EUTECH SDG AWARDS 2024

“Madrid, Digital Capital”

Digital Transformation Strategy for the City of Madrid

Capital Digital

Contents

Introduction to the Digital Transformation Strategy Madrid, Digital Capital "Madrid, Capital Digital"

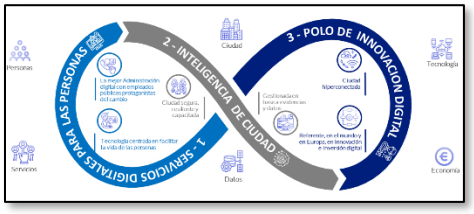
"Madrid, Digital Capital" is the strategy designed by the Madrid City Council for the **digital transformation of the city,** whose objective is to accelerate the process of digitalization of **municipal public services** to contribute to the growth of the well-being of the people of Madrid and ensure that Madrid continues to be a **benchmark city** in the digital field, for all people and companies.

Madrid's Digital Transformation Strategy is based on **three main objectives**: (Link to the presentation video)

1. **Digital services for people.** To facilitate the day-to-day life of all the citizens of Madrid, through excellence in digital services, that is, to make them easy, fast and comfortable.
2. **City Intelligence**. Achieve a more efficient and sustainable management of the city through a greater intensity in the use of technology. A city that is alive and responds and adapts to its environment and people's needs.
3. **Digital Innovation Hub.** To reinforce Madrid as the preferred destination for innovation, investment and talent in the digital sector, creating an attractive ecosystem to invest, work, study, visit, enjoy and live.

In addition, the set of objectives and strategic axes is promoted and impacted by **the enabling levers of the Strategy**, which are those that **drive the digital transformation** of the city through. These levers are: **people, services, city, data, technology and economy.**

Thus, and from a **holistic point** of view, the configuration of the **Digital City** model is structured by uniting the strategic objectives with their corresponding strategic axes and, finally, with the enabling levers:



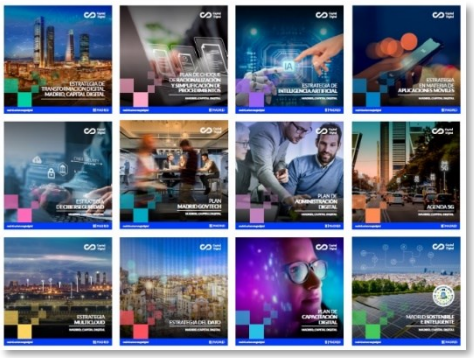
The Digital Transformation Strategy is **ambitious, but realistic.** For this reason, together with the previous strategies, a **structured map of cross-cutting projects has been developed,** the execution of which has already been indicated and will be implemented in the coming years.

This set of **cross-cutting projects** is organized in such a way that they serve as **an enabler and driver of transformation.** Of particular note are corporate **projects** such as the **Intelligent Process Platform, the Comprehensive Citizen Attention Platform, the Digital Brain, the Digital Twin or Smart Urban Spaces, and inclusion and digital skills** for all, among others.

All this, without losing sight of the fact that, at the same time as being intelligent, the city must be sustainable. For this reason, **the Madrid Green and Digital Transition Itinerary has been developed**, conceived as an opportunity to continue advancing in the transformation of the city, materializing the convergence of both phenomena for the construction of a city of the future: efficient, digital,

sustainable and inclusive. Aligned with the **Sustainable Development Goals (SDGs),** it relies on innovation and cooperation practices to ensure its approach is designed by and for people.

The following are some of the main projects that are being implemented within the framework of Madrid, Digital Capital and which, in turn, are aligned with the SDGs selected for this award.ODS



SDG 9: Industry, Innovation and Infrastructure

This SDG includes three fundamental factors for growth and economic development, for this reason the Madrid City Council has incorporated in its Strategy, different innovative projects with advanced technological infrastructure such as the use of 5G networks, the creation of the **Intelligent Process Platform**, the **Digital Twin** and the **IoTMADLAB**. In turn, projects such as the Digital Brain and **Smart Urban Spaces**, which propose approaches for the management and operation of the city, are also addressed. Projects such as the **Digital Brain and Smart Urban Spaces**, which propose approaches for the management and operation of the city, are also addressed.

