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Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

European Commission

smart city

Smart cities

Cities using technological solutions to improve the management and efficiency of the urban environment.

A smart city is a place where traditional networks and services are made more efficient with the **use of digital solutions for the benefit of its inhabitants and business.**

A smart city goes beyond the **use of digital technologies** for better resource use and less emissions. It means smarter urban transport networks, upgraded water supply and waste disposal facilities and more efficient ways to light and heat buildings. It also means a more **interactive** and **responsive** city administration, safer public spaces and meeting the needs of an ageing population.

Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

6 Dimensions of a Smart City

Innovation
Entrepreneurship
Job market vitality

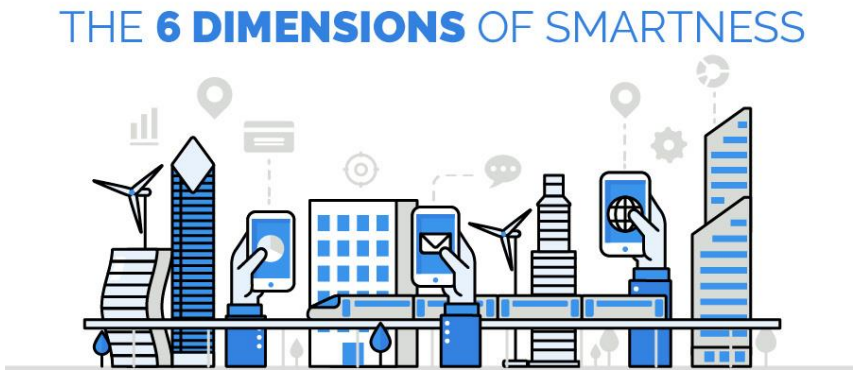
SMART ECONOMY

Education
Social inclusion
Cultural vibrancy

SMART PEOPLE

Political participation
Public services

SMART GOVERNANCE



Rudolf Giffinger - *Smart cities Ranking of European medium-sized cities*

Accessibility
Sustainable transport
Urban mobility

SMART MOBILITY

Sustainability
Pollution management
Energy efficiency

SMART ENVIRONMENT

Quality of life
Healthcare
Housing

SMART LIVING

European Smart City Index

assessment of the smartness of medium-sized cities across Europe based on key criteria

This **Smart City Index** provided valuable insights into how cities can develop through innovative and sustainable approaches to urban planning and governance.

Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

Smart Cities Marketplace – Scalable Cities

The Smart Cities Marketplace and Scalable Cities are separate initiatives of the European Commission

Smart Cities Marketplace

The Smart Cities Marketplace aims to **ENGAGE** cities and towns of all sizes to deliver more sustainable urban environments and offers all the information needed to **EXPLORE** solutions, **SHAPE** sustainable urban projects, and successfully close a **DEAL** for financing them.

Scalable Cities

Scalable Cities aims to create an innovative, sustainable and city-led community of smart and climate-neutral cities in Europe. Scalable Cities represent 124 unique cities involved in **20 Smart Cities and Communities (SCC) projects** funded by the **Horizon 2020** and **Horizon Europe** programmes that are working in consortia with academia, industry, associations and consultants.

Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

European Commission

EUROPEAN UNION
EU MISSIONS
100 CLIMATE-NEUTRAL AND SMART CITIES

smart city

EU Mission on Climate-Neutral and Smart Cities

Key Goals of the EU Smart Cities Mission:

1. Climate Neutrality by 2030

The primary objective is to enable 100 cities to become climate-neutral within a decade, ahead of the EU's 2050 goal for the entire continent.

2. Innovation and Digitalization

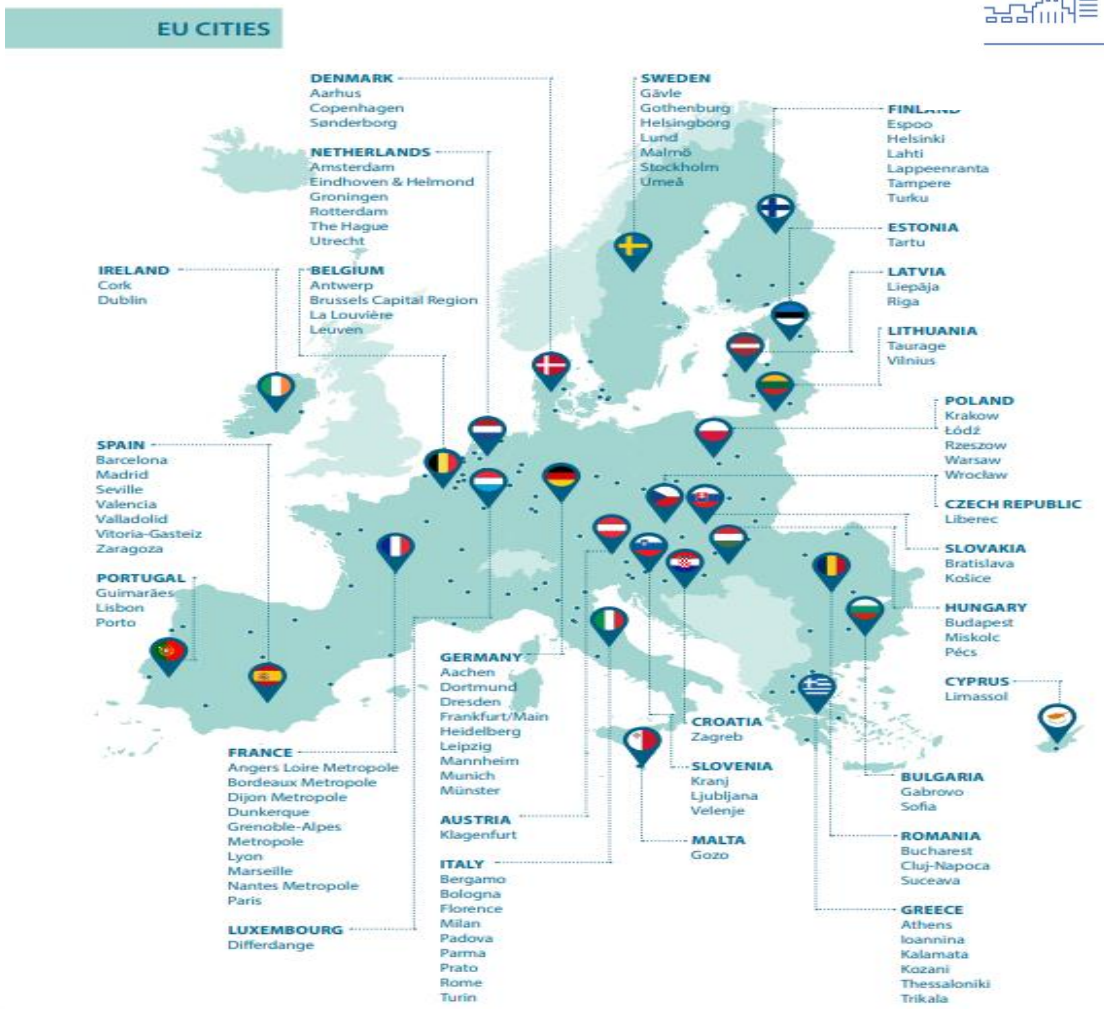
The mission promotes smart solutions through digital technologies, artificial intelligence, and data-driven approaches to manage energy, transport, and other urban services efficiently.

