driving cars and last-mile logistics) for other location-based business cases.

- Social credit development (China) — Point systems by the government for citizen behaviors and actions toward socially defined causes and objectives, from a Chinese point of view. This is top-down to stimulate political behaviors.
- Social credit prediction (OECD) — Point systems by the government for citizen behaviors and actions toward socially defined causes and objectives, from an OECD point of view. This is a social system to stimulate good behavior through gamification and is in the early stages of use-case development.
- Social welfare crisis prevention — Supporting families and individuals during day-to-day vulnerabilities by cross-assessing tax and social records. While highly personalized data is utilized, this use case protects socially vulnerable communities.
- Traffic pattern prediction — Parking places, traffic patterns, vehicles, incidents and events related to weather, timing, drivers and insurance. This use case is highly valuable to intelligent urban ecosystem partners in logistics and warehousing, but also for insurance companies. Congestion charging is a potential revenue source.
- Video analytics on crowd movement — Movement tracking in public spaces for crowd management; journey mapping, especially for environment, health and safety; physical distancing; and city retail and commercial experiences. This is often challenged by privacy issues.
- Weather and environmental scenario planning — Support of climate change parameters driving scenarios for circular cities, climate change mitigation and adaptation, and patterns for strategic urban planning, connecting pollution, sustainability and emissions together.

## About This Research

The Artificial Intelligence Use-Case Prism for Smart Cities does not have any pipeline, because there is no linear workflow across the ecosystem. The ecosystem is composed of stakeholders, beneficiaries, or applicable areas and industries, and the applicability of a use case is indicated with the blocks instead.

Please note: These use cases have been selected and positioned based on an assessment by Gartner analysts and customer feedback. Their applicability may vary across organizations and industries. For detailed customization, use Gartner's prism toolkit (see [Toolkit: How to Rank and Prioritize Your Use Cases With a Gartner Prism](#)).

## Recommended by the Authors

[Conversational Artificial Intelligence Will Drive 'Citizen-Centric' Services for Smart Cities](#)

[Turning Smart Cities Into Intelligent Urban Ecosystems](#)

[Case Study: Data and Analytics Monetization With Knowledge Graphs and AI \(Turku City Data\)](#)

[Uncovering Artificial Intelligence Business Opportunities in Over 20 Industries and Business Domains](#)

[Toolkit: How to Rank and Prioritize Your Use Cases With a Gartner Prism](#)

[Predicts 2022: Smart Cities IoT and Data Analytics for Sustainable Resilience](#)

[Future of Work Trends: Future of Work-Life Integration in Smart Cities](#)

[Quick Answer: What Use Cases Are Driving the Scale of IoT Platform Adoption in Smart Cities?](#)

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