Bilbao

UCLG Community of Practice | Digital Cities

SMART CITIES STUDY 2023

CITIES AS INNOVATION ECOSYSTEMS THAT CONTRIBUTE TO ACHIEVING THE SDGs.

International UCLG Network,
United Cities and Local Governments

I am delighted to present the fifth edition of the “Smart Cities Study”, published by UCLG Digital Cities Community of Practice, led by the city of Bilbao.

This year’s study focuses on cities as innovation-driven ecosystems, spaces of collaboration, creativity and innovation, where pilot projects are generated in response to social and economic challenges of society.

These projects promote R&D&I from a public-private perspective and contribute to the United Nations 2030 Agenda and Sustainable Development Goals.

This implies innovative and dynamic ecosystems in which the interests of citizens, academia and business are rooted, and useful ideas are generated to respond to the needs and challenges of society, in line with the work of local governments in implementing the 2030 Agenda, as they stand for a direct link with the different stakeholders in the ecosystem.

Local governments are the key catalysts and agents of public policies that promote innovation and generate sustainable and lasting growth, allowing for a better quality of life in cities.

This study looks to identify the linkages between innovation projects carried out at the local level and the achievement of Sustainable Development Goals, as this link is often clear but is not reflected in most cases.

Finally, I thank all the cities and municipalities that have prepared this fifth edition of the Smart Cities Study. They have played a key role in the interaction. Various initiatives contributed, which have drastically improved the outcome.

Juan Mari Aburto
(Mayor of Bilbao)

Smart Cities Study 2023

International study on cities as innovation ecosystems that contribute to the achievement of the SDGs

UCLG CGLU | UCLG Community of Practice Digital Cities | Bilbao

The present study is part of the works of the Community of Practice of UCLG Digital Cities, led by the city of Bilbao. Coordinated by the Bilbao City Council, the work of focus, dynamization of participation of cities and preparation of the final study has been carried out by IDOM Consulting, Architecture, Engineering, SAU

IDOM

CONTENTS

1 INTRODUCTION

This chapter introduces the UCLG Digital Cities Community of Practice, the UCLG Compact for the Future of Humanity, and the importance of achieving the SDGs from the local context.

1. INTRODUCTION

The “Smart Cities Study 2023” is part of the activities developed by the UCLG Community of Practice on Digital Cities. This community, chaired by the City of Bilbao, was created to reduce the digital divide and implement local digital agendas to improve citizens’ quality of life and guarantee digital rights protection.

This report also aligns with the goals and principles of the United Cities and Local Governments (UCLG) network, particularly the UCLG Pact for the Future of Humanity. The UCLG network stands for and defends the interests of local governments at the global level, regardless of the size of the communities they stand for. In this sense, the network is committed to promoting local and regional governments in implementing the 2030 Agenda at the local level and the achievement of the Sustainable Development Goals (SDGs).

This is why the Smart Cities Study 2023 focuses on cities as innovation-driven ecosystems, spaces for collaboration, creativity and innovation that drive R&D&I from a public-private perspective and contribute to achieving the United Nations 2030 Agenda.

1.1 The UCLG Community of Practice on Digital Cities

The UCLG Digital Cities Community of Practice is a space where cities worldwide can share knowledge, experiences and best practices on using digital technologies to improve the quality of life of their citizens and the efficiency of their public services.

The Community of Practice was created in 2005 to promote the development of a common vision and dynamics among local governments in favour of an inclusive Information Society, favouring the reduction of the digital divide and the use of new technologies as a lever for sustainable and competitive cities.

Member cities of the Digital Cities Community of Practice have access to a wide range of resources and tools to help improve their digital capacity and develop innovative solutions to specific urban challenges.

In addition, the Community of Practice also organises a series of events, such as workshops, webinars and conferences, where members can share experiences and learn from their peers worldwide. Furthermore, the community fosters collaboration and knowledge sharing through working groups and joint projects.

In short, the UCLG Digital Cities Community of Practice is an important space for cities to learn and share knowledge on how to leverage digital technology to improve the quality of life of their citizens and the efficiency of their public services to leave no one and nowhere behind.

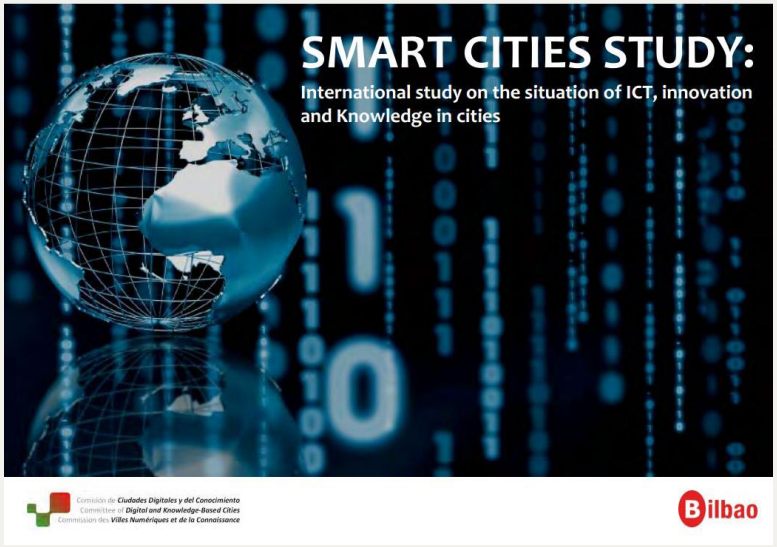
The main task of the Digital Cities Community of Practice is to update the Smart Cities Study regularly. To date, 4 editions of the Smart Cities Study have been published:1

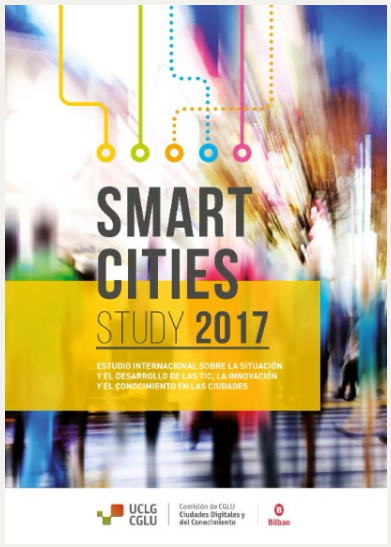
2012: The first edition of the Study offers a holistic vision of Smart Cities, where 6 key main lines of action that affect the development of cities converge: Economy, Citizenship, Governance, Mobility, Environment and Quality of Life.

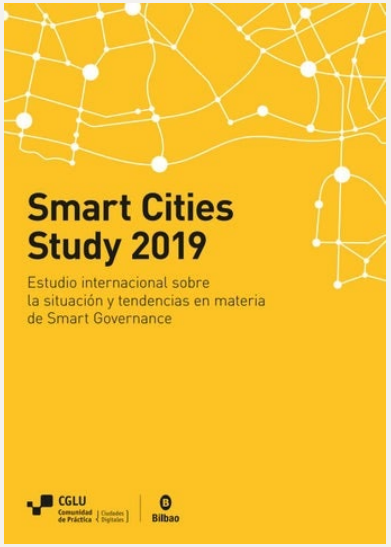
2017: The second edition of the study focused on the "Economy" line of action, which analyses the key factors linked to Smart Cities in areas such as innovation, entrepreneurship, knowledge and talent, and digital society and economy.

2019: This third edition focused on the "Governance" line of action. This edition analysed the keys to smart governance and its main areas of action, open government and advanced strategic management in cities, as factors in the transformation of Smart Cities.

2021: The fourth and most recent edition focused on the resilience of cities, particularly on analysing how the COVID-19 pandemic has induced cities to adopt "Smart" measures to combat the negative effects that the pandemic has generated and contributed to improving their resilience.







Tour of the UCLG Digital Cities Community of Practice

1 UCLG Digital Cities Community of Practice (2023).

1.2 UCLG's Pact for the Future of Humanity

To overcome current levels of inequality, address the environmental crisis, and foster a different way of governing based on care and a more inclusive and networked multilateral system, at the UCLG World Congress, local and regional governments from around the world at the UCLG World Congress in Daejeon in 2022 adopted a Pact for the Future of Humanity - the Daejeon Declaration. Based on three lines of action: people, planet and governance, the Compact for the Future defines the strategic priorities of the Organisation from 2022 to 2028.

The Pact for People's Future puts people and care at the centre, deepening the needs of current generations and extending the rights of future generations by ensuring access to public services and common goods. The Compact for the Future of the Planet promotes systems and ways of living harmoniously with our planet while building resilience and sustainability through policies that renaturalise our production and consumption patterns. The Compact for the Future of Government is based on the call of our communities, who increasingly demand the transformation of government systems.

Technology and smart cities are at the heart of UCLG's Pact for the Future. In an increasingly digitised world, local and regional governments, as the level of government closest to communities, are addressing the challenges and seizing the opportunities that information and communication technologies present daily for the future of fair local public service delivery.

The Pact spells out that we can leave no one and nowhere behind only through digitisation that respects digital rights, fosters human-centred artificial intelligence, and promotes transparency and accountability.

1.3 A look at the SDGs from the local context

Adopting the 2030 Agenda and the Sustainable Development Goals (SDGs) stands for a major milestone, a global challenge, and a moment that reflects the importance of collaboration between local and regional governments and other spheres of governance.

Under the principle of subsidiarity, the Agenda proposes a multi-level governance model based on the joint responsibility of all stakeholders in a bottom-up logic. For this reason, local and regional governments play an important role in implementing the SDGs at the local level and incorporating an SDG focus into their local agendas.

United Cities and Local Governments (UCLG) promotes, encourages, and supports local action to achieve the SDGs. This is achieved by ensuring that local and regional governments play a prominent role in achieving the SDGs, not only as implementers but also as active political stakeholders and decision-makers.

UCLG ensures that local and regional governments are aware of the SDGs and that their SDG-aligned actions are treated as such through capacity building, awareness raising, monitoring and reporting activities. The voices of local and regional governments also reach the UN High-Level Political Forum (HLPF) every year through a Local and Regional Government Forum, which is a key political moment of the collective within the official HLPF programme with the Global Taskforce of Local and Regional Governments (GTF) and UN Agencies.

In this sense, local governments are not only taking ownership of the Agenda. Still, they are also moving towards its implementation at the local level. In most cases, they do so without the necessary resources to tackle the task.

The transformative aspiration and universal applicability of the 2030 Agenda for Sustainable Development challenge UN Member States to stand firm to ensure that the SDGs are implemented with international requirements for the protection of human rights, ending gender inequalities and all forms of discrimination, and ensuring that no one is left behind.

Local governments will play an essential role in achieving all 17 SDGs as a whole. This is why UCLG advocates for the “localisation of the SDGs”. This means considering each community’s local challenges and opportunities when implementing the 2030 Agenda.

UCLG is also working to communicate the 2030 Agenda to its members and help them implement and monitor the SDGs in their communities through local and sub-national voluntary reporting.

Complementarily, UCLG is one of the co-founders of the Local Platform 2030, which supports the implementation of the SDGs on the ground and acts as a focal point between local stakeholders, local, regional and national governments, and the United Nations system.

This platform is a multi-stakeholder space led by the UN Secretary-General’s Executive Office to accelerate the implementation of the SDGs. It is a long-term partner of the Localizing the SDGs Toolkit developed with the United Nations Development Programme (UNDP) and UN-Habitat.

By fostering innovation and smart solutions, cities become ecosystems that promote action to achieve the SDGs. In this context, the need arises to incorporate the SDGs as a backbone of the Smart Cities Study 2023.

2 CHARACTERISTICS OF THE STUDY

This chapter characterises the innovation-driven ecosystems in cities and their role in achieving the SDGs, and introduces the objectives and participants of the Study.

2. CHARACTERISTICS OF THE STUDY

2.1. The current Smart City concept

The concept of a "Smart City" refers to a local environment in which information and communication technologies (ICT) are used to improve its inhabitants' quality of life and optimise the management of its resources.

According to the European Commission, a smart city is "a place that integrates physical, digital and human systems into traditional networks and services to better use energy resources and reduce emissions for the benefit of citizens and businesses".

However, the definition of a smart city goes beyond the use of digital technologies: it also encompasses energy efficiency, the use of integrated renewable energy sources, a commitment to new, smarter and more sustainable means of urban mobility, and improved water supply and better waste disposal facilities to meet the city's economic, social and environmental challenges.

In 2012, the European Commission launched a specific initiative for developing smart cities called "Smart Cities and Communities - European Innovation Partnership". This programme has helped generate innovative ideas and projects in urban areas' energy, transport and ICT.

In this sense, according to the European Parliament, smart cities can be found and classified along six main lines of action: smart economy, smart mobility, smart environment, smart citizenship, smart well-being and smart governance.

Therefore, a city can be defined as "smart" when investments in human and social capital, transport and ICT infrastructure contribute to sustainable economic development and improved quality of life, with sound management of natural resources through participatory governance. A framework has recently been developed to deconstruct the concept along five lines of action: smart and secure living, smart governance and digital citizenship, smart mobility and smart Economy.

The International Organisation for Standardisation "ISO", for its part, dictates that a smart city is a resilient city capable of handling all the challenges of a changing world while keeping essential functions up and running. Resilience is highlighted as a critical element, especially in valuing reactions to unexpected events. Cities must understand their risks, vulnerabilities and strengths to make informed decisions and measure the effects of actions taken.