Madrid complies with this SDG, promoting the development of reliable, sustainable, resilient and quality infrastructures that enable economic development and human welfare with a Strategy that promotes an equitable and friendly digital transformation for all. For this, it is carrying out different initiatives for the development and application of **5G technology**. Specifically, it has the **5G Agenda**, as part of the Digital Transformation Strategy of the Madrid City Council, to accelerate the deployment of high-capacity communications networks and facilitate hyperconnectivity between people and services.

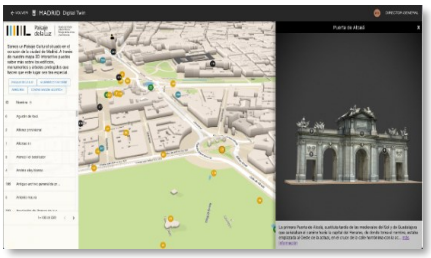
The **5G Agenda** has been designed with the collaboration of the Official College of Telecommunications Engineers to facilitate the deployment of 5G infrastructures and encourage the development of solutions that improve municipal services, the livability of the city and the welfare of people, attracting innovative activity, investment and job creation in digital profiles.

In the field of ongoing actions, from the **Digital Transformation Center (CTD),** the complete inventory of all municipal telecommunications infrastructures is being carried out and the format of the 5G Corridors has been designed, presented in several conferences.

Each 5G Corridor defines a physical space in which to carry out specific use cases. For this purpose, the necessary 5G properties are characterized, a technical solution is proposed to provide it with coverage, the cost of deploying it is economically assessed and the sources of funding for it are identified.

Regarding the application of cybersecurity on IoT infrastructure, 5G and city infrastructures, Madrid is moving towards a city that is a benchmark in cybersecurity and in the use of technology to strengthen security and

resilience, which generates confidence in people and has the capacity to respond immediately to changes in the environment. In this way, Madrid strengthens its management based on data and evidence as raw material to promote greater efficiency in the provision of public services and economic growth.



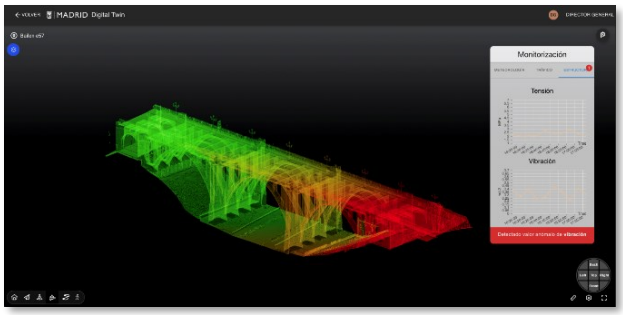
In line with the above, various projects stand out that will help make Madrid a **Smart City.** On the one hand, a **Digital Twin** architecture of the city has been created: a digital representation of **one or more elements of the city, including the characteristics, data, functions, behavior, and interactions** necessary to **meet the needs of management and decision-making about it**

The **Digital Twin** is a **comprehensive software solution** based on a digital replica of the city, where information from various municipal areas is leveraged. This replication, defined by an ontological model, is nourished by data from IoT sensors distributed throughout the city, such as traffic sensors, as well as information from existing solutions within municipal competencies and external services.

In this way, this digital twin becomes a **comprehensive solution** that offers a complete set of functionalities ranging from collection, storage, analysis, sophisticated simulation to artificial intelligence techniques for **predictive modeling and advanced visualization** mechanisms.

The implementation of the digital twin covers areas such as the digitization and **sophisticated visualization of cultural heritage**. This involves not only **preserving historic landmarks and culturally significant sites**, but also **employing sensor technology** to enrich the experience of these spaces.

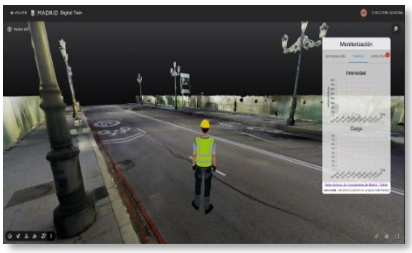
The management of critical urban infrastructure occupies a central role, with the virtual reshaping of elements of the city to align with regulations. Simulation techniques are employed to optimize urban planning and development, ensuring compliance and sustainability.



Madrid City Council's digital twin initiative represents a dynamic and collaborative approach to urban development, preservation, and security. Not only does it align with the vision of a digitally empowered city, but it also lays the foundation for innovation and resilience in the face of ever-evolving urban challenges.

