Smart City Moscow

Interoperability and system integration within Moscow's smart-city ecosystem

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About Speaker

To address 'Interoperability and system integration within Moscow's smart-city ecosystem'.

Surya Dev Prakash is the Founder & CEO of SDP Group and a Global Smart Cities Expert who has delivered 85+ projects worldwide including engagements in Middle-east, APAC, America, South-east, Africa, Eastern Europe & Russia, across strategy, system integration, and implementation.

✓ Leading a multinational ecosystem spanning Smart Cities, PropTech, AI SaaS, Digital Transformation, Data Centres, Wellness Tech, SecurityTech, FinTech, and CivicTech, he builds intelligent, efficient, and human-centric urban environments.

✓ Surya specializes in solving complex urban challenges—particularly the **key issue of interoperability and integration** that cities like Moscow face as they manage vast networks across transport, utilities, housing, waste, energy systems, and digital public services.

✓ As Moscow expands smart-buildings, smart-grids, automated waste systems, and digital governance platforms, he highlights how fragmented systems risk operating in silos without strong coordination, making interoperability a central priority for the next phase of smart-city development. His global work with governments, real estate leaders, and innovators positions him as a leading voice on the future of connected, integrated, and sustainable urban ecosystems.

To address 'Interoperability and system integration within Moscow's smart-city ecosystem'.

❑ The city operates a wide range of interconnected systems— from transport and utilities to housing, waste management, energy infrastructure, and digital public services.

❑ Ensuring that all these components communicate and function smoothly is essential for achieving a truly efficient and responsive smart city. Moscow's smart-city ecosystem includes transport, utilities, housing, waste, energy, and digital governance systems.

❑ These systems often rely on different technologies, standards, and management processes, making integration complex.

❑ The expansion of smart-buildings, smart-grids, automated waste solutions, and digital service platforms increases coordination demands.

➢ Without seamless interoperability, even advanced technologies risk functioning in isolated silos. Strengthening integration is critical to building a cohesive, efficient, and future-ready smart-city ecosystem.

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Moscow is implementing "smart city" initiatives with a focus on digital infrastructure, including an extensive network of over 200,000 CCTV cameras, facial recognition payment systems, and AI-based public services.

Key areas of development include smart transportation systems, public Wi-Fi, and energy-efficient building technologies. A major component of this strategy is the "Safe City" system, which integrates various data sources for security and urban management, though it has raised concerns about surveillance. The use cases include **Digital infrastructure and surveillance, Smart transportation,**

Digital infrastructure and surveillance
Safe City system: A large-scale project that uses over 200,000 cameras and data from various information systems to manage citizens, public services, and transportation.
Facial recognition: The Moscow Metro uses a facial recognition system for contactless payments, which also serves as a surveillance tool.
Data integration: The "Safe City" system combines data from multiple sources, including cell phone geolocation, license plate recognition, and ride-hailing services.

Smart City Moscow Initiative

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➢ **Digital infrastructure and surveillance**

✓ **Safe City system:** A large-scale project that uses over 200,000 cameras and data from various information systems to manage citizens, public services, and transportation.

✓ **Facial recognition:** The Moscow Metro uses a facial recognition system for contactless payments, which also serves as a surveillance tool.

✓ **Data integration:** The "Safe City" system combines data from multiple sources, including cell phone geo-location, license plate recognition, and ride-hailing services.

➢ **Smart transportation**

✓ **Intelligent traffic control:** Moscow has an intelligent traffic control system with thousands of traffic lights, detectors, and cameras to manage traffic flow.

✓ **New transport networks:** The city has invested in expanding its public transport, such as the Moscow Central Circle (MCC), which connects suburban and regional trains to the metro system.

✓ **Future plans:** The "Smart City—2030" project includes plans for uncrewed transport and transport sharing.

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➢ **Public services and connectivity**

✓ **Public Wi-Fi:** Moscow provides free Wi-Fi in many public places, including parks and public transport.

✓ **Digital public services:** The city has modernized public service centers to offer a wide range of digital services, such as paying fines, making appointments, and accessing federal services online or through mobile apps.

✓ **AI-based healthcare:** The city is developing AI-based healthcare services to improve efficiency and accessibility.

➢ **Sustainability**

✓ **Smart lighting:** The city is replacing outdated streetlights with smart LED systems that adjust based on real-time conditions like traffic density and weather.

✓ **Energy-efficient buildings:** Energy-efficient construction methods and materials are being adopted for new developments and renovations.

➢ **Other initiatives**

✓ **Smart City 2030:** An overarching strategy that integrates AI, IoT, and 5G to streamline urban life.

✓ **New smart district:** Moscow has launched a "living lab" district to test and pilot new smart city technologies in various conditions.

✓ **Smart tourism:** Technology is being used to enhance tourism through AI-powered navigation and interactive app

Smart City Moscow-Global Smart City Expert Opinion

To address 'Interoperability and system integration within Moscow's smart-city ecosystem'.

➢ Interoperability and system integration are *core enablers* of any mature smart-city strategy — especially for large, complex urban systems such as Moscow's.

➢ The goal isn't just to connect technologies, but to create resilient, scalable, citizen-centric services that break down silos, streamline governance, and empower data-driven decision-making.

➢ Moscow has made important strides, but realizing the full value of its smart-city vision demands deeper integration, open standards, and governance frameworks that balance innovation with security and privacy.