Ultimately, smart cities and their definition are evolving daily by introducing emerging and frontier technologies, including data science and artificial intelligence. Today, technology can understand and adapt to the behaviours of those who inhabit urban spaces. In this way, it maximises efficiency and aggregates city information in real-time through the daily experiences of citizens to improve the quality of life in cities.

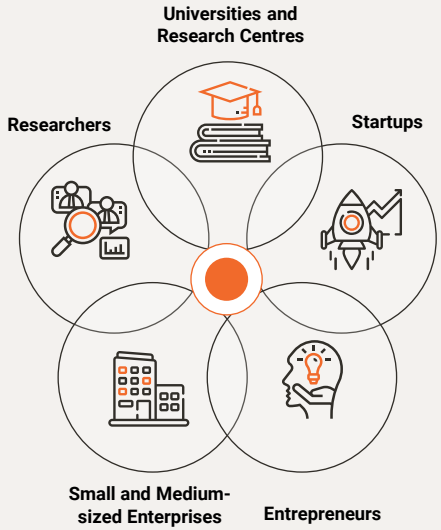
Cognitive cities are, therefore, the next step for smart cities. They are configured as data-driven communities that continuously learn, create memories, and retrieve experiences to improve urban life. However, their innovation ecosystems drive these cognitive cities to generate innovative projects that provide solutions to the challenges faced by modern cities.

In line with the changes facing smart cities today, the New European Innovation Agenda, which came into force on 5 July 2022, aims to position European countries at the forefront of technological innovation and startups. It aims to help develop new technologies to address critical societal challenges and bring them to market. In this way, the idea is for top talent to work hand in hand with the best companies and for technological innovation to flourish, achieving ground-breaking innovative solutions across the continent.

To define the European Innovation Agenda, the European Commission did a survey to gather views on the challenges faced by stakeholders in the European innovation ecosystem, the opportunities foreseen, and visions and ideas for future actions. A wide range of stakeholders from the innovation ecosystem took part in the survey: **1)** Universities and Research Centres, **2)** Researchers, **3)** Small and Medium-sized Enterprises, **4)** Startups and **5)** Entrepreneurs.

Also along these lines, the MIT Sloan Management Review defined innovation ecosystems in 2022 as "places that involve five types of stakeholders (research institutions, entrepreneurs, corporations, investors and governments) united by a strong social fabric of mutual interest, needs, complementary resources and trust."

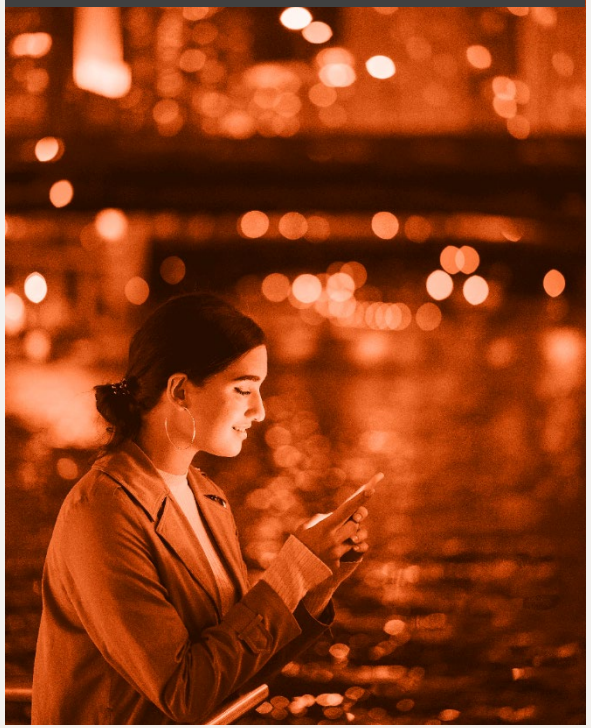
Innovation ecosystem



Innovation and entrepreneurship ecosystems, in addition to prioritising technology-based R&D, investment and growth, also feature strong mobility options (including public transport), robust technology infrastructure and accessible spaces that foster leisure, connectivity and places to live. All this promotes inclusive and fair economic growth and improves productivity and competitiveness through innovation.

Ecosystems approach the activity from a systemic perspective, based on specific sectors and sub-sectors, such as electric vehicles or telemedicine, and focus on functions across multiple sectors, such as Artificial Intelligence or the Internet of Things (IoT). As may be the case for life sciences R&D and agricultural technology, sometimes sectors and functions converge.

A smart city focuses on real-time data, while the cognitive city tries to be proactive and anticipates responding to society's needs, driven through its innovation ecosystems.



2.2. Focus of the Smart Cities Study 2023

2.2.1. Innovation-driven ecosystems in cities

Innovation ecosystems are the engine of smart cities, where initiatives are promoted by stakeholders who believe innovation can transform society and promote human rights, stimulating social and economic development.

Innovation ecosystems are made up of various stakeholders. Each plays a role in the ecosystem and is essential for strengthening the innovative environment. Through their interrelationships, they favour the creation of a knowledge society. According to the quadruple helix model, interaction in ecosystems is based on four key stakeholders:

ACADEMIA

Essential for the training of professionals, exchange of knowledge and technology and stimulation of technological potential in cities.

PUBLIC INSTITUTIONS

The role of public institutions is to create programmes, specific policies and support (financial, communication and visibility) for the ecosystem.

BUSINESS FABRIC

They help create and make viable products and services in economic sectors and boost economic activity locally and internationally.

COMMUNITY

It tests solutions, participates in research and innovative culture actions at different levels, and generates human resources for companies.

The quadruple helix model appeared with the integration of the community, also referred to in this model as society, into a model previously known as the triple helix. This model recognises diversity and integrates citizen participation as a promoter of culture, communication and teamwork in innovative ecosystems.

This change seeks to focus efforts on generating general innovative solutions to problems and challenges faced by the territories and to set up long-term links between the four helices of innovation so that they set up bonds of trust and common collaborative projects.

Likewise, some stakeholders helping and promoting entrepreneurship in the ecosystem stand out within the quadruple helix model. In this way, new ideas, solutions, and innovative prototypes that respond to society's needs appear.

ENTREPRENEURS

They promote the creation of new companies, stimulating the community's economic, technological and social development.

INVESTORS

They are essential to promote access to the capital necessary to develop innovative enterprises and projects.

INCUBATORS

Organisations linked to universities, municipalities and the business fabric to support entrepreneurship in its early stages, offering them training and work tools.

ACCELERATORS

They promote projects with an already defined model by providing funding, advice, market orientation, building bridges to investors, etc.

2.2.2. The role of innovation ecosystems in contributing to the achievement of the SDGs

Local governments are important in implementing the 2030 Agenda, driven by their innovation and entrepreneurship ecosystems. These ecosystems are a direct link with the different players and help the development of innovative initiatives that respond to the economic and social challenges facing cities.

The articulating role of Local Governments is accentuated due to their relationship with the Central Government, the inclusion of civil society participation, and dialogue with the private sector. When a territory has adequate planning, it becomes a benchmark for development and progress through innovation, generating growth and a higher quality of life.

Taking into account the 6 lines of action defined by the European Commission for a Smart City: 1) Economy, 2) Mobility, 3) Environment, 4) Citizenship, 5) Quality of Life, and 6) Governance, the Smart Cities Study 2023 focuses on finding innovative good practices in these lines of action and visualising the link between these and the Sustainable Development Goals.

The Smart Cities Study 2023 focuses on cities as innovation-driven ecosystems, spaces for collaboration, creativity and innovation where pilot projects are generated in response to social and economic challenges. These projects promote R&D&I from a public-private perspective and contribute to achieving the United Nations 2030 Agenda.

2.3. Objectives of the 2023 Study

In the 2023 edition, the study takes a global and transversal approach to a smart city's growth and transformation lines of action. The goals of the study are:

To visualise the current situation and the main trends in smart cities' local lines of action.

Show success stories (good practices) that can serve as a reference for other cities to advance in the "Smart City" concept.

Find the main barriers and key enablers that can affect the development of smart cities.

Link the good practices shown in each of the six lines of action at a local level to their contribution to the sustainable development goals defined in the 2030 Agenda.

2.4. Method for collecting information

For the preparation of Smart Cities 2023, work has been carried out to understand the current situation of cities in terms of their innovation ecosystems and their contribution to the SDGs through two focus groups, on the one hand, and the review and analysis of secondary sources, on the other.

For these focus groups, the top cities in the Smart Cities [2] ranking worldwide and members of the UCLG Digital Cities Community of Practice have been considered.

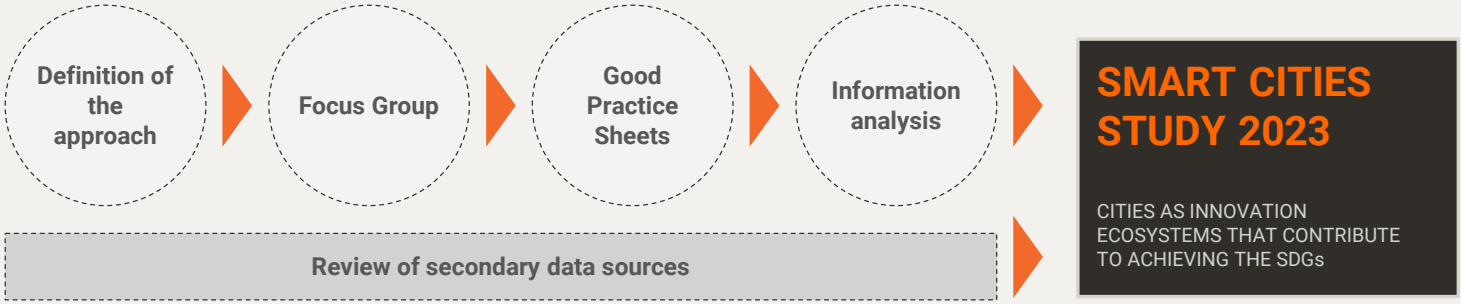
First, the following dissemination channels were used to inform members of preparing this study, encourage them to participate in the focus groups, and fill in good practice sheets.

1. Circulars sent from UCLG and UCLG regional sections
2. Information emails to the members of the Commission
3. Formal communications via social media (X (formerly Twitter), etc.)

Two focus groups were organised on 10 May 2023. In both focus groups, participants were asked to identify projects, initiatives, and/or good practices in the Smart Cities' lines of action and to link these projects to achieving the 17 Sustainable Development Goals.

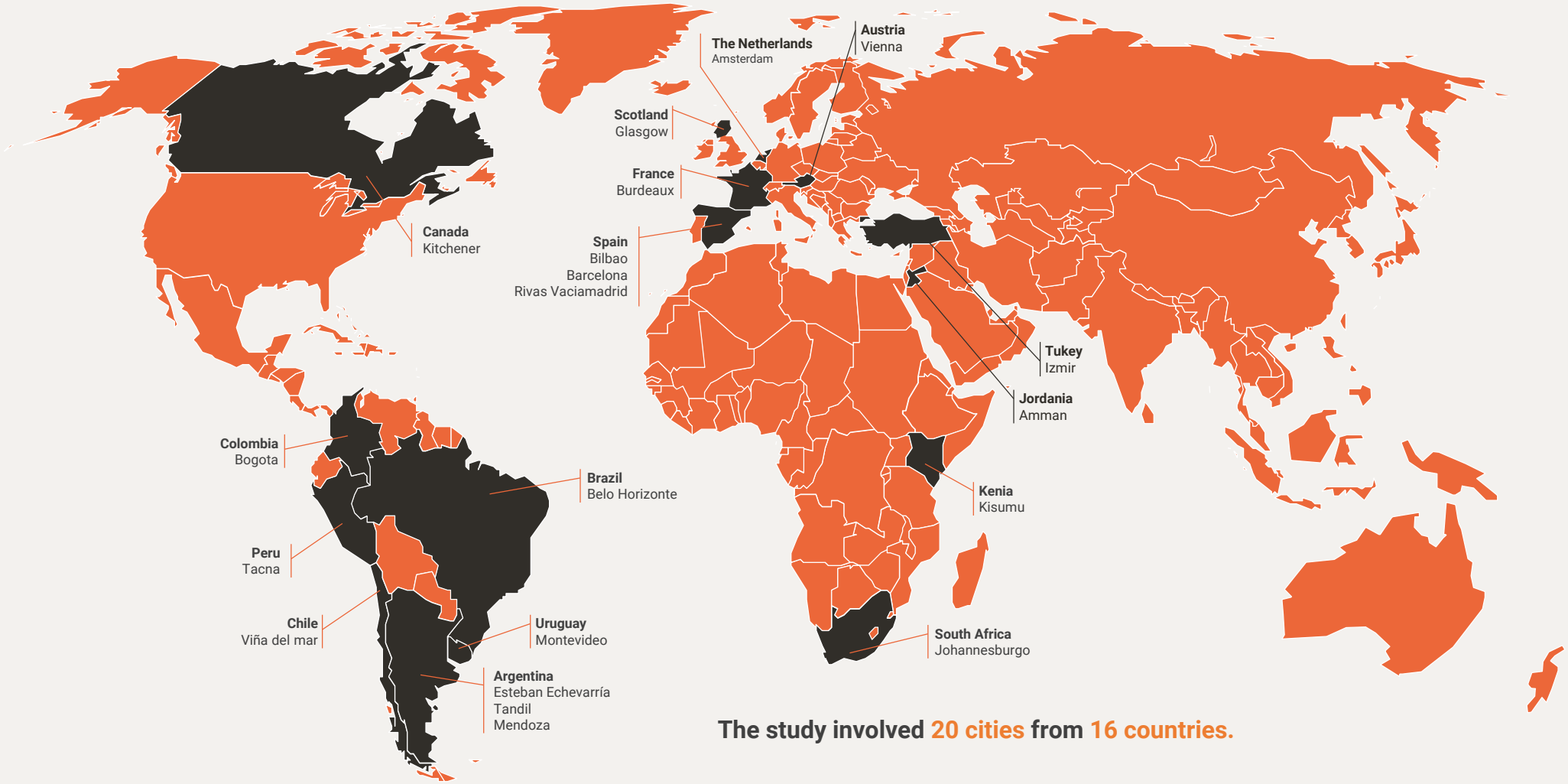
Following these focus groups, participants were contacted so that they could fill in good practice sheets with more information on the innovative projects they were carrying out in the areas defined for this study.

