CENTRO STUDI

TIM

ABSTRACT

ITALY'S SMART AND SUSTAINABLE CITIES

CENTRO STUDI

TIM

with the scientific contribution of

Consiglio Nazionale delle Ricerche

POLITECNICO MILANO 1863 SCHOOL OF MANAGEMENT

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Centro Studi TIM

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CNR Department of Engineering, ICT and Technologies for Energy and Transport - DIITET

Smart City Observatory and Startup Intelligence Observatory Politecnico di Milano

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The 'Italy of smart and sustainable cities' report - Abstract

The report '**The Italy of Smart and Sustainable Cities**' was produced and presented by the TIM Study Centre (**Centro Studi TIM**) in collaboration with the National Research Council (**CNR**) - Department of Engineering, ICT and Technologies for Energy and Transport - **DIITET**, which is the leading Italian public research organization, and the 'Smart City' and 'Startup Intelligence' Observatories of the School of Management of the **Politecnico di Milano**. The study outlines the development prospects of smart cities, provides an overview of their economic impacts, and offers evaluation tools to support public administrators.

> Scenario: cities produce more than 75 per cent of waste, 80 per cent of greenhouse gas emissions and 75 per cent of energy consumption

Today, most of the **world's population lives in urban areas** (in 2021 there were about 4.45 billion or 56 per cent of the total) and this trend is set to grow to over **6.7 billion people living in cities by 2050** (66 per cent of the world's population). Cities are responsible for more than **75 per cent of waste production, 80 per cent of greenhouse gas emissions and 75 per cent of energy consumption**. The use of digital technologies applied to smart cities will improve the efficiency of traditional services **for the benefit of citizens and businesses**, with the aim of making cities more sustainable, convenient, and safe. In Italy, the urban population in 2021 was 44.5 million (75.5 per cent of the total), and is expected to reach **45.3 million by 2050** (**83.5 per cent** of the population).

>The smart city growth market is estimated to reach a value of 1.6 billion euros in Italy (ICT) and over 1 trillion dollars worldwide (total) by 2027.

The **global smart city market** was valued at **more than 500 billion dollars in 2022** and is projected to **exceed 1 trillion dollars by 2027**. In **Italy,** spending on **ICT** (information and communication technologies) solutions for **smart cities** amounted to slightly **over 800 million euros in 2022** and is forecast to increase to nearly **1.6 billion euros by 2027**.

>Benefits from Smart Cities: by 2027, traffic costs in Italy will be reduced by 6.5 billion euros and pollution costs by 405 million euros. 650 thousand fewer tons per year of CO2 emissions

According to estimates by the **TIM Study Centre**, **over the period 2023-2027, in Italy, Smart City applications** based on **5G** and **IoT** will contribute to an **overall reduction of about 6.5 billion euros in city traffic costs** and more than **405 million euros in pollution costs,** thanks to better planning of public and private transport. **Reduced traffic congestion** will lead to a **reduction in CO2 emissions of around 650,000 tons per year. A** decrease of about **3 billion euros in** social, health and administrative **costs** related to **road accidents is** expected due to greater automation of driving systems and earlier rescue.

Public lighting costs decreased by **1.95 billion euros,** using LED lamps and sensors for more efficient management of lighting periods, and **waste collection and transport costs by** around **160 million euros**, thanks to more efficient organization of **waste** collection.

>Funds: more than 100 billion euros from European programs are earmarked for Smart Cities, plus 2.5 billion for metropolitan cities from the NRP

The **United Nations** (UN) has been aiming since 2015, through **SDG 1, 'Sustainable Cities and Communities'**, to achieve a more equitable and sustainable social, economic, and environmental

balance by 2030. To make cities safer, more resilient, inclusive, and sustainable, substantial public funding has been made available, such as that of the **two European programs Horizon Europe** (**100 billion euros**, where Climate neutral & Smart cities is one of the five Mission Areas) and **Smart City Marketplace** (**616.3 million euros**). The **Italian National Recovery and Resilience Plan** (**NRP**) foresees more than **10 billion euros** for Smart Cities, of which almost **2.5 billion euros for projects submitted by metropolitan cities**.