Interoperability-meaning (cross-departmental systems, public/private networks, and citizen-facing applications)

✓ Exchange data seamlessly
✓ Understand each other's data
✓ Use shared information meaningfully across domains

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Current Strengths in Moscow's Approach

Moscow has built a diversified ecosystem with:
- **Multiple digital platforms** for transport, utilities, public safety, urban services, and citizen engagement
- Investments in **IoT infrastructure**, cloud services, and data centers
- A central data platform (e.g., Unified Moscow Digital Platform) that aggregates key information
- Strategic emphasis on **AI**, digital governance, and urban analytics

Expert view: These are the right foundations; having multiple vertical services is normal for a city of Moscow's scale.

Key Integration Challenges

Fragmented Data Architectures
Different systems often use incompatible formats, vocabularies, and standards. Without harmonization:
- Data sharing is manual, slow, error-prone
- Analytical insights remain siloed

Security and Privacy Constraints
Robust cybersecurity is essential, but overly restrictive controls can block legitimate data flows. Balancing:
- **Openness for innovation**
- **Protection of citizens' rights**
is critical.

Organizational Silos
Technical integration is only part of the challenge — **institutional alignment** matters. Agencies must adopt:
- Shared governance models
- Common operational standards
- Cross-departmental KPIs

Legacy Infrastructure
Older systems with proprietary protocols resist integration and slow down modernization.

Smart City Moscow-Stakeholders & their responsibilities matrix

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Government Authority Leading Integration — Moscow Department of Information Technology (ДИТ)

☞ Acts as the **custodian of technical integration**, aligning IT systems across different city functions (transport, healthcare, utilities, public services).

☞ Ensures that IoT devices, public services, and analytical platforms can exchange data and operate as unified services

Mayor's Office and Strategic Leadership

☞ Provides **political mandate and governance framework** that empowers DIT and other agencies to integrate systems.

☞ Supports cross-agency collaboration and large-scale system governance.

Cross-Sector Technical and Standards Stakeholders

☞ **Smart City Standards Bodies** Russian **PNST 447-2020 Smart City standards** provides **technical standardization** guidance for integration across devices, communication networks, and data models.

☞ **Smart City Lab (Within DIT / Strategic Initiative) a**cts as a **testing and R&D center** for interoperable solutions.

☞ **External Tech Partners and Integrators** implement system-to-system integration under technical and architectural governance from DIT and standards frameworks.

Other City Departments and Sector Partners

☞ **Healthcare authorities / ЕМИАС administrators** shares health data and interoperates with city identification and analytics systems.

☞ **Transport / Mobility Departments** integrates transport data into city command centers.

☞ **Housing & Utility services** works with DIT on IoT data sharing for HVAC, metering.

☞ **Municipal Urban and Infrastructure Departments** provides domain data into unified dashboards and analytics systems.

Strategic Opportunities

Adoption of Open Standards (to facilitate plug-and-play integration and expand the city's ecosystem to third-party developers.)
Moscow can benefit from global interoperability frameworks like:
- **ISO/IEC 30141** Smart City reference architecture
- **Open APIs** and data models (e.g., NGSI-LD)
- Semantic layer standards (e.g., CityGML, SensorThings)

Ecosystem Collaboration (for Public-private co-innovation accelerates solution delivery and diversifies the technology stack.)
Realizing interoperability requires active engagement with:
Academia and research institutions
Private technology partners
Urban startups and civic innovators

Unified Data Governance (to enable responsible data flow across agencies and with external partners.)
A centralized data governance model should address:
- Metadata standards
- Data sharing policies
- Privacy and consent frameworks
- Cataloguing and access layers

Intelligent Integration Layer (Middleware) (to give flexibility and future-proofs the architecture)
Rather than forcing all systems into a single legacy platform:
Employ a **middleware integration layer**
Use **event buses, ESBs, and APIs**
Enable asynchronous, scalable data flows

Smart City Moscow-Global Smart City Expert Opinion

Benefits of Deep Integration

When executed well, integrated systems deliver:
- ✓ Faster, more accurate decision-making
- ✓ Reduced operational costs
- ✓ Improved citizen experience
- ✓ New value-added services (e.g., predictive maintenance, real-time insights)
- ✓ Resilience to shocks (e.g., emergencies, network disruptions)

In Moscow's case, this means better transport management, smarter utilities, safer urban environments, and more responsive government services.

Risk Considerations

Over-centralization — can prevent innovation if governance is too rigid

Security gaps — connected systems enlarge the attack surface

Data ethics — AI and analytics must protect rights and avoid bias

Investment misalignment — integration requires sustained funding and skills

Roadmap Recommendations

A phased strategy could look like this:

1.Assessment & Standards Alignment
→ Inventory systems, establish data models

2.Platform Modernization
→ Enable APIs and extractable services

3.Governance & Policy Frameworks
→ Define roles, KPIs, and accountability

4.Pilot Integrated Use Cases
→ e.g., emergency response linking transport, public safety, sensors

5.Scale & Operationalize
→ Expand successful pilots into city-wide services

Conclusion

Moscow's smart-city ecosystem is ambitious and multifaceted. **Interoperability and system integration are not optional add-ons — they are the connective tissue** that determines whether smart investments produce strategic outcomes.

SDP Group aims to support Smart City Moscow with comprehensive smart city strategic advisory, consulting, system integration, and implementation services.

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