Likewise, the process of compiling primary information has been complemented by the review, analysis, filtering and categorisation of information from secondary data sources, which have made it possible to identify the main global trends in the Smart Cities' lines of action and to provide a current definition of all the contents addressed in this Study.



2 World Competitiveness Center (2023). Smart City Index 2023.

2.5. Participating cities



The study involved 20 cities from 16 countries.

3

CITIES AS INNOVATION ECOSYSTEMS CONTRIBUTING TO THE SDGs

This chapter presents the main international trends and good practices in smart cities, and how cities contribute to achieving the SDGs implementing innovative projects.

3. CITIES AS INNOVATION ECOSYSTEMS CONTRIBUTING TO THE SDGs

3.1. International trends and best practices

Following the international definitions of the smart city concept outlined above, smart cities have great potential for growth in developing along these 6 lines of action.

The main trends named worldwide in each of the Smart Cities' lines of action are presented below, together with examples of good practices of reference cities that can be transferred to other cities with similar needs and characteristics.

3.1.1. Smart Economy

Smart economies aim to boost development and attractiveness for new investments in cities. To this end, clusters and ecosystems are promoted through knowledge, innovation and entrepreneurship. It is, therefore, about promoting more efficient use of resources to boost a more competitive economy and achieve high employment rates to develop social and territorial cohesion.

The smart Economy concept encompasses e-business, which enables productivity gains through ICT-based enabling technologies, innovative services, and new products, services and businesses.

The role of Local Governments is based on generating urban planning that articulates the innovation ecosystem and fosters new entrepreneurial initiatives, increasing competitiveness and high productivity in communities to improve the quality of life. It also aims to boost cities' tourist attractiveness and internationalisation potential, generating economic and social growth. Current trends revolve around:

- **Innovation hubs**: Cities are betting on creating hubs and/or digital and innovative community spaces to reform the articulation of innovation ecosystem stakeholders, strengthen workforce development, entrepreneurship and social change, and generate positive societal growth. Promoting these hubs is key to attracting and retaining talent, capital and startups, stabilising the labour market, improving business survival rates and fostering the creation of new innovative products and services.

SDG Idea Factory

Kitchener - Canada

In April 2023, the Kitchener Entrepreneurship Centre opened, providing a space for entrepreneurs, community leaders and like-minded individuals to innovate, collaborate and work around the 17 United Nations Sustainable Development Goals to boost the City of Kitchener. This centre centralises programming for small businesses and entrepreneurs and offers opportunities for collaboration and partnerships.

Link: https://www.sdgideafactory.ca/en/index.aspx

- **Closing the digital divide**: Another major challenge smart cities are trying to address is to help bridge the digital divide through greater use of technology and management of collected data. New infrastructures are being created in areas with lower accessibility to internet services. On the other hand, new digital training programmes are being designed for vulnerable groups, such as older people, migrants, workers with low education, etc., to improve employability and generate more skilled human capital to meet the city's needs.

- **E-commerce**: In the wake of the COVID-19 pandemic, there has been an increasing trend in the use of online shops and the consumption of products and services over the Internet. According to the European Commission, 75% of people in the European Union who have used the Internet in 2022 will have bought or ordered goods or services. Similarly, the proportion of e-shoppers has grown by 20% over the last 10 years. This has led to a shift in priorities at the city level, generating new online products and services tailored to users' needs and, in many cases, through multi-channel platforms.[3]

- **Tourist destination intelligence**: One of the main focuses of public administrations revolves around promoting tourism in their cities with mobile device apps, augmented reality or real-time information panels, among others. To this end, new "Customer Intelligence" and advanced analytics solutions are available, effectively responding to their needs in this new context of becoming smart and sustainable tourist destinations. These solutions are also called "cloud native" as they offer a 360-degree view through automation, speed and agility in processing and activating experiences in real-time for the user.

  Likewise, another major trend perceived to promote tourism is the connection between experiences and ad-hoc personalised content through IoT technology, which allows a more sophisticated, concrete, relevant and impactful tourism offer to be generated based on the combination of physical and digital space in real-time.

Data platform to improve the city's commerce

Bilbao - Spain

Data analysis tool for improving decision-making in retail trade and the City Council itself. It allows the collection of data from different public and open data or private sources to report key indicators on the sector for decision-making by traders and the City Council's knowledge of the urban retail fabric and consumer behaviour so that it can implement or assess data-driven initiatives.

Link: https://www.bilbaoekintza.eus/noticia/ayuntamiento-de-bilbao-y-kutxabank-crean-plataforma-de-analisis-de-datos

3 Eurostat (2023). E-commerce continues to grow in the EU.

Rivas Vaciamadrid – Spain

Todo en Rivas!

Smart Economy

OBJECTIVES:

The "Todo en Rivas" (Everything in Rivas) project came about from the new economic and social paradigm that emerged after the pandemic, in which the need to promote measures from the Public Administration to contribute to the survival of the commercial and business fabric of the town became evident.

DESCRIPTION OF THE ACTIVITIES CARRIED OUT:

This municipal initiative provides businesses, hotels, and services with a space to make themselves known, offer their services and products for sale online or in person or use the platform as a virtual showcase to advertise themselves. In addition, home delivery and multi-buying are facilitated for shops wishing to sell online.

KEY SUCCESS FACTORS:

The City Council promoted a participatory process to shape, in the City Pact, the economic and social reactivation measures for Rivas. Creating a business platform to facilitate online sales and logistics was the measure that attracted the most support in the business and trade forums.

MAIN OUTCOMES OBTAINED:

Todo en Rivas! is part of the actions proposed by the social and economic agents included in the City Pact, such as the package of measures that include the implementation of an application for local businesses and support for their digitalisation, including the launch of the e-commerce platform "Todo en Rivas!" and complementary digital training actions. In December 2022, the Councillor for Economic Development reported that 50 businesses had registered their products on the platform and that 386 firms were registered.

Link:
https://todoenrivas.rivasciudad.es

The initiative provides businesses, hotels, restaurants and services with a space where they can make themselves known and offer their services and products for sale online or physically or as a showcase for advertising.

3.1.2. New Mobility

Although there are different approaches and definitions of the concept of New Mobility, they coincide in encompassing the forms of mobility that promote the transition towards a more sustainable and intelligent model. The scope of New Mobility is often defined by the acronym "CASE", which stands for Connected (C), Autonomous (A), Shared (S) and Electric (E) mobility. Similarly, it is common to include under the concept of New Mobility other alternatives that do not necessarily fit into any of these four components, such as micro-mobility, which refers to the use of very light vehicles such as bicycles, scooters, or similar, and is also a means of sustainable mobility by definition, mainly when used as an alternative to combustion vehicles.

From the above, it can be deduced that New Mobility has a large technological part. This is particularly evident regarding forms of mobility that involve the development or application of new technologies, particularly in the case of connected mobility, which involves, among other things, the development of new technologies that enable the connection between vehicles "V2V", and establishing connections between vehicles and infrastructures "V2I", and also in the case of autonomous mobility, which requires the incorporation of sensor technologies, Big Data, IoT and the processing of large volumes of data. However, New Mobility, which also focuses on more sustainable means of travel, is not limited to those with a strong technological part, such as traditional means of micro-mobility (bicycles, among others) and conventional public transport.

In short, New Mobility is linked to intelligent mobility models that involve technological advances - often disruptive - but with a strong sustainability part, creating more habitable and environmentally friendly spaces.

In this context, in which the concept of New Mobility is gaining international prominence due to its great impact on the environment and the quality of life of citizens, Smart Cities are increasingly committed to shaping smarter, more sustainable, personalised and interconnected transport networks that respond precisely to people's needs. It is becoming increasingly common for pioneering cities to promote strategies, initiatives, regulations and strategic projects that directly address the transition to new mobility.

Current trends revolve around:

- **Electromobility**: one of the main priorities on the public, private and academic Agenda regarding the advancement of new forms of mobility is the large-scale adoption of electric mobility. This implies the need to achieve a productive, industrial and technological development that will provide the different territories with the necessary capacities to supply the demand for electric vehicles while simultaneously posing the challenge of providing and guaranteeing a network of vehicle charging infrastructures sufficiently dense to ease their large-scale adoption.

  The adoption of electric mobility is strongly driven by the regulation and strategic guidelines defined by different local governments, states and supranational bodies. In March 2023, the EU approved a definitive ban on selling vehicles with combustion engines internationally starting from 2035. It should also be noted that in December 2019, the European Commission, through the *European Green Pact*, recognised the great impact of transport on the environment. It established the goal of reducing emissions from transport by 90% by 2050, contributing to climate neutrality. On the other hand, the *"Sustainable and Intelligent Mobility Strategy:* Harnessing Europe's Transport for the Future", published in December 2020, sets up a strategic guideline to work towards a more planet-friendly mobility paradigm.[4]

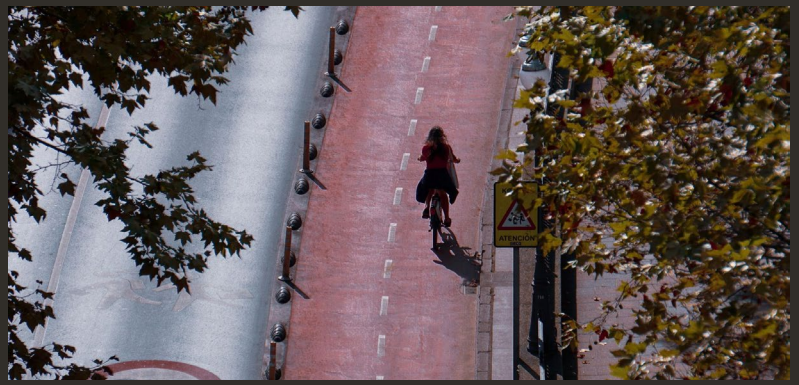
4 European Parliament (2023). EU ban on the sale of new petrol and diesel cars from 2035.

BilbaoAccess

Bilbao - Spain

Developed and implemented an automatic vehicle access control system for areas with special traffic conditions to regulate and control pedestrian preference zones and thus facilitate coexistence with the mobility needs of different groups (residents, shopkeepers, hoteliers, etc.).

The first area to be integrated into the new control system was the Casco Viejo area, and other pedestrian areas of the city will gradually be incorporated.



Link:
https://www.bilbao.eus/cs/Satellite?c=BIO_Noticia_FA&cid=1279221284378&language=es&pageid=3000005580&pagename=Bilbaonet%2FBIO_Noticia_FA%2FBIO_Noticia

- **Shared mobility**: In recent years, new business models associated with shared mobility have become popular, supplying greater flexibility and customisation. The market for these models is expected to grow considerably in the future. Examples of these models are carsharing (which refers to the rental of other users' vehicles for a short period), carpooling (which refers to the shared use of an individual's vehicle for common journeys) or shared micro-mobility fleets, which are being promoted both by companies and by the public administration of different local governments and countries.[5]
- **Intermodal transport**: Supported by new digital technologies and the growing capacity to store, process and use transport-related information, cities and territories worldwide are developing sophisticated information systems, websites and platforms to promote inter-modality and coordination between different modes of transport. This lets users choose personalised mobility alternatives at a click, allowing them to move efficiently without relying on private vehicles.
- **Micro-mobility**: another notable trend in mobility is the pedestrianisation of cities and urban design, with other forms of micro-mobility in mind, mainly bicycles. This is in addition to the policies establishing restrictions on promoting traditional vehicles in different cities worldwide (Low Emission Zones, among others). This trend is also related to the concept of 15-minute cities.[6] This urban planning trend refers to cities where all citizens can access any basic service from their homes in less than 15 minutes on foot or by bicycle. This implies rethinking and redesigning the mobility models of cities and how citizens interact with the means of mobility.
- **Connected mobility and autonomous mobility**: looking at mobility trends from a more technological perspective, more and more cities are incorporating different technologies that enable the adoption of connected and autonomous mobility, incorporating sensors and other infrastructures based on technologies such as IoT in their urban spaces. In this way, cities equip themselves with the necessary capabilities to achieve smart mobility management while providing new tools for collecting and managing large volumes of transport-related data.[7]

5 European Commission (2019). The European Green Deal.
6 Term made popular by the mayor of Paris, Anne Hidalgo.
7 European Commission (2020). Sustainable and Smart Mobility Strategy - putting European transport on track for the future.