With the ultimate objective of strengthening **Madrid as a Smart City** for sustainable growth, exchanging information and data between the various urban systems for a more efficient management and control of the city and its services, and responding more effectively to the needs of everyone: administration, companies and citizens.

In line with the Digital Twin, the City Council develops **Smart Urban Spaces** as specific physical spaces or locations in which, through technologies such as IoT, the application of sensors in urban equipment, or citizens' mobile devices, data from the spaces themselves are collected, analyzed and used, allowing them to be managed **more intelligently and sustainably**. providing **valuable services** to its citizens, as well as to the municipal staff who operate them.



On the other hand, the creation of a Digital Brain has been designed, understood as a **real-time Monitoring and Follow-up Centre** for the **functioning of the City and municipal services** with a greater impact on citizens, which integrates all the command centers of the different services of the City Council, with the **aim** of obtaining a **up-to-date and integrated view of the state and main incidents** in Madrid.

In recent years, cities have installed a large number of sensors in various municipal services, such as mobility, cleaning, equipment, energy and infrastructure, which use different communication protocols, which means that they "speak" different languages, making it difficult to connect directly between them despite being located in nearby areas.

To address this issue, and establish a **"universal language", open, neutral, and interoperable** for Internet of Things (IoT) devices used in cities, The Internet of Things (IoT) Laboratory has been implemented, an **expert center dedicated to the Internet of Things that** plays a critical role in accelerating the **transition to a city that is both environmentally friendly and highly digitalized**. In addition to positioning it as **a city of reference, intelligent and sustainable**.

This transformation pursues the creation of a city that is capable of operating in an **interconnected manner**, promoting **cooperation between municipal areas** that use this technology, technology manufacturers and municipal service providers.

In this way, a series of tests have been planned **in the laboratory** that will be installed in a controlled real environment. Thus, **7 Smart Urban Spaces (EUI) are already contemplated** with devices connected to each other on a daily basis, so that the impact of interoperability can be continuously evaluated.

More specifically, **there are 10 areas of application of the IoT** that are combined in the Laboratory's environment: **energy, lighting, urban facilities, environment, green areas, parks and gardens, cleaning and waste, mobility, security and emergencies, urban space and people**.

Thus, IoTMADLAB stands out as a **practical example of trilateral collaboration** between entities from the public-private and social spheres, joining the efforts of numerous actors with a shared goal: **to build the city of tomorrow today**, an adaptive city **whose** services are adjusted to efficiency and quality of life, with **people at the core.**

This project is open to the participation of all private agents, manufacturers and service providers. So there are many **technology companies involved** in the initiative, such as **T-Systems, Telefónica, Kyndryl, Orange, Accenture, NTT Data, Ferrrovial, Signify, etc**.

In this sense, the Digital Transformation Strategy 'Madrid, Digital Capital', modernizes the city infrastructure and promotes technological innovation, improving the efficiency and sustainability of urban services, promoting scientific research and promoting the improvement of the technological capacity of industry and infrastructure.

SDG 11. Sustainable Cities and Communities

The 'Madrid, Digital Capital' Strategy also promotes what is known as Madrid's **Twin (green & digital) Transition**, a city in which technology and sustainability complement each other to boost efficiency. For, as stated in the report published by the European Union, the green and digital transitions are two fundamental trends in the future of the Union, and the combination of both phenomena accelerates changes in societies.

Madrid, Digital Capital, is framed in the European and national strategic context in line with the **European Digital Agenda, the European green pact and the 2021-2027 /2021-2030 funding programs**, as well as with the **Spain Digital Agenda 2026** and its different development strategies. And it incorporates the main lines foreseen in the municipal and city strategies defined by the different government areas.

The Madrid City Council is adding to its digitalization efforts a sustainable vision that allows this transformation with the least possible impact. In a context of rapid urban growth, highly complex challenges such as mobility, air quality, and resource or waste management substantially impact people's lives. **This is when technology consolidates as a transformative tool, enabling the creation of efficient and innovative solutions for the territory, people, and businesses**.

In this sense, **the transition towards the environmental and climate sustainability of the city becomes an imperative necessity to ensure the quality of life**. Therefore, within the framework of the 'Madrid, Digital Capital' Strategy, a convergence in the green and digital transition is managed, strengthening these elements mutually.

The Strategy integrates the principles of environmental sustainability, seeking to achieve two major objectives**: (I) Enhancing the use of technology and digitalization as an enabler of positive impacts on the environment and (II) Promoting sustainable digitalization**.