3. Citizen Engagement

Involving citizens in decision-making processes is central, encouraging participatory governance to co-create sustainable urban environments.

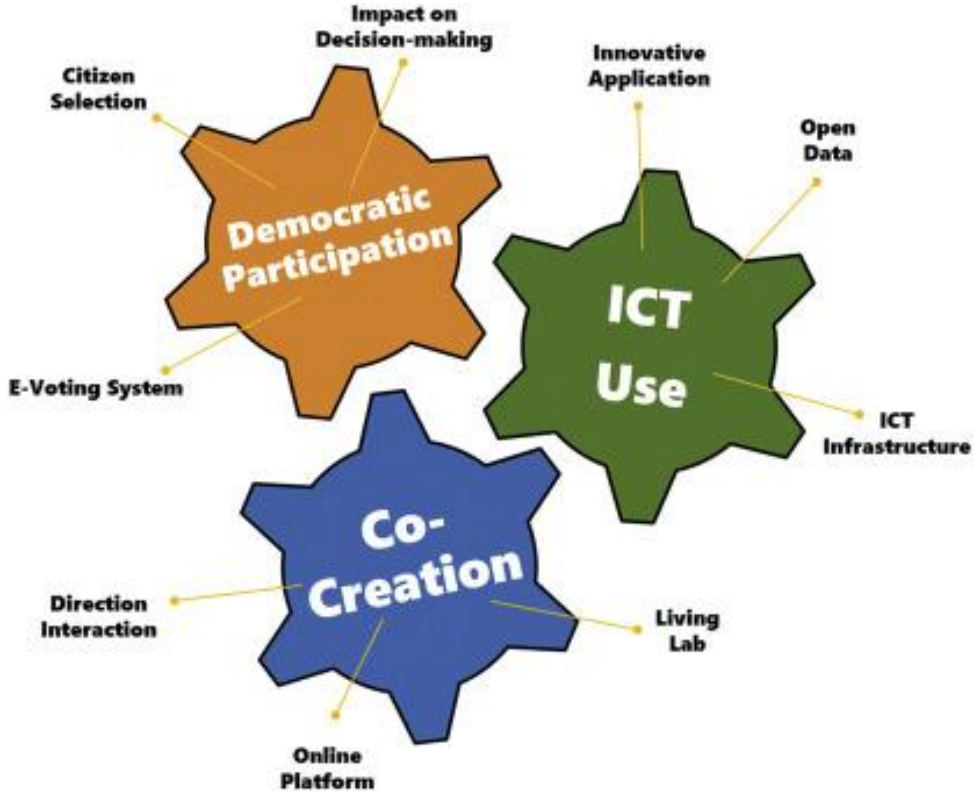
4. Replication and Knowledge Sharing

Cities that achieve success through the program will share their best practices and experiences to help other cities across Europe, especially medium and smaller cities.



Smart City - Thematic Areas

- DIGITAL TECHNOLOGIES
- ENVIRONMENTAL SUSTAINABILITY
- ACTIVE PARTICIPATION OF CITIZENS



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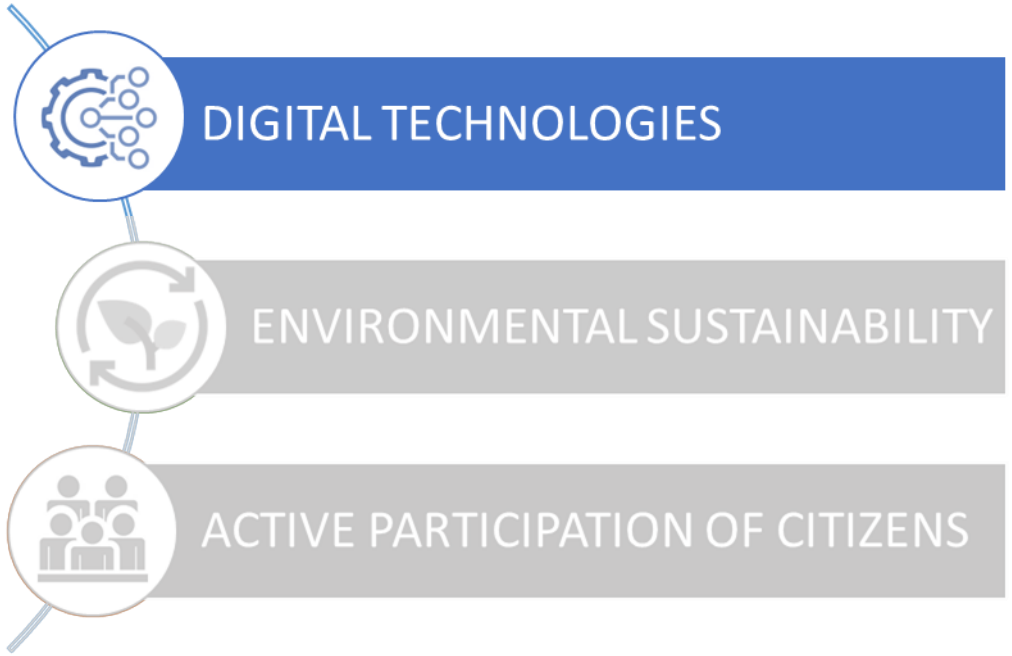
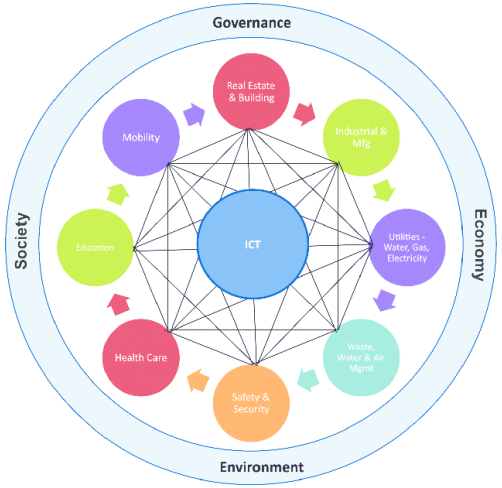
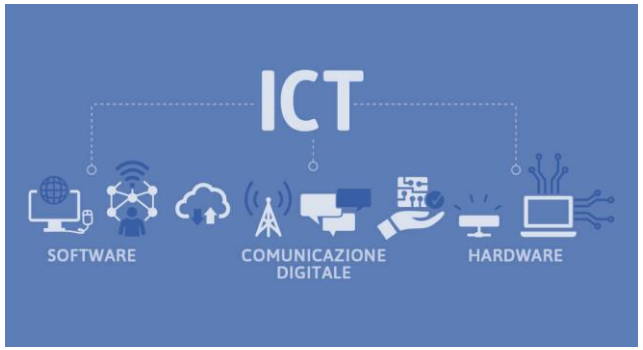