Amman – Jordan

Bus Rapid Transit (BRT) Project in Amman

New Mobility

Link:
http://www.ammanbrt.jo/?l=en

OBJECTIVES:

Improve the efficiency and sustainability of public transport by introducing a Bus Rapid Transit (BRT) system to improve transport accessibility and reduce congestion in Amman.

DESCRIPTION OF THE ACTIVITIES CARRIED OUT:

First, a study was conducted to assess the feasibility of the BRT system in Amman. The optimal routes and the necessary infrastructure for the BRT system were then determined. Subsequently, dedicated bus lanes, stations and other necessary infrastructure were built. In addition, a fleet of buses was procured, taking into account their capacity and environmental sustainability. Finally, pilot implementation of the BRT system was carried out on selected routes. Monitoring and continuous improvement mechanisms were established to ensure its efficiency.

KEY SUCCESS FACTORS:

Implementing the BRT system in Amman is based on key factors that include improving the efficiency and speed of public transport, promoting sustainable transport, increasing accessibility, stimulating economic development, improving the quality of life and increasing public transport safety.

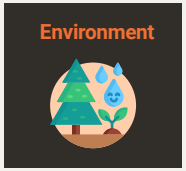
MAIN OUTCOMES OBTAINED:

First, a system was implemented that benefited daily commuters. In addition, traffic congestion was reduced by creating dedicated bus lanes and route optimisation. BRT stations improved accessibility and allowed more people to use public transport services conveniently. In addition, electric or low-emission buses were prioritised for sustainability, which significantly reduced carbon emissions and improved air quality. The BRT system also succeeded in encouraging a modal shift towards public transport, providing an affordable option for residents and reducing reliance on cars..

The project was made possible thanks to the collaboration and participation of different stakeholders, including local communities, transport authorities and government agencies

Implementing the BRT system in Amman is based on key factors that include improving the efficiency and speed of public transport.

3.1.3. Environment



The Environment line of action addresses smart energy, including renewables, ICT-based energy networks, pollution measurement, control and monitoring, renovation of buildings and services, green buildings, green urban planning, and resource efficiency through circular economy resource reuse and substitution models.

It also addresses activities linked to urban services, such as street lighting, waste management, drainage systems, and water resources. These are checked to assess and control the system, reduce pollution, and improve water and air quality.

In this sense, the goals pursued in the Environment line of action focus on areas that can be made intelligent with ICTs:

- **Energy:** energy consumption and efficiency.
- **Water:** control, management and optimisation of water.
- **Waste:** control and sensorisation of containers and monitoring vehicles dedicated to waste collection.
- **Environment:** monitoring air pollution, noise, the natural and perceptual environment, and the construction of sustainable eco-buildings.

Current trends revolve around:

- **Circular economy**: on the one hand, smart cities work to promote circular economy and zero waste models through the refurbishment of consumer goods, recycling of materials and packaging, regeneration and repair of components, extending the life cycle of products to reduce waste, generation of clean energy from agricultural and industrial waste; and the reduction of emissions.

  Examples include virtual power plants (VPPs) that support the development of clean energy and the advancement in the development of smart farms around plant growth and miniature vertical forests that increase urban biodiversity. These renewable energy practices transform organic waste into biogas more efficiently using bacteria.

Montevideo más Verde

Montevideo - Uruguay

Montevideo Más Verde (Greener Montevideo) is a strategy committed to cultural change through the responsible use of resources, the intelligent organisation of services, the social inclusion of the inhabitants, the generation of opportunities and the care for diversity. It is a comprehensive environmental plan to transform and enhance the city where it seeks to build a new environmental reality through a set of innovative actions. This plan proposes solutions by promoting collective experiences of inclusion and citizen participation to make Montevideo a clean, efficient, sustainable and egalitarian city.

Link: https://montevideo.gub.uy/montevideo-mas-verde

- **Smart energy storage**: energy management through improved energy storage and distribution, offering interconnected IoT solutions. On the one hand, smart grids supply real-time monitoring. On the other hand, predictive learning solutions forecast energy consumption and predict potential system failures. One example is how advanced waste management systems use IoT sensors to monitor waste disposal accurately, notify residents of their consumption, and incentivise them with monetary rewards.

- **Smart waste management:** Another practical example in this recycling area is e-waste recycling kiosks, which allow people to exchange disposable electronic products for cash. On the other hand, technology is also showing great advances in waste collection and management. Smart bins sort unsorted waste and regulate the amount of waste. Recycling robots using Artificial Intelligence (AI) accurately identify the type of materials during waste separation, increasing productivity by avoiding human involvement.

- **Efficient water resource management**: highlight smart tools and devices in wireless metering that provide citizens with hourly statistics on water consumption to raise awareness and help reduce consumption. For example, intelligent control systems employ cloud computing, **sensors** and user-oriented approaches, helping reduce water waste in buildings. In addition, real-time water quality monitoring detects potential leaks and prevents problems at an early stage.

  Other digitised items for water restoration, such as saltwater desalination and rainwater harvesting materials, are also gaining importance. As a last case, structural floating technology is presented, which dynamically systematises water level changes, generating more diverse aquatic life within river banks.

- **Managing green space through satellites and smart devices**: Finally, on the city environment, mention how satellites and “machine learning” can help urban planners create a picture of green space in their cities.

  New technologies, **such** as drones and RFID (radio frequency identification) tags, can also make it easier and cheaper to maintain and protect the life of plants, even if they are found in high-rise buildings.

Advanced water supply network management

Bilbao - Spain

Piloting an IoT platform as a key structural element for asset monitoring (irrigation elements, public toilet, water tank, storm tank, underground container). The platform provides possibilities for monitoring, remote operation, alert generation and actions derived from the alerts. It is a transversal tool that, in the medium term, will expand the services' strategic, tactical and operational possibilities.

Link:
https://www.bilbao.eus/cs/Satellite?c=BIO_Noticia_FA&cid=1279175847225&language=es&pageid=3000075248&pagename=Bilbaonet%2FBIO_Noticia_FA%2FBIO_Noticia

- **Managing green space through satellites and smart devices**: Finally, on the city environment, mention how satellites and “machine learning” can help urban **planners** create a picture of green space in their cities.

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Tandil – Argentina

Comunidades Solares I

Environment

Link:
https://renovables.usicom.com.ar/comunidades-solares/

OBJECTIVES:

This project aims to promote the transition to renewable energies by the community of Tandil. Comunidades Solares (Solar Communities) offers private users the possibility of acquiring solar modules. With its investment, the kW/h of monthly energy generated is subsequently credited to each user's bill. If there is a surplus, the surplus is fed into the city's general electricity grid.

DESCRIPTION OF THE ACTIVITIES CARRIED OUT:

With the participation of investments from private users, the initiative is innovative in that it is one of the first of its kind in the country, as it enables access by citizens who are committed to the energy transition but cannot install solar panels in their homes for various reasons. The modules of this solar park were purchased by users interested in renewable energies at a value of USD 1,000 each at the official exchange rate. With this contribution, investors will have, from 1 June 2021 to 10 years from now, 190 kW/h per month credited to their energy bill at a monthly price set by the Wholesale Electricity Market Management Company (CAMMESA).

KEY SUCCESS FACTORS:

The vision and work of the Usina Popular y Municipal de Tandil S.E.M. is a mixed (public-private) entity in charge of the distribution of electricity to the whole Tandil district. Having achieved a high percentage in its distribution, the Usina began several years ago to work on the energy and ecological transition through renewable energies, even building solar parks for other localities in the Province of Buenos Aires.

MAIN OUTCOMES OBTAINED:

Comunidades Solares is an associative project promoted by the Municipality of Tandil together with Usina Popular y Municipal and the Universidad Nacional del Centro de la Provincia de Buenos Aires (UNICEN), and the participation of citizens as users and private investors. This multi-stakeholder public-private partnership initiative involved the construction of a new resilient and affordable infrastructure, contributes to increasing the percentage of renewable energy in the city, encourages the efficient use of resources and promotes mechanisms to adapt to the effects of climate change while being environmentally responsible by using renewable energy.

Comunidades Solares offers private users the possibility of acquiring solar modules.

3.1.4. Digital Citizenship

Con Digital Citizenship refers to citizens' digital skills, working in ICT-enabled environments, access to education and training, human resources and capacity management within an inclusive society that enhances creativity and fosters innovation.

As a feature, it looks to empower individuals and communities to contribute information to use, manipulate and personalise data, for example, through analytical tools and dashboards that enable decision-making and the development of innovative solutions, products and services.

Specifically, the digital citizenship line of action addresses the following areas:

- **Digital skills**: to **equip** citizens with digital skills to access new technologies and improve their quality of life, fostering social integration, accessibility, and the flow of ideas and knowledge among citizens.
- **"Senspeople": making** citizens smart sensors involved in data input in smart cities, contributing to information feedback and improving the quality of services.
- **Telework-Teleducation**: digital training focuses on best training smart city citizens, supplying tools such as flexible schedules and facilitating greater interaction between **citizens** online.

Current trends revolve around:

- **Digital participation of citizens**. Technological advances have generated greater trust between citizens and institutions and encouraged citizen participation. Today's applications allow citizens to report on local issues and increase community networking that helps resource sharing. Social media and other service creation tools for both **public** administration and citizens, such as digital polls, online voting, and e-participation, give more credibility and transparency to the administration and contribute to the creation of a stronger system that functions more smoothly and delivers more to citizens as part of a better and smarter way of life. In this way, new solutions for citizen participation and services, such as omnichannel communications, appear to carry out administrative and healthcare activities, improving waiting times and the quality of the service offered.

Digital Inequalities Observatory

Bordeaux - France

The constant renewal of the digital environment threatens the ability to maintain contact with public administration, economic opportunities, health services and their social environment. There is a lack of tools for understanding digital inequalities and improving the impact of local policies. Creating a local observatory aims to meet this need through collaboration with other cities. The success of this project lies not only in the methodological soundness of its implementation but is an opportunity, from the beginning and throughout its life cycle, to bring together a whole ecosystem of stakeholders interested in a better understanding of digital inequalities.

Link: https://aginum.bordeaux-metropole.fr/

- **Irruption of Artificial Intelligence (AI) in the everyday life of citizens**. AI is revolutionising all sectors, especially education. In education, it presents benefits and threats for both students and teachers. One of the main tools revolutionising the sector is AI-powered virtual assistants to help teachers and students with time management and task execution. Similarly, AI helps personalised remote learning customised to the individual's pace and style.

  According to UNESCO,[8] AI has the potential to address several of the barriers posed by the current context, such as tackling inequalities in education globally. However, AI's emergence challenges society, as this disruptive technology must be deployed equitably.

- **Development of Cybersecurity**. On the other hand, another major trend today is the development of cybersecurity and protection against attacks and cybercrime. There is an increasing need for critical infrastructure, including school and hospital systems. To this end, efforts are being made to strengthen cyber defences regarding data protection and routine systems backup, reinforce basic cyber security awareness and education, and review virtual incident response plans.

- **Moving towards Society 5.0.** Technological advances have led to a transformation known as the fourth industrial revolution, driving digitalisation in today's society. In this context, initiatives focused on Society 5.0 have been developed, which aim to set up a smart society that effectively integrates physical and digital spaces through innovations in science and technology. This trend implies a change in human society, from the economy to social structures. The introduction of digitalisation in society will bring significant changes. For example, Augmented Reality will change the perception of reality, allowing digital information to be superimposed on the physical world. In addition, blockchain technology will enable financial transactions without banking intermediaries, transforming how payments are made and finances are managed.[9]

Cybersecurity for citizens

Bilbao - Spain

This Cybersecurity for Citizens project is based on creating a real-time information platform to identify and block digital threats and inform each person individually and in real-time of latent threats detected on their device. The project also includes a Cybersecurity Awareness and Training Plan for Citizens, aimed at providing them with tools for their protection in the digital world.

Link:
https://www.euskadi.eus/contenidos/noticia/sale_albistea_230701/es_def/11.-TekguneaBilbao.pdf

8 UNESCO (2021). Artificial Intelligence in Education.
9 EU-Japan Centre for Industrial Cooperation (2022). About IT & Society 5.0.

Vienna – Austria

BRISE - Building Regulations Information for Submission

Digital Citizenship

OBJECTIVES:

Achieve a fully digital submission process for building permits, combining “Building Information Modelling” (BIM), Augmented Reality (AR) and Artificial Intelligence (AI).

DESCRIPTION OF THE ACTIVITIES CARRIED OUT:

The BRISE - Vienna project is based on a worldwide technical innovation. The BRISE - Vienna approach combines the high-tech planning tool “Building Information Modelling” with Artificial Intelligence and Augmented Reality to create a comprehensive end-to-end automated digital approval process.

KEY SUCCESS FACTORS:

BRISE - Vienna was created in close cooperation between the Vienna administration and the partners of the TU Vienna, the Chamber of Civil Engineers Vienna, Lower Austria and Burgenland, and ODE and WH Media. In addition, it involved 13 pilot partners as practitioners in the project, contributing their expertise and testing the practical feasibility of BRISE.

MAIN OUTCOMES OBTAINED:

In this context, the BRISE - Vienna solution establishes an innovative basis that will bring about a paradigm shift in building projects: from planning to submission and review procedures to acceptance of the finished building. BRISE - Vienna thus sets a new international benchmark in digitising urban administration processes.

