Smart Mobility and Digital Innovation in Patras - Municipality of Patras – Greek Cluster, METACITIES Project

Vassilis Papaioannou

Directorate of Planning, Organization and Informatics, Municipality of Patras

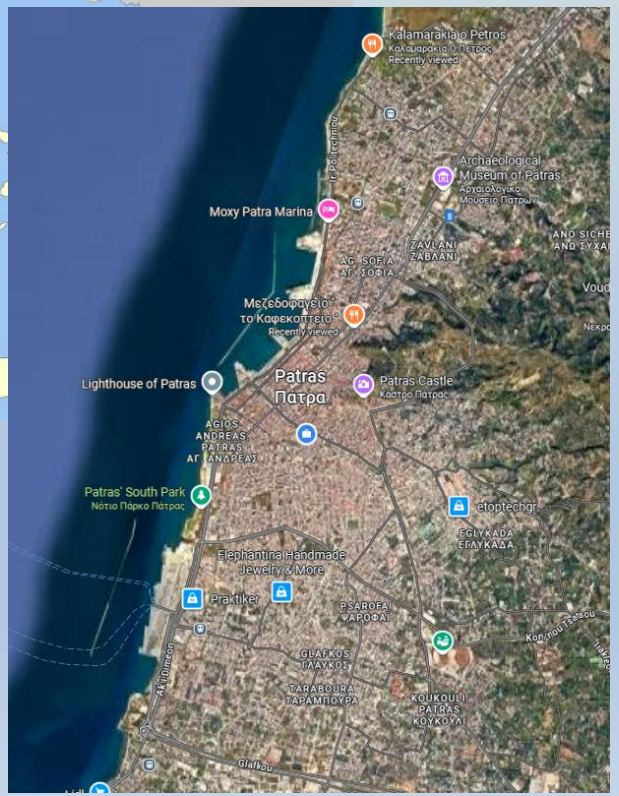
Date: 20th October 2025

City of Patras

City of Patras

Main Figures

- ✓ **The 3rd biggest city in Greece.**
- ✓ **213.984 inhabitants.**
- ✓ **Area: 345,67 Km2 (125.4 Km2 urban area)**
- ✓ **Density: 609/Km2 (1303/km2 urban center).**
- ✓ **5 Municipal Units.**



City of Patras

Transportation (Infrastructure).

Port is the main gateway to Europe by boat, managing more than half of the foreign sea-passenger transportation in Greece. It has excellent car-ferry links with the Ionian islands and the major Adriatic ports of Italy (Ancona, Bari, Brindisi, Venice).

Ring Road 20 km long, opened in 2002.

Mini ring road minimize heavy traffic-related problems in the city centre, opened in 2018.

Rio-Antirrio Bridge is located to the north of the city and links Peloponnese to mainland Greece. It was completed in 2004.

City of Patras

Transportation (Infrastructure).

Commuter Railway links the city center with the Northern suburbs (Rio, Ag. Basileios).

Regional Railway linking Patras with Athens and other Greek cities (Pyrgos, Kalamata) is currently under re-construction in order to meet higher quality standards.

Regional Bus connects Patras with Athens and numerous other major destinations.

Airport Araxos is located 40km south of Patras and operates specific flights and charters.

Patras as a Pilot City within the METACITIES Greek Cluster

Patras METACITIES Pilot Focus:

- Smart Mobility & Digital Services
- Integration of sensors, IoT networks, and data analytics for real-time management
- Creation of a Smart Mobility Digital Twin
- Supported by the LoRaWAN IoT network, Interoperability Centre, and Open Data Platform

Objective:

- To develop a replicable and interoperable smart-city model that enhances mobility, safety, and quality of life through data-driven governance.

A Vision for a Connected, Sustainable, and Data-Driven City

The Smart City Vision of Patras:

- Promote **sustainable urban development** through large-scale digital transformation.
- **Enhance service quality** for citizens — fast, easy, accessible everywhere.
- Ensure **efficient, safe, and environmentally responsible** infrastructure management.
- Advance **urban mobility** through data-driven systems and real-time information.
- Enable **smart energy management** in public buildings and networks.
- Expand **connectivity** with modern network infrastructures (LoRaWAN backbone).
- Encourage **interoperability and open data** for innovation and transparency.

Understanding the Mobility Challenges of Patras

Key Urban Challenges:

- Limited **parking availability** and lack of short-term parking options in the city centre.
- **Traffic congestion** caused by illegal parking and peak-hour pressure.
- **Safety and accessibility issues** for cyclists, pedestrians, and vulnerable groups.
- Fragmented data systems — no unified digital tool combining **parking, traffic, and air-quality information**.
- Limited ability to **simulate and test mobility policies** before real-world implementation.