Smart City and Digital Technologies

All smart cities exploit the **World Wide Web**, information and communication technologies (**ICT**), big data, cloud computing, the Internet of Things (**IoT**) and artificial intelligence (**AI**) to collect, process and share data useful for improving various aspects of urban life such as mobility, energy, safety, health, education, culture, tourism, etc.





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Smart City and Environmental Sustainability

Smart cities are attentive to **environmental, economic and social sustainability**, with the aim of reducing the negative impact of human activities and consumption.

Key elements of environmental sustainability in smart cities:

1. **Intelligent management of energy resources**
2. **Energy efficiency in buildings**
3. **Sustainable mobility**
4. **Intelligent waste management**
5. **Monitoring of air and water quality**
6. **Green spaces and urban biodiversity**
7. **Sustainable management of water resources:**

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Smart City and active citizen participation

Smart cities involve and empower citizens in the process of **digital transition** and innovation of their city through tools for consultation, dialogue, collaboration, feedback, co-creation, sharing, learning, etc. Furthermore, citizens are not considered only users of services, but also producers of the same in a win-win logic of **active citizenship** and **open government**.

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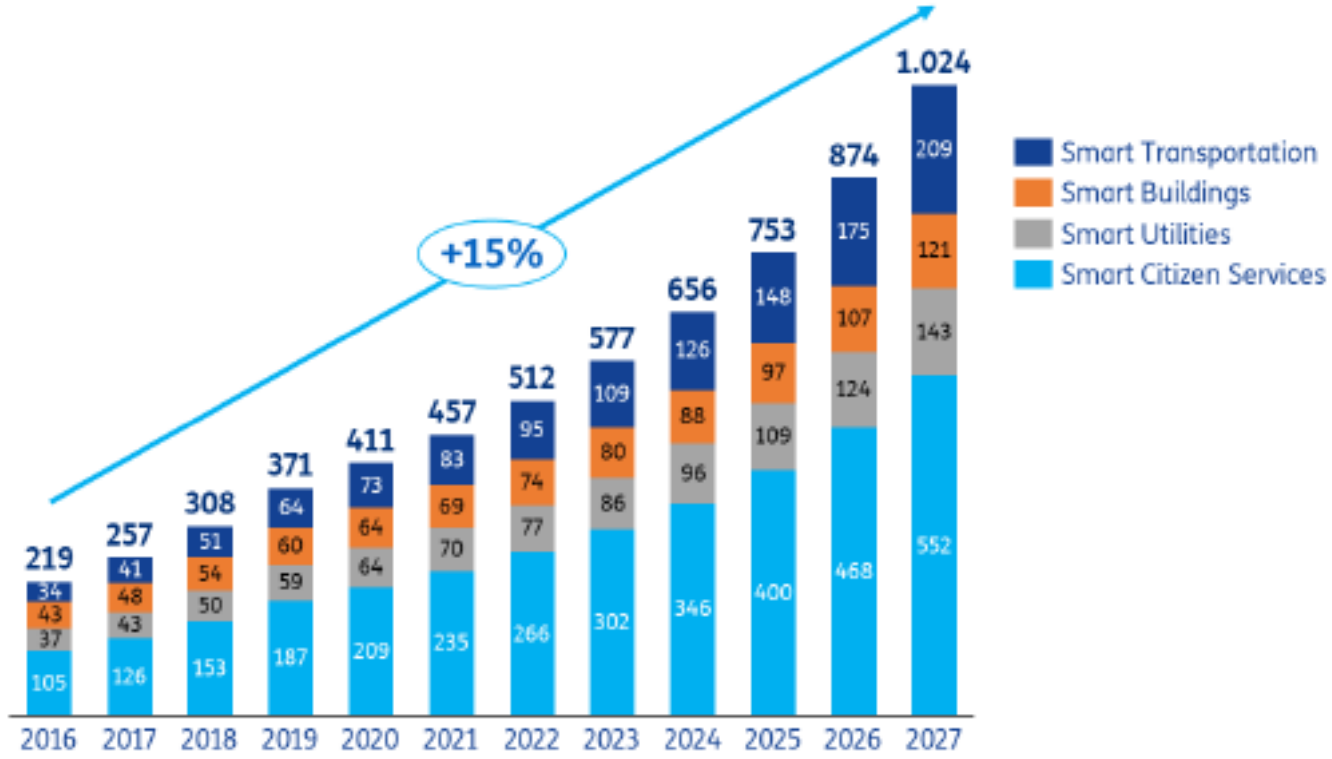
Smart Cities trends worldwide

Revenues from **IoT services** in smart cities represent only a portion of revenues, most of which come from the **management of platforms**, **applications**, **services** and **devices** and **integration** and **consulting** costs. For the services component, professional services, such as consulting, deployment and system integration, support and assistance, are worth about double the Managed services, demonstrating how the industrial component prevails over outsourcing. As for solutions, the Network management component progressively decreases as a percentage of solutions, going from 18% in 2020 to 14% in 2026, to the advantage of an increase in data management and in the reporting and analysis of the data itself. According to IDC 32, the use cases that contribute most to spending in the period **2018-2023** are **smart grid**, fixed visual surveillance, **advanced public transport**, **intelligent lighting** and in**telligent traffic management**. These five use cases represent more than half of all spending for smart cities. According to MarketsandMarkets, the **greatest developments** will be in the **Smart Transportation** sector, and especially in **Smart Citizen services**, which include **Smart Healthcare**, **Smart Education**, **Smart Public Safety**, **Smart Street Lighting**, and **eGovernance**.