>Traffic, mobility and waste management the main areas of intervention

In the last three years in Italy, an increasing number of municipalities have started to design Smart Cities using applications mainly focused on optimizing traffic and mobility of vehicles and people (Venice, Florence, Rome, Mantua, Novara, Assisi) and waste management (Mantua and Cremona). The use of Internet of Things (IoT) and 5G in Smart City applications will make a significant contribution to reducing traffic and city pollution, optimizing waste management and energy expenditure for lighting.

>Smart mobility in Italian cities

The study by the Connected Car & Mobility Observatory of the Politecnico di Milano shows that **smart mobility is an increasingly central theme for Italian municipalities**: almost nine out of ten municipalities (88 per cent) with a population of over 15,000 inhabitants consider it relevant or fundamental. In addition to interest, the number of projects in the field is also growing: **59 per cent of the responding municipalities said they had launched at least one smart mobility project in 2021**. However, many of these projects (one in two) are still in the embryonic phase of experimentation, a sign that there is still a long way to go to bring the new solutions fully up to speed and to fully grasp their value. Among the **barriers** contributing to slowing down the innovative transformation of the sector, municipalities point to the **lack of economic resources and expertise**, both of which are essential to make the breakthrough. A push in this direction can come from the NRP and its numerous grants for smart and sustainable mobility.

>Smart City Policy: more cross-sectoral rules and management models are needed

The creation of ecosystems that can lead to the development of efficient and effective smart city models is an ambitious challenge with multiple aspects that go beyond technological complexities. Today, many projects clash with a sectoral approach to urban management (regulatory, administrative and management), whereas **the development of smart cities requires a more transversal and cross-sectoral view** that can **create synergies** between different areas of development, from mobility to energy and citizen services.

To be able to give meaning and extract value from the data generated by the multiple sensor networks (present and future) and to make the most of them, also in terms of greater environmental sustainability, a **single and multidisciplinary technological and management direction** is needed that enables the various players involved in the development of the smart city to 'interact' (IoT, cloud, connectivity, Artificial Intelligence (AI), cybersecurity, start-ups), in full compliance with the fundamental principles of privacy protection provided by the European regulatory framework. For this to happen, it is also necessary to intervene in the procurement and management processes of local administrations, favoring the standardization and exportability of successful models.

>Start-ups changing the face of smart cities and buildings

According to a study by the Internet of Things Observatory and the Startup Intelligence Observatory of the Politecnico di Milano, technological innovation trends in cities increasingly represent a springboard for **start-ups** wishing to venture into the **Smart City and Smart Building sectors**. The Research **analyzed 307 IoT start-ups worldwide** that have developed solutions in these areas. Of these, **69 per cent have received funding from** institutional investors in the last three years, totaling **8.5 billion dollars**. Leading the way is the United States, where 44 per cent of total resources are allocated, with an average of 49 million dollars received by each start-up. **Italy,** on the other hand, still lags behind and shows **difficulties in raising funding**, which accounts for only **0.4 per cent of the total funding** surveyed. The research also shows that start-ups in the sector prefer to deal with the development of enabling software and are mainly focusing **on Scenario Management**, **Energy Monitoring** and **Security**.

>Urban Intelligence: a 'digital twin' to optimize city development and management

The CNR's 'Urban Intelligence' strategic project a**ims to strengthen the ability of cities to develop integrated approaches and policies** for urban sustainability, thanks to the unprecedented potential offered by new digital technologies in terms of **analysis and prediction** (artificial intelligence and machine learning), simulation (HPC - high performance computing), **optimization, and decision support**. There are three axes of innovation: enhancing the multidisciplinary knowledge framework; coordinating technological innovations with governance innovations; and structurally strengthening civic inclusion and participation.

To this end, the Urban Intelligence (UI) project is developing next-generation Urban Digital Twins (UDT), based on an **ecosystem of technologies also integrated with 5G and Internet of Things (IoT)**, which make it possible to **think and model the city** as a complex and evolving system thanks to a **Decision Support System available to civic administrations.**

This makes it possible to **strengthen urban governance** both at an operational level, to plan routine operations and react more promptly to critical situations and emergencies, and at a strategic level, to generate medium- to long-term policies for sustainability and inclusion.