The BRISE - Vienna project has achieved results such as fast feedback, visualisation of building status, secure data access, automatic deviation analysis, efficient virtual negotiations and simplified and sustainable processes.

The BRISE-Vienna approach combines the high-tech planning tool Building Information Modelling (BIM) with Artificial Intelligence and Augmented Reality to create a comprehensive digital and automated approval process.

Link:
https://smartcity.wien.gv.at/en/brise/

3.1.5. Quality of Life

The Quality of Life line of action promotes new ICT-based lifestyles, behaviours and consumption patterns.

It is also about living a healthy and safe lifestyle in a model of culturally active cities with diverse cultural assets. It also incorporates affordable and good-quality housing and accommodation. In addition, to achieve higher standards of quality of life, the aim is to work towards social cohesion and to achieve a united society and harmonious coexistence through new spaces.

This line of action focuses on the following areas:

- **Social Innovation**: to improve and develop new services for society by incorporating ICTs through innovation to improve citizens' quality of life, design new tools for accessibility for everyone, and provide them with autonomy.
- **Digital health**: applying new technologies in the health field, with telecare methods, online medical and social services, and remote patient monitoring.
- **Culture**: to transmit and promote the city's cultural identity through digital platforms, which allow the sharing of historical and cultural heritage and make it available to citizens at any time and place.
- **Security**: integrating emergency services, using video surveillance cameras and real-time big data analytics to enhance law enforcement response to emergencies.

Current trends revolve around:

- **Digital health**: With the COVID-19 pandemic, healthcare trends have increased. Smart technologies support diagnosis, treatment, prevention, and self-care, enabling predictive behaviours and alleviating traditional healthcare systems.

  New models for data analysis also allow the creation of a personalised healthcare system for patients based on their individual needs and remote monitoring of chronic conditions. Likewise, AI-powered healthcare offers prevention and early predictive measures based on data-driven information, particularly supporting older people. However, its impact on people's health is still limited.[10]

- **Predictive policing**: On the other hand, a new trend in smart cities is predictive policing and surveillance using, once again, AI. Cities are harnessing Artificial Intelligence to improve and ensure the safety of their citizens while protecting their privacy and human rights.

- **People-centred design**: Another functionality achieved through current technologies is modernising the user experience, offering new solutions for citizen participation, improving services for omnichannel communications, and managing personal data for administrative and health activities. In this way, it has been possible to improve the management of day-to-day procedures and optimise the experience of citizens who access platforms to carry out their online operations.

Kilometre 0 Programme

Tandil - Argentina

The Kilometre 0 Programme aims to strengthen local production and consumption and link the products with Tandil's values and identity. In this sense, local consumption and production are promoted and made available to citizens. This means caring for the environment and increasing the population's quality of life through access to quality products. The main outcomes are the defence of traditions, the revaluation of craft productions, local development, community self-sustainability, tourism and healthy habits.

Link: https://www.tandil.gob.ar/novedades/146492

10 World Health Organization (2022). Use of artificial intelligence on the rise, but its impact on health still limited, new study finds.

- **Digital twins**: these are virtual models of physical objects. Digital twins act as a bridge between physical and digital assets. They give a real-time view of all operating variables. All data and systems involved in implementing new ideas can be analysed using a digital twin before they are brought to market.

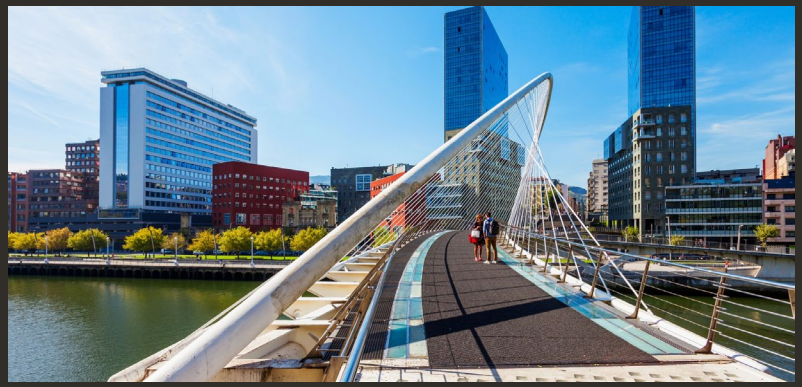
  The application cases for digital twins cover various fields, such as air quality monitoring, asset tracking and logistics monitoring, structural health monitoring, water metering, street lighting, smart parking, waste management, water storage tank monitoring and swimming pool monitoring.

- **New urban spaces**: as cities and populations continue to transform, it is necessary to rethink the use of urban space itself. In this respect, the percentage of green spaces in European cities has increased by 38% over the last 25 years, and 44% of the European urban population now lives within 300 metres of a public park. Public green spaces provide different benefits for residents, such as improved air quality, microclimate regulation, social integration and public health.[11]

Bilbao WiFi

Bilbao - Spain

Bilbao continues to expand the free and open municipal WiFi network throughout the city, favouring the possibilities of increasing productivity and generating business. Currently, practically 100% of the city's residents have municipal WiFi coverage within 300 metres of their homes. With approximately one hundred thousand people daily using it (one in three citizens), it provides a very representative sample of the city. On the other hand, the deployment of fixed broadband throughout its territory places Bilbao in an excellent position to take on the challenge of deploying the 5G network and services.



Link: https://bilbaogazte.bilbao.eus/es/espacio/wi-fi-guneak/

11 European Commission (2019). Space and the city.

Kitchener – Canada

Growing together

Quality of Life

OBJECTIVES:

A significant percentage of the growth in Kitchener is occurring around the areas of the ION LRT system. Building and growing around public transport is a fundamental principle of Ontario's planning framework. Growing Together will update the planning framework for these areas, known as Major Transit Station Areas, enabling and encouraging responsible growth for the future.

DESCRIPTION OF THE ACTIVITIES CARRIED OUT:

Growing Together is a pioneering project in integrating the physical and digital worlds, leveraging the same 3D model and methodology to communicate complex content to the public and build shared understanding. It also generates many growth scenarios and quantitative metrics directly related to community participation.

KEY SUCCESS FACTORS:

Focus on community participation. The City of Kitchener has worked closely with local organisations and residents to identify the most pressing needs and opportunities of each neighbourhood. This has involved various activities, including community consultations, surveys and workshops, and soliciting feedback through a 3D printed city model.

MAIN OUTCOMES OBTAINED:

Engagement of nearly 600 residents with the 3D printed model from January 2023, translation of workshop results into multiple growth scenarios within the smart model and generation of quantitative data for comparison, and community involvement in the creation of growth scenarios for comparison and evaluation using data, meaning that residents will be directly connected to the outcomes of policies and strategies. Finally, the project has won two awards: Smart50 and Municipal Systems Excellence 2023.

Growing Together will update the planning framework for Major Transit Station Areas, enabling and encouraging responsible growth for the future.

Link: https://www.kitchener.ca/en/strategic-plans-and-projects/growing-together.aspx

3.1.6. Smart Governance

A smart government is one whose governance model is characterised by the intensive and intelligent use of ICT, by the maximisation of the positive results associated with Open Government, and where, in addition, other elements such as interoperability or open innovation are incorporated across the board.[12] This involves public, private and civil partnerships and stakeholder collaboration to achieve smart city-level goals.

A city with Smart Governance is primarily based on transparency and open data through ICT and e-government in participatory decision-making. To this end, work is carried out in the following areas:

- **Transparency**: facilitating access to information and processes carried out by the administration to citizens, providing transparency in all operations and projects underway and completed.
- **Digital government**: improving democratic processes and increasing opportunities for all citizens to interact with governments. Adopt new uses of ICTs and develop a common platform integrating the services of active e-government.
- **Digital administration**: providing online access to basic information, carrying out procedures, paying taxes, one-stop shops and electronic signatures.
- **Open Data**: providing free and easy access to data for greater transparency and decision-making to achieve a positive economic and social impact for cities.

Current trends revolve around:

- **E-governance**: encouraging smart city stakeholders to make public services and decisions more open, sustainable, collaborative and transparent. To achieve this, blockchain and IoT-based solutions are used to include all stakeholders in the decision-making process.

Belo Horizonte S.M.A.R.T!

Belo Horizonte - Brazil

Belo Horizonte S.M.A.R.T! aims to integrate more efficiently the policies and projects of the different departments of the City of Belo Horizonte. To achieve this, the municipality uses the interconnected approaches of smart cities to increase its operational efficiency and sustainable development to fulfil its main commitment to improve the well-being of its citizens. Belo Horizonte S.M.A.R.T! impacts, through technological integration and the responsiveness of public administration, helping to provide more efficient public services.

Link: https://prefeitura.pbh.gov.br/cidade-inteligente

12 ECLAC (2023). What is Smart Government?

- **Online services**: On the other hand, new digital services, such as online voting, digital passports, data management, and security tools, encourage citizen participation and lead to the expansion of e-democracy. Complementing this are new online programmes, e-career centres and services provided through digitising business functions, such as licensing and tax payments, contributing to economic growth and a more dynamic business environment.

- **GovTech:** arises from the need for public administrations to adopt digital transformation models as new technologies are rising. Most private companies have already opted to partially or digitise their processes, especially after the health crisis experienced in the COVID-19 pandemic. In this sense, there is also interest in facilitating communication between the public sector and citizens, consolidating governance models that respond in real-time to citizens' demands, and anticipating the social and economic challenges that arise in modern cities in an agile and efficient manner.

  In recent years, GovTech ecosystems have arisen from the synergies generated between startups or science and technology-based SMEs and public administrations around the world, which has allowed governments to advance their digital transformation processes and adapt to the needs of the current business and entrepreneurial fabric and the needs of citizens.

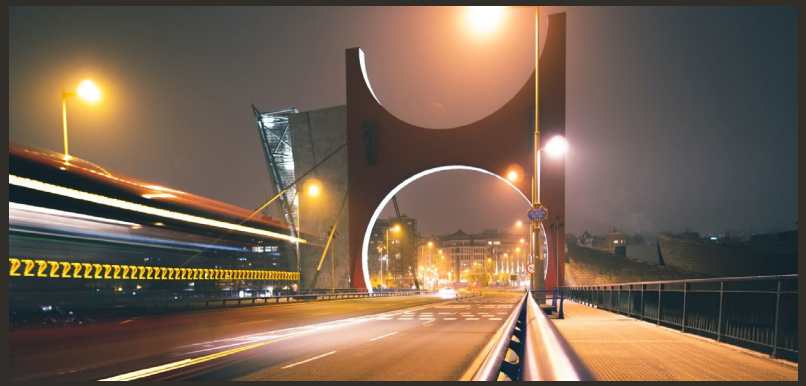
- **Adm ICT-based administration**: Finally, several key enabling technologies are driving the work of smart administrations, including the following as the most decisive in resolving conflicts and situations of interaction with citizens: facial recognition and identity verification, automation, interconnection of systems and digitised process management, Artificial Intelligence and machine learning, Big Data and blockchain, RegTech, authentication and citizen access, electronic signature and certified communication, OCR and validation of identity documentation, fraud prevention and anti-money laundering tools. These are the new tools of smart governments to become digital, transparent and open governments in their relationship and interactions with citizens.

Data Governance

Bilbao - Spain

Transformation of Bilbao City Council and the Municipal Public Companies into Data-Driven Organisations. To that end, a "Bilbao data manifesto" has been drawn up, in which municipal data use principles are set out. A municipal data governance model has also been defined, and the necessary architecture has been designed for the medium term.

With this in mind, a benchmarking of tools has been carried out to help the work of municipal technicians in the preparation and availability of the data.



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https://www.bilbao.eus/cs/Satellite?c=BIO_Noticia_FA&cid=1279214035837&language=es&pageid=3000075248&pagename=Bilbaonet%2FBIO_Noticia_FA%2FBIO_Noticia

Montevideo – Uruguay

Data Strategy

GOBERNANZA INTELIGENTE

OBJECTIVES:

Montevideo's Data Strategy aims to generate a greater impact on management within the organisation and the citizenry by improving decisions from a data culture based on management transparency and the continuous search for innovative solutions.

DESCRIPTION OF THE ACTIVITIES CARRIED OUT:

Data is the raw material for evidence-based decision-making. The key is to collect data from as many sources as possible and have mechanisms for storing it, which can be shared across agencies and with the public. This includes having a City Data Inventory and creating the Montevideo Observatory and the Open Data and Services Portal.

KEY SUCCESS FACTORS:

There is permanent support from the authorities, starting with the mayor herself, and the conviction on the part of civil servants in adopting this policy.

MAIN OUTCOMES OBTAINED:

A What Work Cities certification process on data-driven city management by Bloomberg Philanthropies has been worked on throughout 2022 and until March 2023. As a result of this process, the need has been perceived to create a Data Committee with people from the different departments of the Quartermaster's Office. In addition, the first thematic observatories (in the environmental and health fields) have been implemented in the framework of the Montevideo Observatory, which includes different indicators and visualisations.

Likewise, the Open Data Portal has been relaunched. The Open Services Portal (Montevideo API) was created, where the use and publication of different APIs for building applications by third parties using services developed by the City Council is promoted.

Montevideo's Data Strategy aims to generate a greater impact on management within the organisation and the citizens themselves.