Focus Mercato Smart City a livello mondiale ($Mrd)[33]



[32] *IDC's Worldwide Semiannual Smart Cities Spending Guide, 2018H2, May 2019*
[33] *Smart Cities Market, 2022, MarketsandMarkets*

Smart City in Italy




Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

Smart Cities trends in Italy

The development of Smart City projects is naturally affected by this peculiar situation, characterized by significant differences that, simplifying, can be summarized as follows:

_**a nucleus of large cities** (**Genoa, Turin, Bari, Milan, Florence**) which, in particular thanks to the push of Italian and European calls for tenders, have started **structured paths** towards the Smart City through a "**holistic**" **approach** of systematizing projects and interventions with a unitary perspective, as well as **multilevel governance mechanisms** between **public actors**, the **world of production**, the **world of banking**, **research and culture**;

_a significant number of **Municipalities**, especially **medium-sized** ones, which over the years have experimented and **implemented high-quality interventions** in specific sectors (**sustainable mobility, e-government, energy efficiency, enhancement of cultural heritage, integrated data management**) and which are now starting to work towards integration with other areas of city intervention;

_**urban and large area contexts** that, especially due to a significant territorial, dimensional and infrastructural divide, still appear to be **behind in adopting planning models and interventions based on the integration of networks, services and territorial actors**.

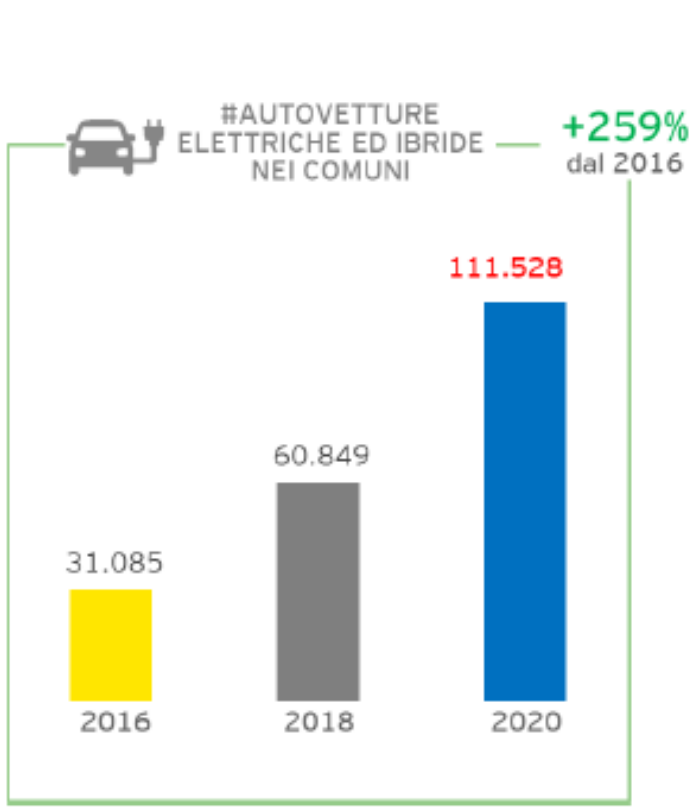
41 VADEMECUM PER LA CITTÀ INTELLIGENTE, Osservatorio Nazionale Smart City di ANCI in collaborazione con ForumPA, 2013

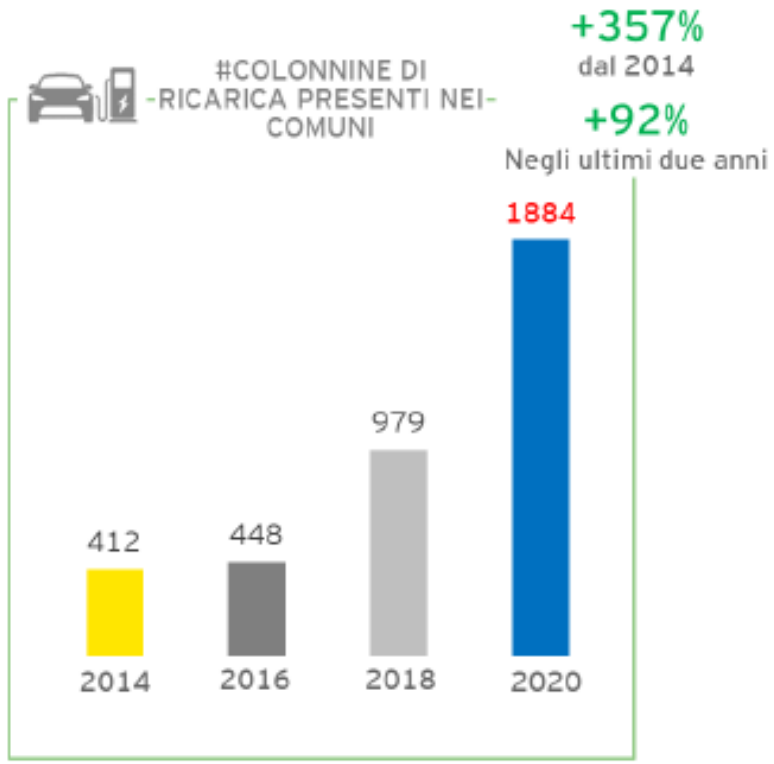
Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

Sustainability trends in Italian cities

Electric mobility

Electric mobility is the newest area, where the most significant increases have been recorded. Charging stations have shown rates of doubling every two years in the last four years, and have therefore more than quadrupled since 2014. Electric and hybrid cars are also increasing at significant rates, having more than tripled in the last four years. It should be noted that cities are implementing initiatives to incentivize the least polluting car fleet, such as the possibility for electric cars to access ZTLs or not to pay for parking in blue lines.