At the same time, it promotes the use of all kinds of **innovative technologies to create products, services, and processes that help mitigate negative environmental impacts related to industry, energy, transport, or waste**. Similarly, it encourages the choice of technologies or devices that foster energy savings.

Likewise, the **transition towards the environmental and climate sustainability of the city** emerges as an imperative necessity to ensure the quality of life.

The commitment to successfully managing the dual green and digital transition in the city is reflected in Madrid's recognition as a **Smart and Climate-Neutral City in 2023 with the 'Climate City Contract' (CCC**).

To achieve this, the City Council aligns with the goals of this SDG, focusing its efforts on applying resilient, inclusive, and sustainable urban development policies and practices. In this sense, the implementation of **Smart Urban Spaces (SUS)** is a clear example of using technology to reduce impact. Among the fields of IoT technology application are energy, green areas, parks and gardens, cleaning and waste, mobility, urban spaces, and people, among others.

These spaces, with a demonstrative character, take advantage of the benefits of **hyperconnectivity**. Thanks to the interconnection of equipment installed in the environment of the space or its users (vehicles, mobile devices, environmental sensors, energy, lighting network, traffic lights, urban furniture, containers, trees, urban installations, etc.), decisions can be made in real-time for the management of these spaces. This builds a new model of the city, integrating services and improving their coordination for better response to the needs of the people.

These are specific physical spaces or locations in the city where, through various technologies such as IoT, the application of sensors in urban equipment, or the citizens' own mobile devices, data is collected, analyzed, and utilized from the spaces themselves. **This allows for a smarter and more sustainable management of these areas, providing valuable services to citizens as well as to municipal personnel who operate these services**.

Among the benefits these **Smart Urban Spaces (SUS)** offer to citizens are the reduction of energy consumption and the creation of positive energy spaces, the transition to data-driven and automated service management, the reduction of emissions and noise and light pollution, possible physical and digital accessibility of spaces, greater economic and social cohesion with new professional profiles, and the data economy, among others.

At the same time, digitalization itself contributes to more sustainable cities. An example of this is the **Integrated Citizen Platform**, which seeks to establish an integrative, agile, omnichannel, and 360-degree approach in the relationship between citizens and the City Council. To achieve this, it integrates all the tools from the different Government Areas of the City Council, **creating a single point that consolidates each person's information and provides access to all relevant municipal resources and services.**

This platform proposes the self-consumption of information and services from mobile devices as the preferred channel for citizens, thus reducing the need for citizens to travel to City Hall offices, decreasing energy consumption, and significantly reducing paper consumption. This is achieved by making public procedures available to citizens through the **Citizen Wallet and the Madrid App** on their mobile devices.

Another example of Madrid's effort to create a sustainable city is the **"Mobilities for EU"** project, part of the initiative *'New Mobility Solutions for Climate Neutrality in EU Cities,'* and within the framework of the European Mission 'Climate-Neutral and Smart Cities.' The objective of this project is to analyze the state of the art of technology through real demonstrators: autonomous vehicles for the transport of people and goods, powered by a viable electric grid that adjusts to a market where demand and photovoltaic production vary independently. Led by the cities of Madrid and Dresden and integrated by 29 European public and private entities, it has secured funding from the European Commission amounting to around 25 million euros. It will launch 11 pilot projects that include 27 innovative solutions for autonomous electric mobility, 5G technology, smart urban spaces, digital twin technologies, and artificial intelligence.

Specifically, in Madrid, 5 pilots will be implemented in the scenarios of **Mercamadrid** and the nearby **Operations Center of the Municipal Transport Company (EMT)** in Entrevías. Mercamadrid is the largest market in Spain and one of the most active in Europe, employing 8.000 people and supplying 46 other markets in the city as well as a vast area in the center of the country.

Therefore, as efficient mobility solutions, pilots have been proposed for autonomous electric vehicles for transporting people and goods, using **5G technology**, and operating in a smart urban space with interoperable IoT devices, an electric grid based on renewable energy sources, on a "smart grid" that uses digital twin and artificial intelligence technologies, efficient charging and electrification of goods fleets, **bidirectional G2V and V2G chargers integrated** with an energy data market, and the implementation of hydrogen refueling stations and 10 hydrogen fuel cell buses powered by green hydrogen.

SDG 17: Partnerships for the Goals.