Link:
https://montevideo.gub.uy/noticias/tecnologia/estrategia-de-datos-de-la-intendencia-de-montevideo

3.2. Smart cities' contribution to achieving the SDGs

Sustainable Development Goal 11 aims to make cities more inclusive, safe, resilient and sustainable.[13]

46% of cities consider their projects contribute to SDG 11.

One of the major problems facing cities today is that rapid urbanisation is leading to increasing numbers of slum dwellers, inadequate and overburdened infrastructure and services (such as waste collection and water and sanitation systems, roads and transport), and worsening air pollution. As a result, urban sprawl is out of control.

In this situation, local governments must develop strategic urban plans to prevent uncontrolled growth in cities and work with slum dwellers to improve their conditions and provide them with access to basic services. In this regard, joint projects can be developed to enhance inclusive and sustainable urbanisation and capacity for participatory, integrated and sustainable planning and management of human settlements.

On the other hand, access to affordable housing is another problem in many cities. To this end, through innovation projects, governments, together with the other agents of the ecosystem, can promote the construction of sustainable and resilient buildings using local materials to facilitate access to housing, also thinking of the groups with the greatest difficulties. They can also promote new forms of mobility and encourage public transport use in urban areas to improve safety and reduce city carbon emissions.

To achieve greater environmental sustainability, local governments are committed to sustainable solid waste management, emphasising reuse and recycling, which is also vital to reducing the environmental impact of cities. In this regard, measures are being developed to mitigate the effects of climate change and protect against and anticipate the impact of natural disasters based on real-time data.

45% of cities consider their projects contribute to SDG 9.

Sustainable Development Goal 9 focuses on building resilient infrastructure, promoting sustainable industrialisation and fostering innovation.

Regarding this goal, innovation and technological progress are key to finding lasting solutions to cities' global economic and environmental challenges, such as increasing energy and resource efficiency.

In sync with regional and national governments and in collaboration with local innovation stakeholders, local governments are key in developing and maintaining the enabling infrastructure that supplies urban areas and links them to their surrounding territories. To this end, scientific research and new innovative projects contribute to improving technological capacity, facilitating access to ICTs and providing support to those sectors of industry that require it. This goal is linked to promoting inclusive and sustainable industrialisation and significantly increasing industry contribution to employment and gross domestic product.

29% of cities consider their projects contribute to SDG 8.

Sustainable Development Goal 8 promotes inclusive and sustainable economic growth, employment and decent work for all.

Local governments generate growth and employment from the bottom up through economic development strategies that capitalise on their territories' unique opportunities and resources. To this end, through innovation ecosystems, they seek to generate new projects focused on achieving higher levels of economic productivity through diversification, technological upgrading and innovation, focusing on high-value-added and labour-intensive sectors.

Another major challenge that local governments are trying to address is to work in partnership with the informal sector to improve their working conditions and social rights and to formalise enterprises. Local Governments can serve as an example in providing safe working environments and equal pay for equal working conditions. Alongside this, governments are responsible for developing and

13 United Nations. Sustainable Development Goals.

implementing policies to promote sustainable tourism that creates jobs and promotes local culture and products.

19% of cities consider their projects contribute to SDG 17.

Sustainable Development Goal 17 strives to revitalise the Global Partnership for Sustainable Development.

The United Nations indicates that for a development agenda to be successfully implemented, "inclusive partnerships (at global, regional, national and local levels) need to be built on principles and values, and on a shared vision and goals that focus first on people and planet".

As regards this goal, therefore, the aim is to develop coherent policies at a local level to address key challenges such as poverty reduction and sustainable development, regulating local taxation and controlling revenue generation. Local governments are articulating to promote cooperation between public bodies, the private sector and civil society in the communities.

New smart governance models allow for more reliable and efficient analysis of local data as an essential tool to monitor actions, identify resources to ensure that deviations are avoided, and take the necessary corrective measures to ensure the correct implementation of processes in which the stakeholders of the quadruple helix of ecosystems are actively involved.

15% of cities consider their projects contribute to SDG 3.

Sustainable Development Goal 3 seeks to ensure healthy lives and promote well-being for all ages.

Local governments pay particular attention to issues related to improving child mortality rates and working to improve the quality of life in cities. One way to address this problem is through improvement programmes in disadvantaged neighbourhoods that will enhance access to basic services for the poorest people. At the same time, through integration, cohesion and social aid programmes, the aim is to improve citizens' quality of life.

On the other hand, Local Governments, through urban planning linked, among others, to the use of public transport, can contribute to the reduction of environmental, noise and light pollution, promoting healthier lifestyles and as a way to prevent deaths due to traffic accidents. Similarly, new technologies contribute to reducing water and soil pollution through efficient natural resource management and controlled and predictive environmental protection.

13% of the cities consider their projects contribute to SDG 4 and SDG 10.

- Sustainable Development Goal 4 focuses on ensuring inclusive, equitable and quality education and promoting lifelong learning opportunities for all.
- Sustainable Development Goal 10 seeks to reduce inequality within and between countries.

Concerning these goals, Local Governments have the tools to integrate technical and vocational training programmes into local economic development strategies, ensuring that education is valued and factored into labour market opportunities. Currently, it is in its hands to lead the digital transformation processes, considering the development of projects together with the agents of the quadruple helix of innovation, to impart digital tools to education and generate ICT skills in the new generations, and to transform the existing ones.

The role of Local Governments is also based on implementing practices to achieve equality and non-discrimination and to protect social rights both in their institutions and operations and in the rest of the organisations through criteria in their policies for the supply of goods and the provision of services. They are also responsible for providing public services in a non-discriminatory manner.

Local governments can contribute by applying progressive forms of local taxation in their fiscal policy and by dedicating budget lines in municipalities to generate greater opportunities for and increase the incomes of the poorest households in their communities.

10% of the cities consider their projects contribute to SDG 13 and SDG 16.

- Sustainable Development Goal 7 ensures access to affordable, secure, sustainable and modern energy.

- Sustainable Development Goal 13 deals with urgently combating climate change and its impacts.
- Sustainable Development Goal 16 aims to promote just, peaceful and inclusive societies.

On the one hand, to ensure access to affordable, secure, sustainable and modern energy, local governments can contribute to energy efficiency directly by investing in energy-efficient buildings and sustainable energy sources to supply public institutions' infrastructure and by introducing sustainability criteria in their activities. In the same way, initiatives can be implemented with incentives to reduce public spending on energy and improve energy consumption ratios, promoting energy efficiency both in the private sector and in the daily consumption of citizens.

On the other hand, Local Governments, especially in the most vulnerable cities, are working to integrate climate change adaptation and mitigation into urban and regional planning to reduce cities' emissions and increase their resilience. In this way, the consequences of climate change that directly impact citizens' security and quality of life (e.g. rising temperatures or water scarcity) can be addressed, as the necessary measures can only be taken at the local level according to the particular circumstances.

Local governments are also experimenting with new forms of participatory decision-making, such as participatory budgeting or planning. To achieve these goals, Local Governments must be effective and accountable to citizens. This requires combating corruption and increasing public access to information.

8% of the cities consider their projects contribute to SDG 5 and SDG 15.

- Sustainable Development Goal 5 seeks to achieve gender equality and empower all women and girls.
- Sustainable Development Goal 15 aims to sustainably manage forests, combat desertification, stall and reverse land degradation, and stall biodiversity loss.

Local governments act to identify and address violence and situations of inequality against women. Urban planning around public spaces and local policing are two key tools to respond to these problems. It is also responsible for working on the provision of services to women affected by violence, supporting them in their recovery process.

On the other hand, the leading role of local governments in protecting habitats, terrestrial ecosystems and natural resources should be emphasised. Its work seeks to articulate the private sector with local communities for the integrated management of natural resources, considering that administrations are the providers of services (especially water, sanitation and solid waste management) and their influence in incentivising behavioural change in communities.

Local governments ensure that biodiversity conservation is an important part of urban planning and development strategies, positioning this challenge in their urban and territorial agendas and generating tools to promote public-private initiatives around these specific needs.

Less than 5% of cities consider their projects contribute to SDG 1, SDG 2, SDG 6, SDG 12 and SDG 14.

- Sustainable Development Goal 1 aims to end poverty in all its forms worldwide.
- Sustainable Development Goal 2 is about ending hunger.
- Sustainable Development Goal 6 focuses on ensuring the availability and sustainable management of water and sanitation for all.
- Sustainable Development Goal 12 focuses on ensuring sustainable consumption and production patterns.
- Sustainable Development Goal 14 is based on conserving and sustainably using the oceans, seas and marine resources.

Local governments are responsible for providing basic services, such as water and sanitation, making them a key stakeholders in achieving SDG 1. It also has an essential role in identifying the resources and services needed to help disadvantaged groups escape poverty. Within innovation ecosystems, they are the promoters of action to orient public innovation policy around social and demographic problems.

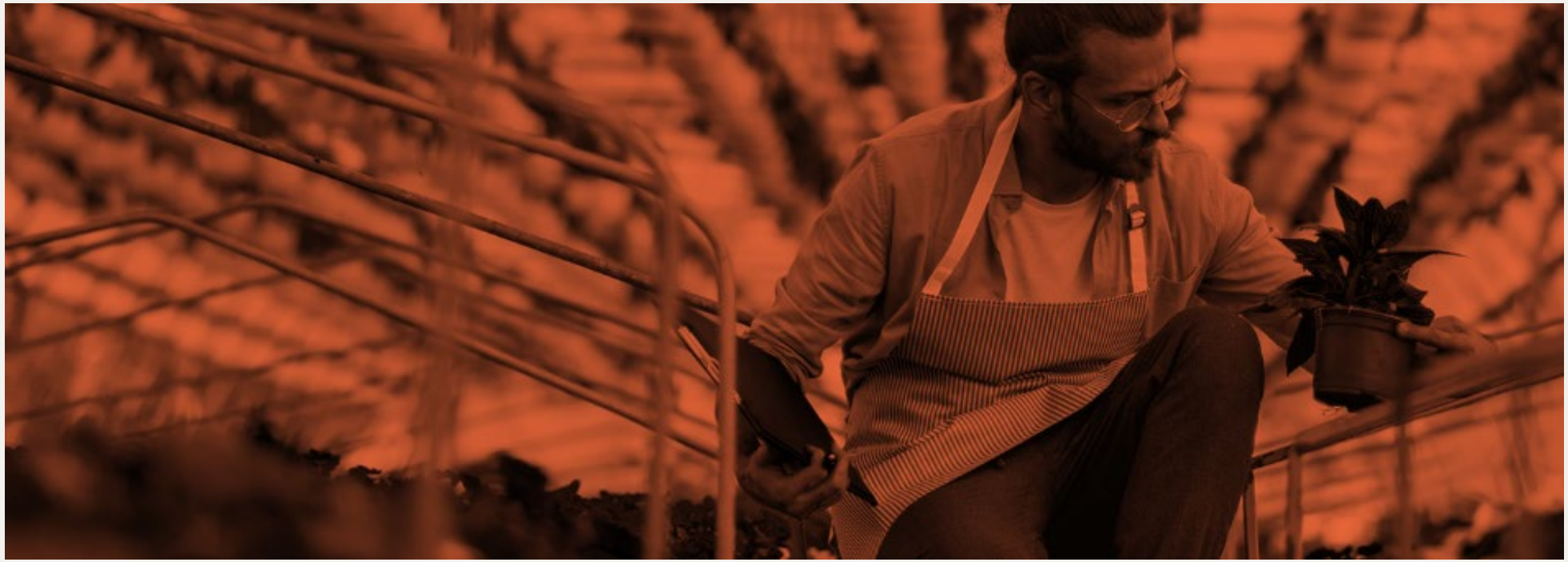
Local governments are also key to fostering sustainable and inclusive food systems that enable people to afford nutritious food and eat healthily. Again, urban planning can be instrumental in achieving effective waste reduction. It can support greater food security by providing efficient

transport and storage, clean water access, and sanitation. Another way to contribute to the achievement of SDG 2 is to promote urban agriculture on both public and private land.

Another major challenge in cities is to significantly increase the efficient use of water resources in all sectors and to ensure the sustainability of freshwater abstraction and supply to address water scarcity and considerably reduce the number of people suffering from water scarcity. In this sense, local governments develop environmental protection measures and implement sustainable waste management, in line with SDG 6, supported by the private sector, academia and civil society.

Furthermore, linked to SDG 12, work is being done on short supply chains to reduce transport and carbon emissions through land management, infrastructure, urban planning, education and training, and public markets. Local governments encourage the promotion of sustainable consumption and the production of energy and water through various pricing mechanisms. This results in greater collaboration to develop.

Finally, regarding SDG 14, the work being done at the local level to prevent sewage, industrial and other wastewater discharges directly into the surrounding seas is important. To this end, coastal cities are working to develop and enforce planning and building regulations to prevent building in unsuitable coastal areas and developing innovative initiatives and programmes from the public and private sectors.



Below is a linkage matrix showing the relationship between the smart cities' lines of action addressed in the Study with the Sustainable Development Goals to which they contribute through the innovative projects (good practices) being carried out by cities at the local level.

Linking Smart City lines of action to the SDGs

SDG outstanding

The SDGs highlighted refer to those Sustainable Development Goals most frequently linked to each of the lines of action, measured by the number of total projects that participants have indicated are linked to each one.