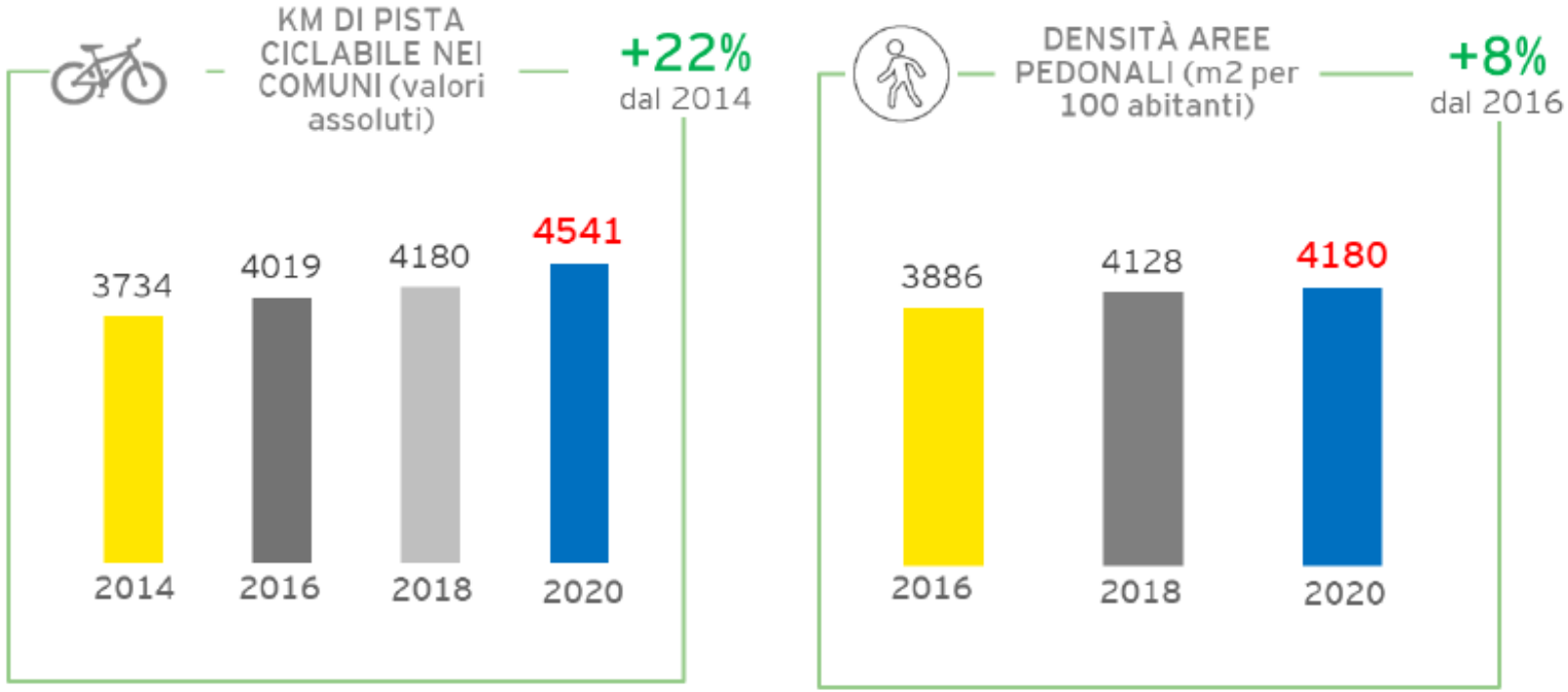
Fonte: Smart City Index EY 2020

Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

Sustainability trends in Italian cities

Slow mobility (bicycle and pedestrian)

The so-called “slow” or “soft” mobility, which concerns both bicycles and pedestrians, is also receiving increasing attention: the extension of both cycle paths and pedestrian areas is increasing, although more slowly than other phenomena such as electric and sharing.



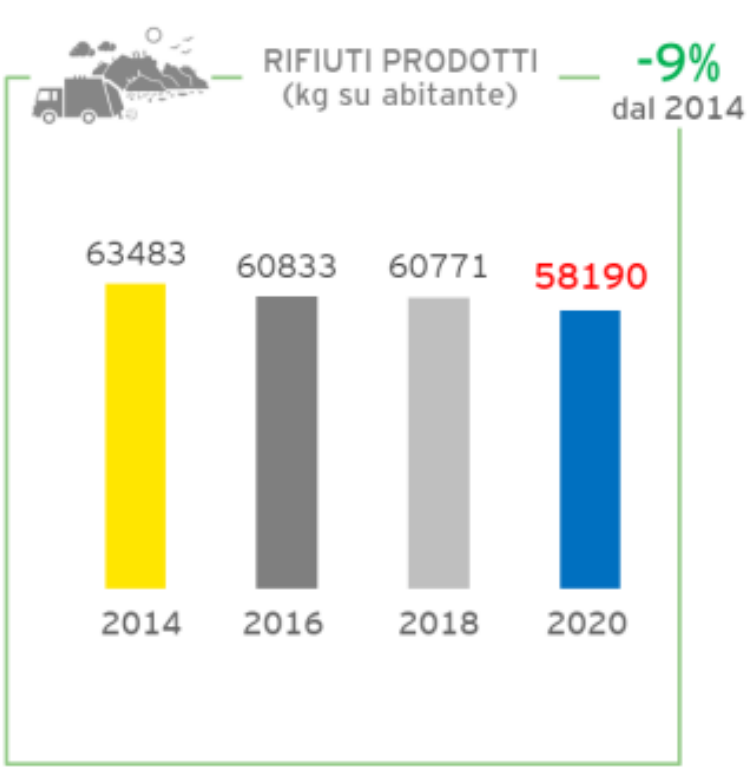
Fonte: Smart City Index EY 2020

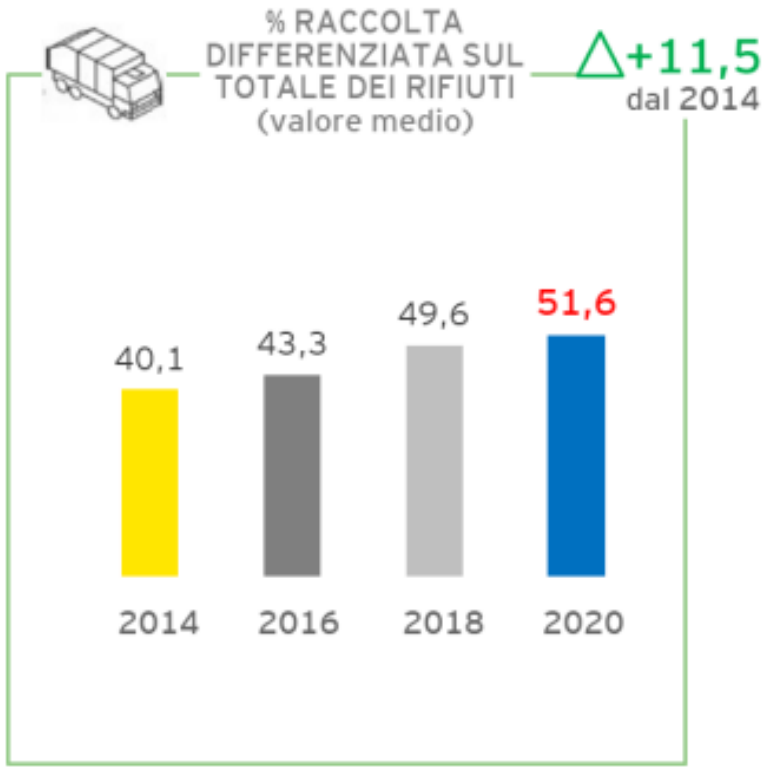
Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