Need for Innovation:

- Patras needs an integrated, data-driven platform that monitors, analyses, and predicts urban mobility conditions — enabling smarter decision-making and citizen-friendly policies.

The Smart Infrastructure of Patras: A Strong Foundation

Digital Infrastructure Highlights

- **LoRaWAN IoT Network** – 65 gateways providing full city coverage.
- **Smart Mobility Systems** –
  - 700 curb-side parking sensors (110 for special use).
  - 70 smart bus-stop panels and 22 VMS (Variable Message Signs).
  - 15 smart pedestrian crossings near schools (LED + motion sensors).
- **Interoperability Centre** – integrates all city systems into a single real-time dashboard (mobility, environment, infrastructure).
- **Open Data Platform** – CKAN-based portal for public access, APIs, and visualisations.
- **Citizen Tools** – Mobile & web apps offering live parking, public transport, traffic, and air-quality information.

700 parking sensors

70 smart bus stops

22 Variable Message

Smart Crossing

Building the Digital Twin of Patras' Mobility System

What It Is

- A **digital replica** of Patras' urban mobility network — integrating real-time data from sensors, IoT systems, and municipal services.

What It Does

- Monitors traffic, parking, and air-quality conditions in real time.
- Simulates "what-if" mobility scenarios before real-world implementation.
- Supports emergency routing, congestion prediction, and environmental analysis.
- Provides open data and analytics tools for researchers and developers.

Supported by

- Smart Parking & Mobility Application
- Interoperability Centre (AI & ML analytics)
- Open Data Platform (CKAN-based)
- LoRaWAN Network (65 gateways)

Delivering Real Value to Every User Group

For Citizens

- Real-time parking availability (mobile & web)
- Live bus-arrival information at smart stops
- Traffic alerts, air-quality updates, multimodal trip planning
- Safer crossings near schools

For Researchers & Developers

- Open Data Platform (CKAN-based) with real-time and historical datasets
- Geospatial visualisations & metadata indexing
- APIs for integration and AI/ML analytics via Interoperability Centre

For the Municipality

- Unified dashboard for mobility & environmental data
- Automated alerts and decision-support tools
- Remote control of infrastructure components (VMS, crossings, sensors)
- Data-driven policy development and cost-effective operations

An Ecosystem of Collaboration Supporting Smart Mobility

Key Stakeholders

- **Municipality of Patras** – Owner, coordinator, operator of all smart city infrastructure.
- **University of Patras** – Research, analytics, AI & digital twin development.
- **Region of Western Greece** – Regional alignment, scalability, and funding support.
- **Public Transport Providers (KTEL)** – Data contributors for live bus information.
- **Technology Companies & Contractors** – Infrastructure deployment, integration, and maintenance.
- **Citizens & Associations** – End users and feedback providers for accessibility and safety.
- **Local Businesses & Startups** – Users of open data, innovation enablers, advertising partners.

Collaboration Principles:

- Co-creation, transparency, and continuous data exchange among all public, private, and civic actors.

Designing Solutions Inspired by the Patras Smart Mobility Ecosystem

Conceptual Areas for Innovation:

- **Smart Parking Management:**
  Design logic or prototype tools that could optimise parking allocation, predict demand, or visualise occupancy trends
- **Traffic Flow Modelling:**
  Develop simulation models that could forecast congestion or propose alternative routes based on hypothetical sensor inputs.
- **Citizen Mobility Experience:**
  Create user-friendly app concepts that combine different city services (parking, public transport, environment) in one digital interface.
- **Public Awareness & Sustainability:**
  Design gamified or educational tools that could encourage citizens to choose greener mobility options.
- **Decision Support Frameworks:**
  Prototype dashboards or analytics that illustrate how municipalities can make evidence-based mobility or environmental decisions.

Towards a Smarter and More Connected Future

Next Steps

- Continuous **integration of new data sources** and IoT devices into the existing ecosystem.
- Expansion of the **Digital Twin** to include energy, environment, and crisis-response domains.
- Strengthening **citizen participation and awareness** through open data and engagement campaigns.
- Establishment of a **dedicated Smart City operational structure** within the Municipality.
- Transition towards **public–private collaboration models (PPP/BOT)** for long-term sustainability.

Vision:

- Patras aims to evolve from a single smart city into a connected “meta-city” — sharing data, innovation, and experience with other European municipalities.