The fundamental basis of the Digital Transformation Strategy **'Madrid, Digital Capital'** is collaboration. By **working together with the public and private sectors** and the citizenry, the Madrid City Council ensures that its projects are viable in many aspects. In this regard, having innovative technology from the private sector provides continuous innovation and updates, as well as acquiring specialized knowledge from academia.

This joint effort is based on multisectoral collaboration, such as partnerships with universities. An example is the collaboration agreement between the Polytechnic University of Madrid and the Madrid City Council, which allows the expansion of the research area, thereby extending work on topics such as 5G, cybersecurity, digital twin, drones, embedded artificial vision, connected autonomous vehicles, as well as specialized groups in digital training and GovTech.

This has also been achieved with the support of the Forum for Madrid, to create the Madrid City Internet of Things Laboratory (IoTMADLAB) based at the **Integral Domotics Center (CeDInt)**, which also includes 5G and cybersecurity fields.

The context of what has been proposed in Madrid, Digital Capital, and specifically in the 5G Agenda, the 5G Forum is the meeting point between the local administration, the university, civil society, and companies.

In this same collaborative context, the **5G Agenda** has been designed with the collaboration of the **Official College of Telecommunications Engineers** to facilitate the deployment of 5G infrastructure and promote the development of solutions that improve municipal services, city livability, and people's well-being, attracting innovative activity, investments, and creating jobs in digital profiles.

Similarly, Madrid has launched the GovTech program in search of fostering technological innovation through the collaboration of the City Council with startups and scaleups, such as Saturno Labs, with solid technological foundations. These companies, mostly entrepreneurs who have demonstrated the viability of their business models and seek support for their expansion, find in the City Council a set of actions to promote the GovTech ecosystem and foster collaboration between the public and private sectors in municipal open innovation initiatives.

Additionally, the City Council is part of **Collaboration Networks**, involving actors from the public and private sectors for the execution and success of projects, which also allow the transmission of

knowledge and experiences that enrich the institutions themselves beyond just providing specific resources.

Moreover, as part of Madrid's commitment to forging Partnerships for the Goals, not only with companies or universities but also with the citizenry itself, developing a community commitment, projects like **Digital Volunteers** have been developed. In collaboration with third sector entities such as **Somos Digitales, Emancipatic, and the Banking Users Association**, Madrid also collaborates with companies like **Telefónica** in the field of care for these groups through the development of platforms that use AI to detect and manage unwanted loneliness. Digital training for municipal staff is also promoted through the development of the **Easydro Platform** aimed at transforming the digital environment of municipal employees by mobilizing the user position and fostering their digital training using innovative learning techniques, microlearning, training pathways, MOOCs, webinars, or self-training 24/7, in collaboration with Microsoft and Accenture.

The **Multicloud project**, in collaboration with Microsoft among others, provides the City Council and the city of Madrid with **flexible and resilient technological infrastructures** to support the various municipal service management solutions and accelerate digital transformation.

Thus, through the 'Madrid, Digital Capital' Strategy, the City Council aligns with the goal of this **SDG** by generating partnerships among multiple **stakeholders** to mobilize and exchange knowledge, expertise, technology, and financial resources to achieve its objectives.

Other projects Aligned with SDGs

While this document justifies the presentation of the Digital Transformation Strategy 'Madrid, Digital Capital' by aligning it with three main Sustainable Development Goals: **9. Industry, Innovation, and Infrastructure, 11. Sustainable Cities and Communities, and 17. Partnerships for the Goals**, the other projects that comprise it also align with **various SDGs** as described below.

Another key aspect of Madrid's digital transformation is digital training for everyone. The City Council promotes training for both **municipal staff and society in general**, aiming to enhance the competencies of the citizenry and thus strengthen the city's digital leadership, closing existing gaps. One of the most notable initiatives is the **Digital Volunteers project**, characterized by a series of participatory workshops to identify the need to create a digital service that addresses situations of unwanted loneliness and the digital divide affecting older adults. This project aligns with **SDGs** 4. Quality Education and 10. Reduced Inequalities.

The Madrid City Council created the **"Madrid City Council Cybersecurity Center" (CCMAD)** as an organic unit, with the rank of a sub-directorate, attached to the **Autonomous Informatics Organization of the Madrid City Council (IAM**), to provide cybersecurity services to the Government Areas and Autonomous Organizations of the City Council. Its mission is to reinforce the protection of municipal digital management in the face of the exponential growth of threats in cyberspace and to become the reference center for cybersecurity in smart cities, which aligns with SDG 16. Peace, Justice, and Strong Institutions.