Sustainability trends in Italian cities

Waste Management

The best results were achieved on the waste management front: per capita production has progressively decreased, down 9% since 2014, while separate waste collection has finally exceeded 50% in the provincial capitals as a whole, reaching 51.6% (it was 40.1% in 2014).





Fonte: Smart City Index EY 2020

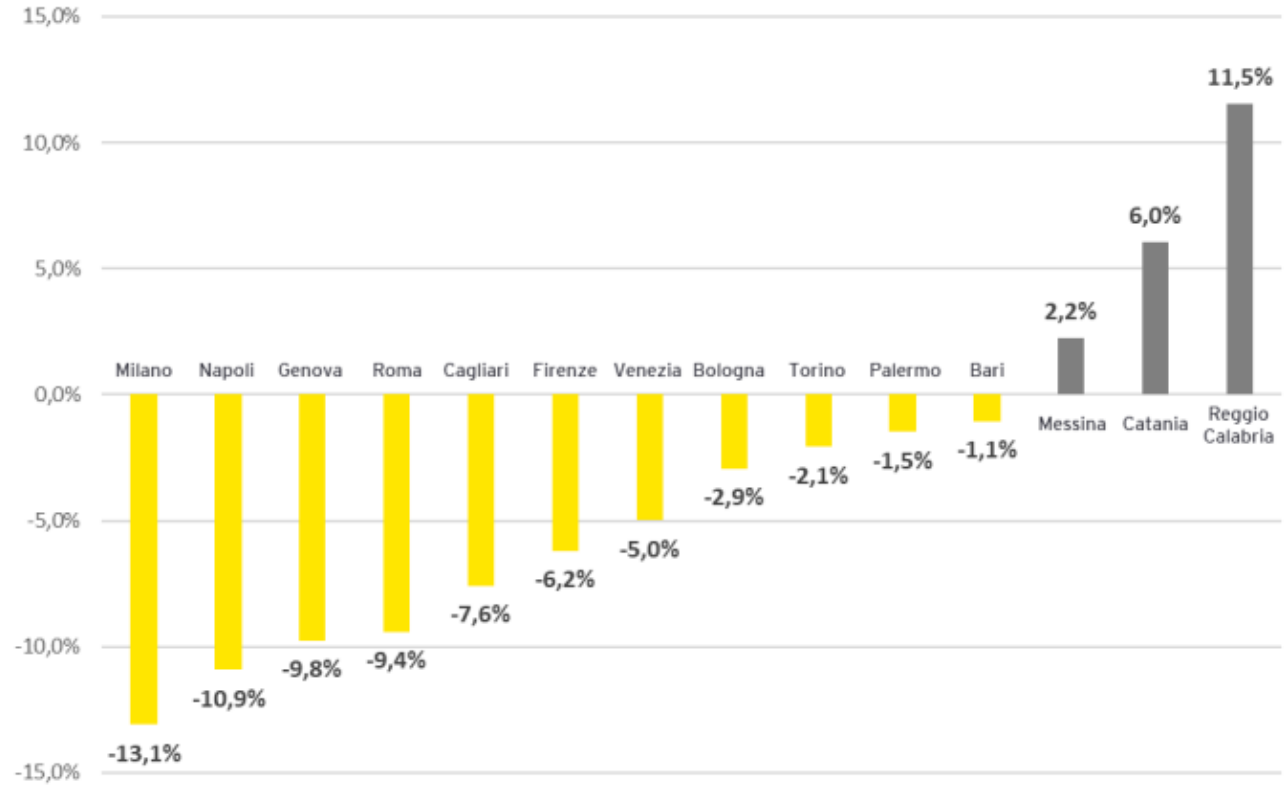
Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

Sustainability trends in Italian cities

Change in circulating cars

For several years, cities have launched initiatives to promote sustainable mobility and reduce phenomena such as air pollution and traffic congestion. This has occurred by trying to reduce private traffic, strengthening public transport, developing forms of alternative mobility that are less polluting (cycling, electric) or shared (car sharing, bike, sharing, etc.).Analyzing one of the most concrete parameters, namely the change in the circulating fleet of cars in the capital cities, we note how, particularly in metropolitan cities, investments in more sustainable forms of mobility and the adoption of incentive measures have made it possible to obtain concrete results such as the reduction in the number of cars in circulation.

Variazione parco veicolare nei 14 capoluoghi metropolitani dal 2002 al 2018 (%)



Fonte: Smart City Index EY 2020 (elaborazione su dati ACI/ISTAT)