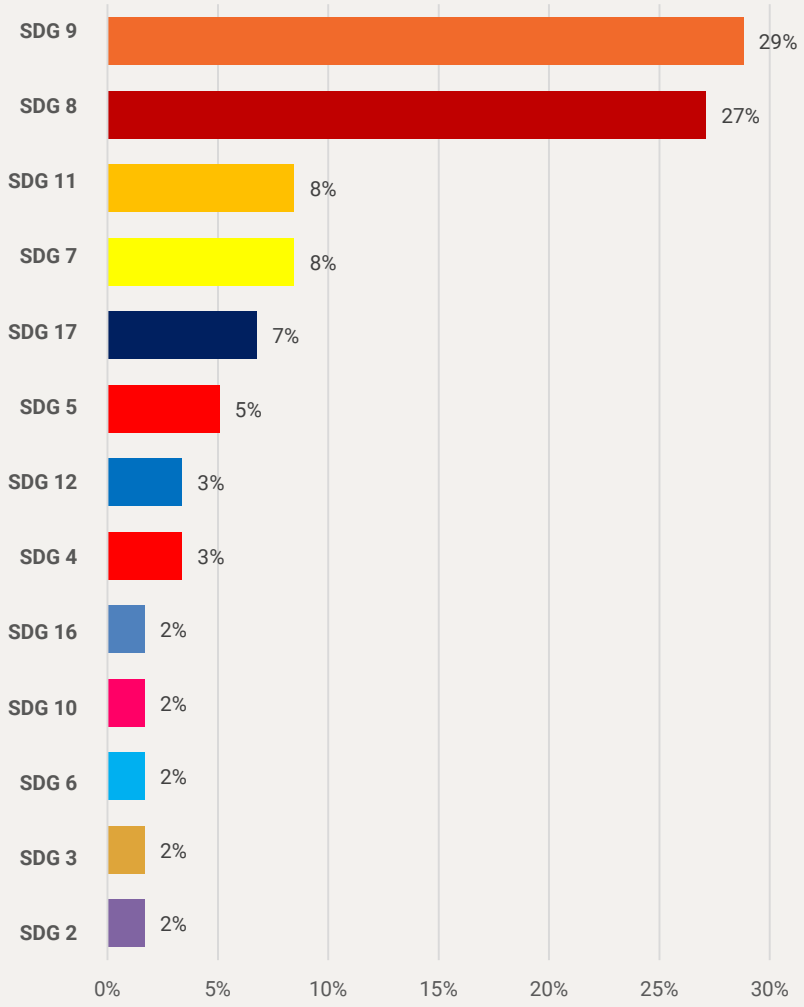
The breakdown for each line of action will be shown below, showing the number of linkages each line of action has received regarding the SDGs.

Smart Economy

SDG 9. Industry, Innovation and Infrastructures are the most prominent in the Smart Economy line of action, considering the number of projects promoted by the cities that contribute to achieving this (29% of the total). Considering that this SDG aims to boost inclusive and sustainable industrialisation, along with innovation and infrastructure, smart economies are closely linked to this goal. Indeed, innovation ecosystems play a key role in introducing and promoting new technologies, facilitating international trade and improving the use of resources to achieve smarter models.

Likewise, the Smart Economy line of action also links to a large extent with SDG 8. Decent Work and Economic Growth: To achieve inclusive and sustained economic growth, we can drive progress, create decent jobs for all, and improve living standards. Indeed, among the targets of this SDG is to promote development-oriented policies that support productive activities, the creation of decent jobs, entrepreneurship, creativity and innovation, and foster the formalisation and growth of micro, small and medium-sized enterprises, including through access to financial services, which embodies the link to the essence of Smart Cities.

SDGs highlighted in the **Smart Economy** line of action



Izmir – Turkey

Izmir Entrepreneurship Ecosystem Initiative

Smart Economy

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Link: https://izka.org.tr/innovation-and-entrepreneurship/?lang=en

OBJECTIVES:

The Izmir Entrepreneurial Ecosystem initiative aims to foster a culture of entrepreneurship and innovation in the city, in line with local high-potential sectors. Through various multi-sectoral entrepreneurship programmes and facilities, the Municipality of Izmir is committed to supporting entrepreneurs, especially social entrepreneurs and creative industries. The initiative covers a number of key projects such as: Izmir Entrepreneurship Centre, IzQ, Fikrimiz, Fab Lab Izmir, Izmir Film Office and Izmir Game Development Centre.

DESCRIPTION OF THE ACTIVITIES CARRIED OUT:

Initiatives include an Entrepreneurship Centre offering incubation programmes and coworking spaces for start-ups, support for internationalisation and partnerships with experts and investors. IzQ Academy provides training and conferences, while IzQ Agency offers consultancy services in corporate communication. Fab Lab Izmir is an advanced technology fabrication lab that provides prototyping training and technical advice for entrepreneurs. Izmir Film Office offers comprehensive support for audiovisual production and collaboration with local talent in the film industry. Finally, the Game Development Centre (OYGEM) is a game development centre offering training programmes and networking events.

KEY SUCCESS FACTORS:

The different initiatives that make up the project have been successful due to the comprehensive support provided to the entrepreneurs through mentoring services, training, resources and facilities for developing their projects. In addition, the networking, collaboration between key players and the thematic focus of each initiative contribute to strengthening Izmir's entrepreneurial ecosystem.

MAIN OUTCOMES OBTAINED:

The Izmir Entrepreneurial Ecosystem project has managed to achieve several milestones, such as developing a startup community, promoting cross-sector collaboration, facilitating innovation and R&D, supporting social impact enterprises, providing access to finance and investment, generating employment and economic growth, boosting creative industries, and fostering knowledge sharing and learning.

The initiative aims to foster a culture of entrepreneurship and innovation across the city, in line with local high-potential sectors.

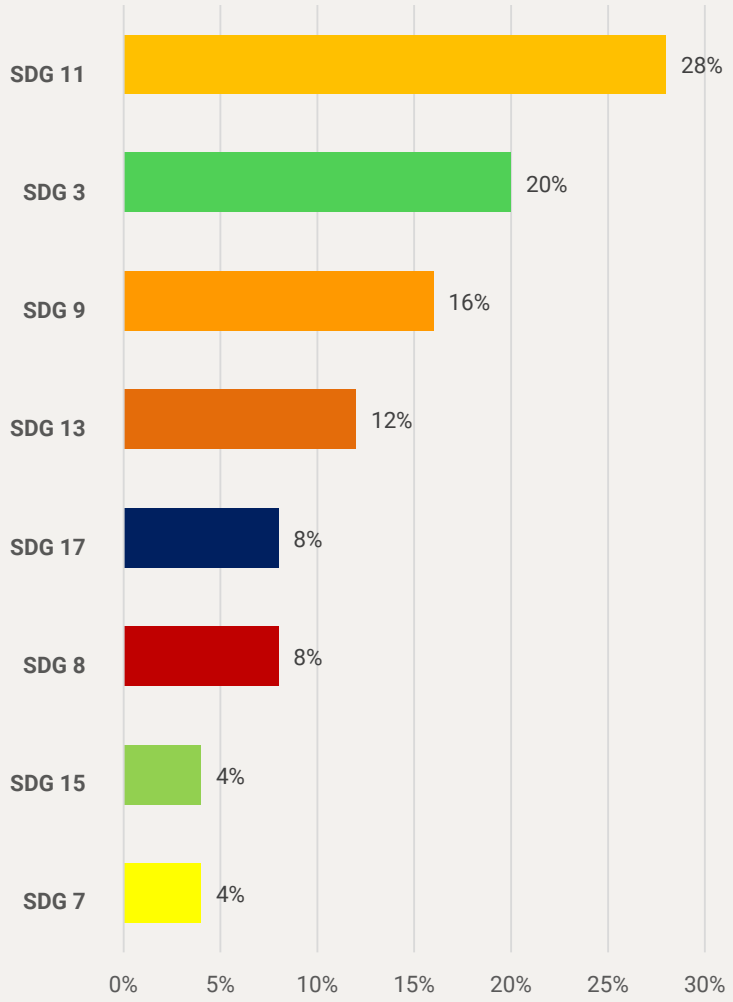
New Mobility

SDG 11. The SDG highlighted in the New Mobility line of action is SDG 11. Sustainable Cities and Communities aims to make cities more inclusive, safe, resilient, and sustainable. Among the targets under this Goal are to provide access to safe, affordable, accessible and sustainable transport systems for all and to improve road safety, in particular through the expansion of public transport, paying special attention to the needs of persons in vulnerable situations, women, children, persons with disabilities and older people.

In this sense, new mobility is a new way of understanding means of mobility and forms to make smart cities more environmentally friendly, reduce transport pollution, and promote new forms of active mobility that favour healthier lifestyles.

Similarly, New Mobility is closely linked to the achievement of SDG 3. Health and wellness is focused on ensuring healthy living and promoting wellness for everyone of all ages. In particular, this goal aims to substantially reduce the number of deaths and illnesses caused by hazardous chemicals and air, water and soil pollution, which is one of the major challenges addressed through new mobility.

SDGs highlighted in the **New Mobility** line of action



Montevideo – Uruguay

Montevideo Avanza

New Mobility

11 SUSTAINABLE CITIES AND COMMUNITIES

Link:
https://montevideo.gub.uy/montevideo-avanza

OBJECTIVES:

The Montevideo Avanza (Montevideo progresses) project involves mobility, environmental and urban design works that promote job creation through investment and construction of new infrastructure in the city. Two sub-projects stand out as part of the programme: Montevideo se Ilumina and Montevideo en Tiempo Real.

DESCRIPTION OF THE ACTIVITIES CARRIED OUT:

Montevideo se Ilumina (Montevideo lights up) is the municipality's large-scale lighting programme. The city renews and expands its lighting with efficient technology, in balance with the environment, with more habitable, enjoyable and safe spaces.
Montevideo en Tiempo Real (Montevideo in real-time) has several elements. On the one hand, the availability of a "live map", with the possibility to visualise in real-time different devices: buses with GPS, IoT sensors, etc. On the other hand, the aim is to reduce traffic congestion situations at points identified as critical and with a high impact on mobility through different road infrastructure interventions, thanks to the data collected with varying types of devices.

KEY SUCCESS FACTORS:

From the beginning of the implementation of the project, meetings were held with the neighbours of the different areas to inform them about both subprojects, listen to them and involve them in the actions. The entire process of replacing lights and congestion information can be viewed in real time via the Montevideo Observatory (https://montevidata.montevideo.gub.uy/observatorio-montevideo-se-ilumina) and https://congestionvial.montevideo.gub.uy/).

MAIN OUTCOMES OBTAINED:

Montevideo se Ilumina includes replacing 70,000 street lights with LED technology in the different neighbourhoods (80% of the lights by June 2023), 14,000 in the main avenues and the recovery of squares and parks. It also includes management software for these luminaires. Better lighting improves safety, accessibility and coexistence.

In the framework of Montevideo en Tiempo Real, a web application has been published that allows the visualisation of information related to the state of traffic in Montevideo for the last 15 days to reduce, through different road infrastructure interventions, traffic congestion situations in points identified as critical and with a high impact on mobility thanks to the data collected with various devices.

Two sub-projects stand out as part of the programme: Montevideo se Ilumina and Montevideo en Tiempo Real.

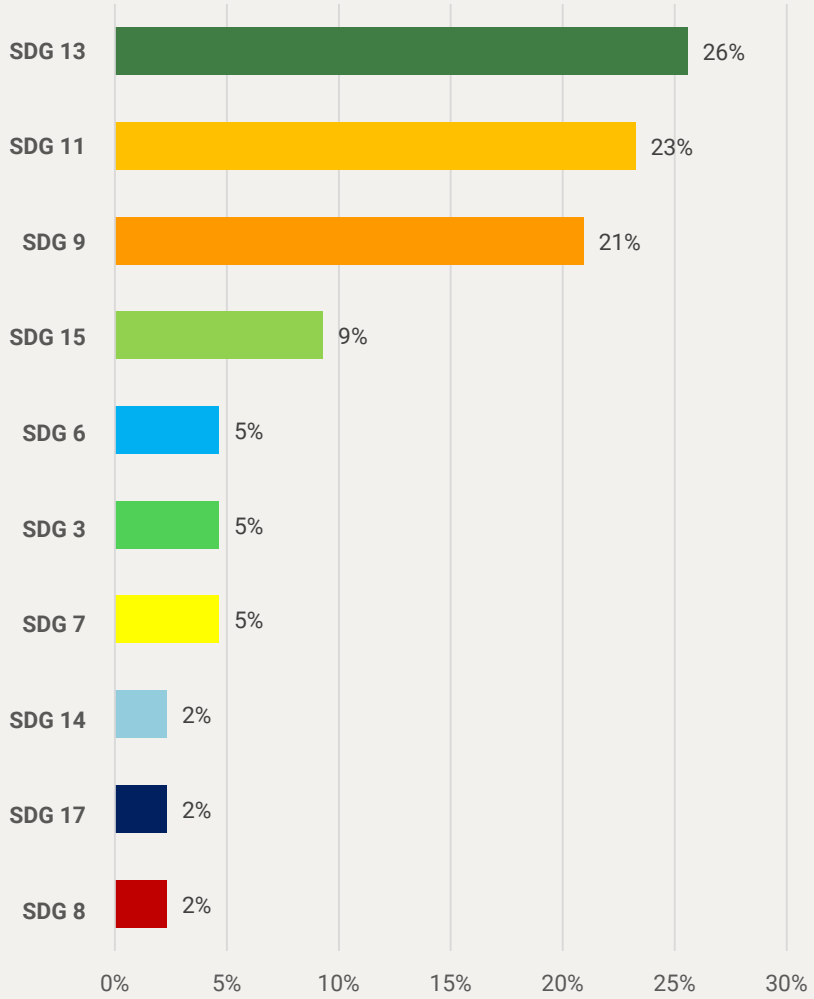
Environment

ESDG 13 has stood out above the rest in the Environment line of action. Climate Action (26%) aimed at urgently combating climate change and its effects. Targets under this goal focus on strengthening resilience and adaptive capacity to climate-related risks and natural disasters in all countries and improving education, awareness and human and institutional capacity for climate change mitigation, adaptation, mitigation and early warning, among others.