Additionally, various projects like the **Green and Digital Transition Itinerary** align with **SDG 7. Affordable and Clean Energy** by promoting the use of renewable energy and reducing GHG consumption, also impacting **SDG 12. Climate Action**.

In conclusion, the Digital Transformation Strategy 'Madrid, Digital Capital' not only seeks to reaffirm its position as a global benchmark in digitalization but also with an intelligent, efficient,

and sustainable vision, aligned with the **Sustainable Development Goals**. It aims to create a technological and sustainable urban environment in the most friendly and effective way for the city, vulnerable groups, and the environment, fulfilling its objective of advancing towards green and sustainable digital transformation without leaving anyone behind.

Useful Links

In this section, you will find links with **information, news, events, and testimonials** about the cross-cutting projects of the Digital Transformation Strategy 'Madrid, Digital Capital.'

- Presentation - Ayuntamiento de Madrid
- Digital Transformation Strategy (youtube.com)
- Madrid Digital Capital Strategy: cross-cutting projects (youtube.com)
- Action Plans - Ayuntamiento de Madrid
- Cybersecurity Centre of the Madrid City Council (youtube.com)
- The Digital Twin of the City of Madrid (youtube.com)
- Digital Twin - Ayuntamiento de Madrid
- Launching of the European project Mobilities for EU (youtube.com)
- Mobilities for EU | Accelerate Climate Neutrality (mobilities-for.eu)
- Mobilities for EU project - Ayuntamiento de Madrid
- Interviews with cities and partners of the European project Mobilities for EU (youtube.com)
- Digital volunteering (youtube.com)
- Madrid GovTech (youtube.com)
- Madrid moves forward with 5G (youtube.com)
- 5G Forum Day – Testimonials (youtube.com)
- International testimonials in support of IoTMADLab (youtube.com)
- City of Madrid IoT Laboratory - Ayuntamiento de Madrid
- Diseño tecnológico (madrid.es)
- Third workshop of Madrid 5G Forum (youtube.com)
- Digital Administration Indicators - Ayuntamiento de Madrid

Similarly, in recent years, the Digital Office has received a wide variety of recognitions. Due to their nature, these links are in Spanish:

2024

- **Socinfo Digital "AI in Public Administrations"** awards in the categories of **"AI for the health sector"** and **"AI for the reinforcement of cybersecurity"**.
- **EIPA (European Institute of Public Administration)** good practice certificate in the category of Digital Transformation, for the project **"Digital sustainability: Contribution of technology to the green and digital transition in the city of Madrid"**.

2023

- **Socinfo Digital "CIBERSEGURIDAD AAPP"** award in the category of **"Cybersecurity in risk management"** to the Madrid City Council Cybersecurity Centre (CCMAD).
- **ASTIC** Award for the **"Best public-private collaboration"**, to the IoT City of Madrid Laboratory (IoTMADLAB).
- **AMETIC's "Digital Skills Awards Spain 2023"** for the best project in the **"Digital skills for all"** category. "Easydro" project, part of the City Council's digital transformation strategy, "Madrid, Digital Capital".
- **ADSLzone Awards, best innovation 2023**, to the Cybersecurity Centre of the Madrid City Council.
- **ABB Ability Award: Digitalisation and Sustainability, Public Administration** category, for the Digital Transformation Strategy, "Madrid, Digital Capital".
- **Seoul Smart City Prize, Tech-InnovaCity Project** category, to the project "Madrid Data Drive, City Intelligence".
- **Internet Day 2023 Award, digital citizenship** category, to the "Digital Volunteers" project.

2022

- **First position** together with Berlin in the **United Nations LOSI 2022 Index**.
- **CNIS 2022** Award for the **best digital transformation project**.
- **Enertic 2022** Award for the **best *multi-cloud* strategy project**.
- **Data Center** in 2022 magazine award for the concept of **Madrid as a Digital Hub**.
- **Internet Day 2022** Award, **healthy ageing** category, for the "Madrid Te Acompaña" App.
- **AUTELSI 2022** Award in the **Inclusion** category, to the App "Madrid Te Acompaña".
- **CIO 100 IDC - Computerworld** award for **technological public administration in the year 2022**.
- **OECD Best Practice** in the framework of the 2022 call of its **Observatory on Innovation in Public Administrations**.