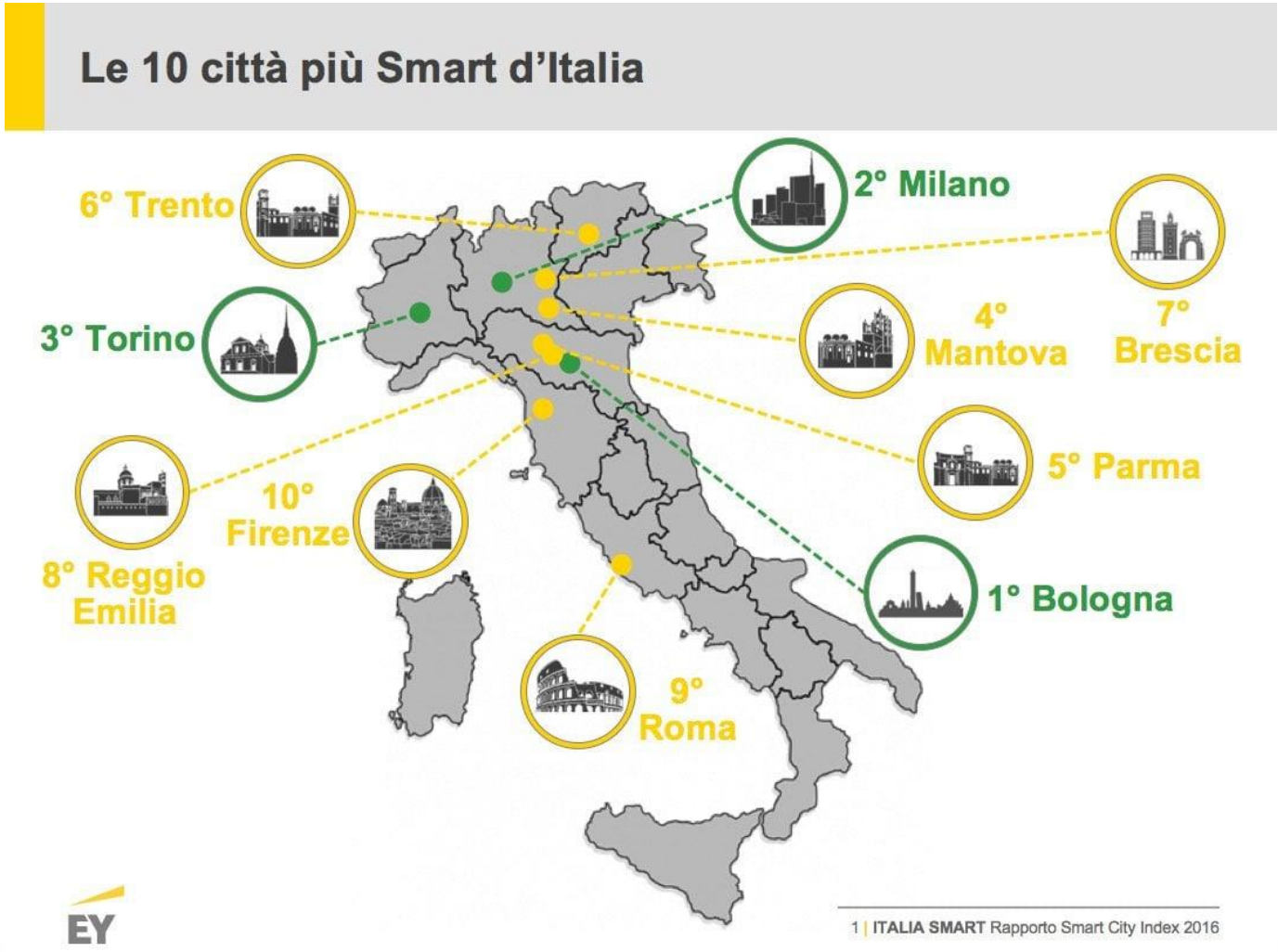
Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

Smart City in Italy 2016

In 2016, **The Smart City Index** in Italy was published by **EY (Ernst & Young)**, in collaboration with the **Osservatorio Nazionale Smart City** of ANCI (Associazione Nazionale Comuni Italiani). This report evaluated and ranked Italian cities based on their level of "smartness," measuring how cities leveraged technology to improve services, sustainability, mobility, and governance.

The **Smart City Index 2016** ranked cities across Italy based on a series of key performance indicators (KPIs) related to:

1. **Digital and ICT infrastructure**
2. **Mobility solutions**
3. **Sustainability and energy efficiency**
4. **Healthcare and education services**
5. **Public safety and governance**



Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

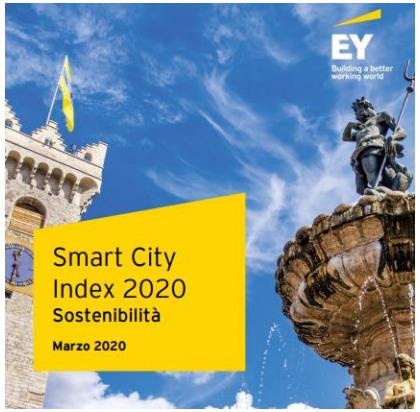
Smart City in Italy 2020

The **Smart City** project in Italy has gained momentum over the years, and **2020** was a key year for its evolution, also thanks to the growth of digitalization initiatives in response to the **COVID-19** pandemic. The definition of a **smart city** implies the use of innovative technologies to improve the quality of life in cities, optimizing the efficiency of public services and resources, and promoting sustainable development from an environmental, economic and social point of view.

The **Smart City Index 2020** ranked cities across Italy based on a series of key performance indicators (KPIs) related to:

1.Sustainability and Mobility
2.Digitalization and Smart Government
3.Sustainable urbanization and efficient use of resources
4.Integration with the Internet of Things (IoT)

Fonte: Smart City Index EY 2020



La top 20 nella sostenibilità urbana secondo lo Smart City Index 2020

Pos.	Città	Punteggio
1	Trento	100,00
2	Torino	92,90
3	Bologna	89,84
4	Mantova	89,17
5	Milano	84,51
6	Bolzano	84,03
7	Brescia	82,74
8	Bergamo	74,78
9	Pordenone	73,91
10	Ferrara	73,90

Pos.	Città	Punteggio
11	Modena	73,58
12	Parma	72,64
13	Udine	72,47
14	Reggio Emilia	72,08
15	Padova	71,30
16	Treviso	71,30
17	Monza	70,98
18	Cuneo	70,75
19	Cremona	68,05
20	Firenze	65,67

Fonte: Smart City Index EY 2020

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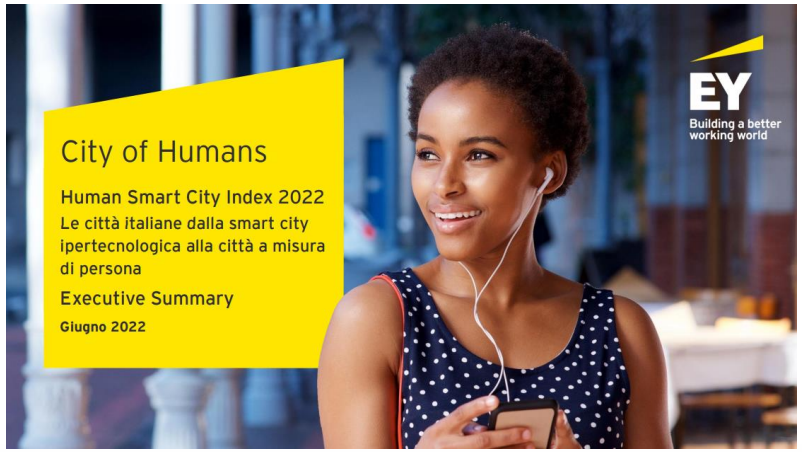
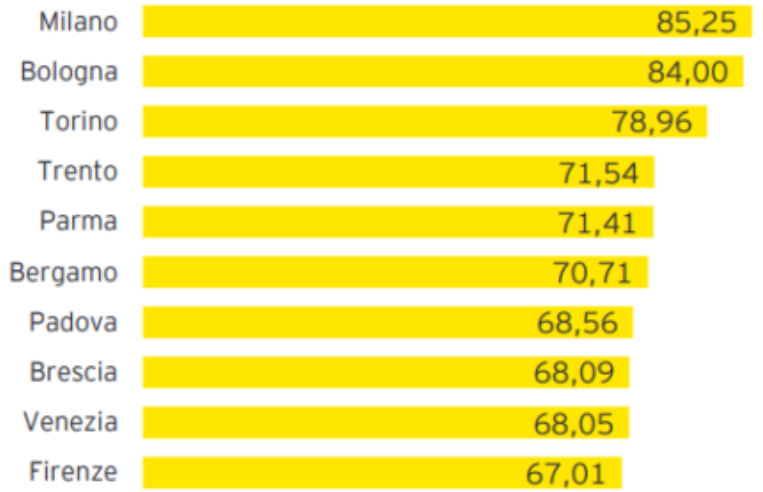
Smart City in Italy 2022

The **EY Human Smart City Index 2022** ranks Italian cities based on their transformation into more people-friendly, sustainable urban environments.
It focuses on three key areas:

1.Digital transition
2.Ecological behavior
3.Social inclusion





Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

Smart City in Italy 2024

Milan was the smartest city in Italy, followed by **Bolzano** and **Trento**, **Bologna** and **Turin**. These are some of the results of the research by the **Smart City Observatory of the School of Management of the Politecnico di Milano**, presented on May 10, 2024 at the conference "Smart City: in search of a winning strategy". They are followed by several cities in the Center-North, while the South and the Islands are not in the top 10.

Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

The Smart City Market in Italy

The Smart City market in Italy is growing rapidly, driven by significant investments and the push for digital transformation. In 2022, the market saw a **23% increase**, reaching approximately **€ 900 million**.
This growth is powered by initiatives in areas like smart public lighting, mobility, metering systems for utilities (electricity, water, and gas), and smart buildings.
Much of the funding comes from Italy's National Recovery and Resilience Plan (**PNRR**), which has allocated **€ 17.1 billion towards** smart city initiatives.
Key areas of investment include:

- **Smart mobility and intelligent lighting systems.**
- **Green energy solutions such as renewable energy communities.**
- **Urban regeneration efforts focused on modernizing city infrastructure, especially in metropolitan areas.**
- **Smart utilities through advanced metering and network systems.**

Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

1. **Sustainable Mobility**
    1. BikeMi, offering both traditional and electric bikes.
    2. Electric Vehicle Infrastructure: charging stations spread across the city.
    3. Public Transport: The city's public transport upgraded with smart technologies for better efficiency.
2. **Energy Efficiency and Green Buildings**
    1. Smart Grids
    2. Eco-friendly Buildings
3. **Data-Driven Governance and Services**
    1. Urban Data Centers
    2. Open Data Platforms
4. **Waste Management and Sustainability**
    1. Smart Bins
    2. Recycling Programs
5. **Innovation Hubs and Research**
    1. Politecnico di Milano
    2. Innovation Districts: Mind - Milano Innovation District
6. **Smart Health and Public Safety**
    1. Digital Healthcare
    2. Smart Policing and Safety
7. **Citizen Participation and Digital Inclusion**
    1. Participatory Platforms: Decidim Milano
    2. Digital Literacy

Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

TRENTO SMART CITY

1. Sustainability and Energy Efficiency
1. Smart Grids and Renewable Energy
2. Green Buildings

2. Mobility and Smart Transport
1. Smart Parking
2. Sustainable Mobility
3. Cycling and Pedestrian Infrastructure

3. Digital Services and e-Governance
1. Open Data Platform
2. Smart City Dashboard
3. e-Government Services

4. Smart Education and Research
1. University of Trento
2. Smart Learning

5. Smart Waste Management
1. Smart Bins
2. Waste Sorting and Recycling

6. Public Safety and Urban Management
1. IoT and Surveillance
2. Environmental Monitoring

7. Citizen Engagement and Participation
1. Participatory Platforms
2. Digital Inclusion

8. Smart Tourism
1. Smart Tourism Apps
2. Cultural Preservation

Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

TORINO SMART CITY

1. **Smart mobility:**
    1. Electric car charging stations
    2. Bike lane network
    3. The **SMILE** project (Smart Mobility, Inclusion, Life & Health)

2. **Energy management and sustainability:**
    1. Smart streetlights
    2. Green construction

3. **IoT and big data:**
    1. IoT (Internet of Things)
    2. Big data

4. **Digital inclusion and participatory governance:**
    1. Open data and digital platforms
    2. **Torino Social Innovation**

5. **Culture and innovation:**
    1. **Polo dell'Innovazione** (OGR)
    2. **Torino City Lab**

Smart cities and Smart buildings: analysis of the Italian context over the last 10 years

1. Sustainable Mobility
- Public Transport and Smart Mobility
- Bike Sharing and E-scooters: **Mobike**
- Traffic and Parking Management

2. Energy Efficiency and Sustainability
- Green Buildings and Smart Grids
- Renewable Energy Projects

3. Digital Services and e-Governance
- Online Public Services
- Open Data Initiative

4. Smart Waste Management
- Smart Waste Bins
- Recycling and Waste Sorting

5. Innovation and Research
- University of Bologna: urban sustainability, digital innovation, and smart technologies
- Innovation Hubs: innovation hubs and startup incubators

6. Smart Health and Well-being
- eHealth Services
- Smart Aging Programs

7. Citizen Engagement and Participation
- Participatory Budgeting
- Civic Technology Platforms

8. Cultural and Smart Tourism
- Smart Tourism Apps: These apps also include augmented reality (AR)
- Cultural Heritage Preservation

9. Public Safety and Urban Security
- IoT and Surveillance: The city utilizes the Internet of Things (IoT) and AI-based surveillance systems
- Smart Lighting

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Smart strategies to mitigate causes and effects of climate change and reduce the environmental footprint

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