In this sense, SDG 13 is closely linked to the Environment line of action of smart cities, as this line of action is mainly aimed at controlling and reducing pollution and promoting the use of clean energies and energy efficiency. Among the measures to be taken to advance the achievement of these goals in smart cities is the creation of a collective awareness among citizens and teaching methods, which are closely linked to the achievement of SDG 13.

Secondly, SDG 11 was again highlighted. Sustainable Cities and Communities, in this case, has targets focused on reducing the negative per capita environmental impact of cities, including special attention to air quality and municipal and other waste management; this is closely linked to the Smart Cities Environment line of action.

SDGs highlighted in the **Environment** line of action



Rivas Vaciamadrid – Spain

50:50 Project

Environment

13 CLIMATE ACTION

Link: https://www.rivasciudad.es/noticias/servicios-a-la-ciudadania/2018/11/22/ahorro-de-energia-y-de-agua-en-colegios/862600047363/

OBJECTIVES:

The 50:50 project is based on generating an economic incentive for energy saving through a change of habits in publicly funded educational centres used by people who normally do not have access to a budget. The incentive consists of 50% of the annual economic savings achieved by changing habits awarded to the group or groups that have carried out the process.

DESCRIPTION OF THE ACTIVITIES CARRIED OUT:

Among the actions carried out, the training workshops on energy saving and efficiency for groups in the educational community, such as the Parents' Association, the cleaning team, the lunch team, the pupils and the teaching staff, are particularly noteworthy. Similarly, the different municipal technicians and local educational centres have been provided training in the methodology of the 50:50 projects. In addition, advisory sessions have been given to prepare the different projects designed under the 50:50 approach, operational monitoring of the actions carried out in the schools, and monitoring with the municipal technicians. Similarly, advice has been provided on the administrative procedures and formalities for the start-up and management of the projects.

KEY SUCCESS FACTORS:

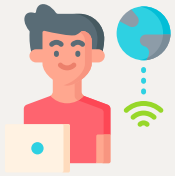
The involvement of pupils in the project's goal.

MAIN OUTCOMES OBTAINED:

Substantial and sustained savings in gas, water and electricity consumption within the participating centres. During the 2022-2023 school year alone, public schools in Rivas saved more than 69,000 euros, the equivalent of 223.66 tonnes of CO_2. Most of the combined savings are attributed to gas consumption, where the eleven schools participating in the initiative managed to save 55,525 euros, representing 79.25% of the total savings.

The incentive consists of 50% of the annual economic savings achieved by changing habits awarded to the group or groups that have carried out the process.

Digital Citizenship



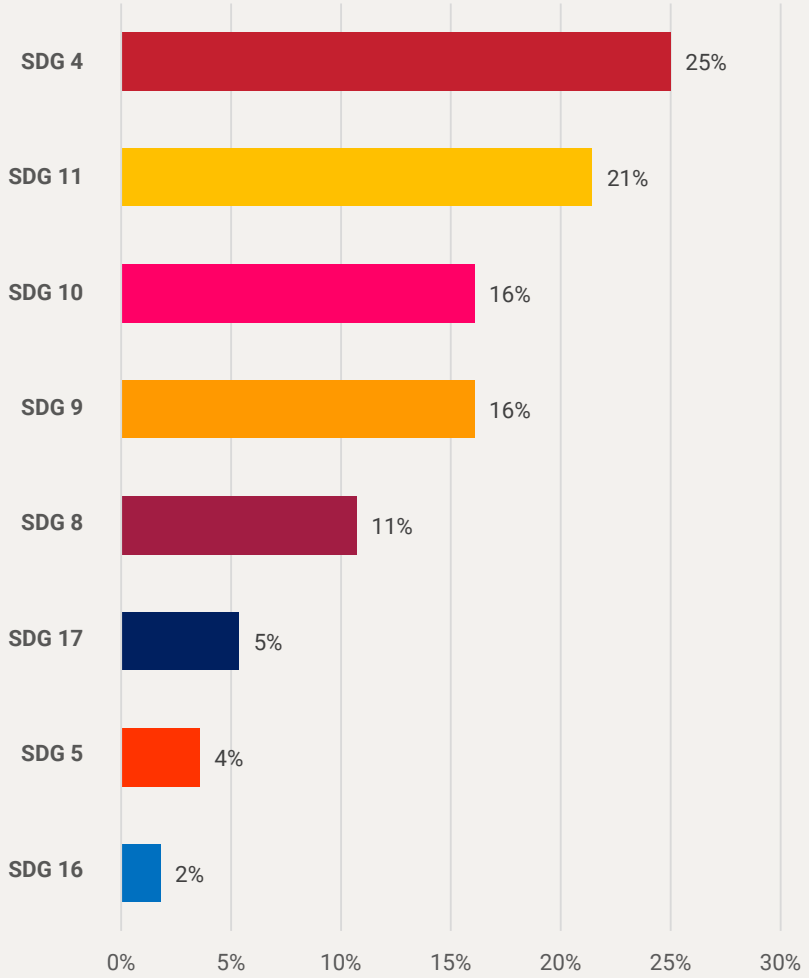
SDG 4. In the case of the Digital Citizenship line of action, the Sustainable Development Goal highlighted by the Survey participants was SDG 4. Quality education (25%), which seeks to ensure inclusive, equitable and quality education and promote lifelong learning opportunities for all.

Among the targets of this goal is to significantly increase the number of young people and adults who have the necessary skills, particularly technical and vocational skills, to access employment, decent work and entrepreneurship. This is linked to the Digital Citizenship line of action, which is to develop digital competences among citizens and the skills and competences needed to generate new smart products and services in today's cities.

Again, for the Smart Citizenship line of action, SDG 11 is highlighted. Sustainable Cities and Communities are the second most pursued. This follows the line of action, considering that a considerable part of the population lives in slums and does not have access to basic services linked to education, nor does it know about the use and benefits of ICTs.

In this sense, it is necessary to develop inclusive cities with possibilities for all, pursued through this Sustainable Development Goal.

SDGs highlighted in the **Digital Citizenship** line of action



Kitchener – Canada

Kitchener Tech Connect Project

Digital Citizenship

Link:
https://www.kitchener.ca/en/recreation-and-sports/kitchener-tech-connects.aspx

OBJECTIVES:

Provide technology training and resources to older adults in the city to improve their social connections, access to information and online safety.

DESCRIPTION OF THE ACTIVITIES CARRIED OUT:

Among the actions developed within the programme's framework are free training in technology both in virtual and face-to-face mode (in the different local community centres). In addition, a technology lending programme (iPads and Chromebooks) is included, and they are helped to make connections with community resources that lead to solutions to their everyday problems.

KEY SUCCESS FACTORS:

Key enablers of the project's success include grant funding from the Government of Canada's New Horizons for Seniors programme, as Kitchener Tech Connects began during the pandemic to support seniors in maintaining connections with their families and friends.

MAIN OUTCOMES OBTAINED:

The programme provides information and training to ensure that older adults can access vital services online, such as bill payments, grocery shopping or booking medical appointments. On the other hand, partnerships with community groups have served to assist in implementing the programme and provide technical support.
The programme has attracted considerable interest, with more than 1,410 older adults participating in 193 classes.

The programme has attracted considerable interest, with more than 1,410 older adults participating.

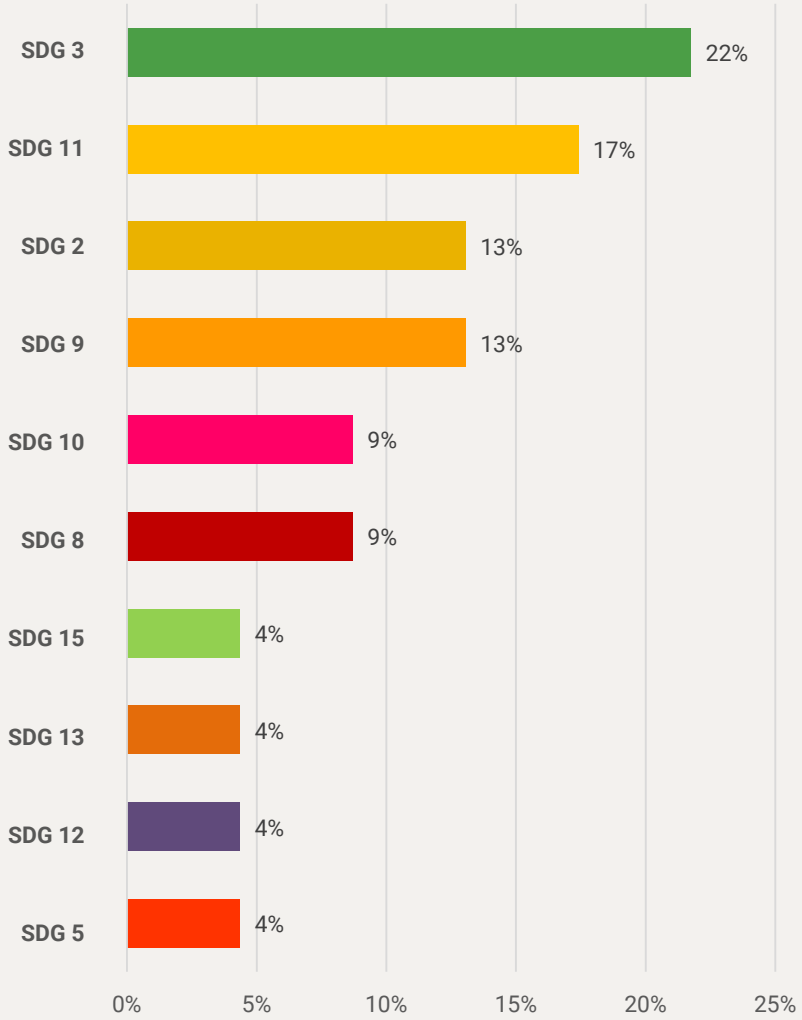
Quality of Life

SDG 3. In the Quality-of-Life line of action, SDG 3 has stood out above the rest. Health and Well-being (22%) aims to ensure healthy living and promote well-being for all ages. Therefore, The aim is to achieve universal health coverage, including financial risk protection, access to quality essential health services and safe, effective, affordable and quality medicines and vaccines for all.

This goal is linked to the quality-of-life line of action, specifically through digital health, seeking new means of healthcare that are affordable and that respond to the new challenges of cities and the needs of all people in need of support tools.

On the other hand, SDG 11 also stands out in this Quality-of-Life line of action. Sustainable Cities and Communities, providing universal access to safe, inclusive and accessible green spaces and public spaces, particularly for women and children, older persons and persons with disabilities, and strengthening efforts to protect and safeguard cultural and natural heritage. This is closely related to the line of action to promote culture, new ways of enjoying it, and new spaces and ways of life for groups with greater needs.

SDGs highlighted in the **Quality of Life** line of action



Izmir – Turkey

Cittaslow Metropolis 'Cittaslow Neighborhood Program'

Quality of Life

3 GOOD HEALTH AND WELL-BEING

Link: https://cittaslowturkiye.org/en/csm/

OBJECTIVES:

Izmir became the first Cittaslow metropolis model to slow down and protect the urban environment and nature of the city. Targets were set in six areas: community, good governance, mobility, urban resilience, access to good food and slow neighbourhoSDG.

DESCRIPTION OF THE ACTIVITIES CARRIED OUT:

Analyses involving representatives of society, trade boards, experts and academics were carried out to understand life in Izmir and the metropolitan city in general. These analyses also considered the prevailing global views in this area and were compared with Cittaslow's philosophy. From this perspective, the priority issues to be addressed in the Cittaslow model were identified.

KEY SUCCESS FACTORS:

The success factors of the project are linked to the solutions provided by the project, which, in this case, belong to two different typologies: social and spatial. Through the social solutions, it has been possible to strengthen the neighbourhoSDG' urban identity and sense of belonging. The success of the spatial solutions has been based on tools such as Slow Spaces, which close areas to vehicular traffic and establish pedestrian areas. The Quality of Life axis promotes new lifestyles, behaviours and forms of consumption based on ICTs.

MAIN OUTCOMES OBTAINED:

Streets can become more liveable through the design of the physical environment and by becoming owned by users of all ages. Including city residents in the design process ensures transparency and fairness in decisions. By designing streets with the participation of residents, the sense of belonging to the city is strengthened, communication is fostered, and ownership of urban practices is promoted. As part of the Cittaslow Neighborhood programme, a citizen participation process was carried out to identify the neighbourhood's problems, needs and potential based on residents' opinions and responses.

As for the success of spatial solutions, they have been based on using tools such as Slow Spaces, which close areas to vehicular traffic and establish places for pedestrian use.

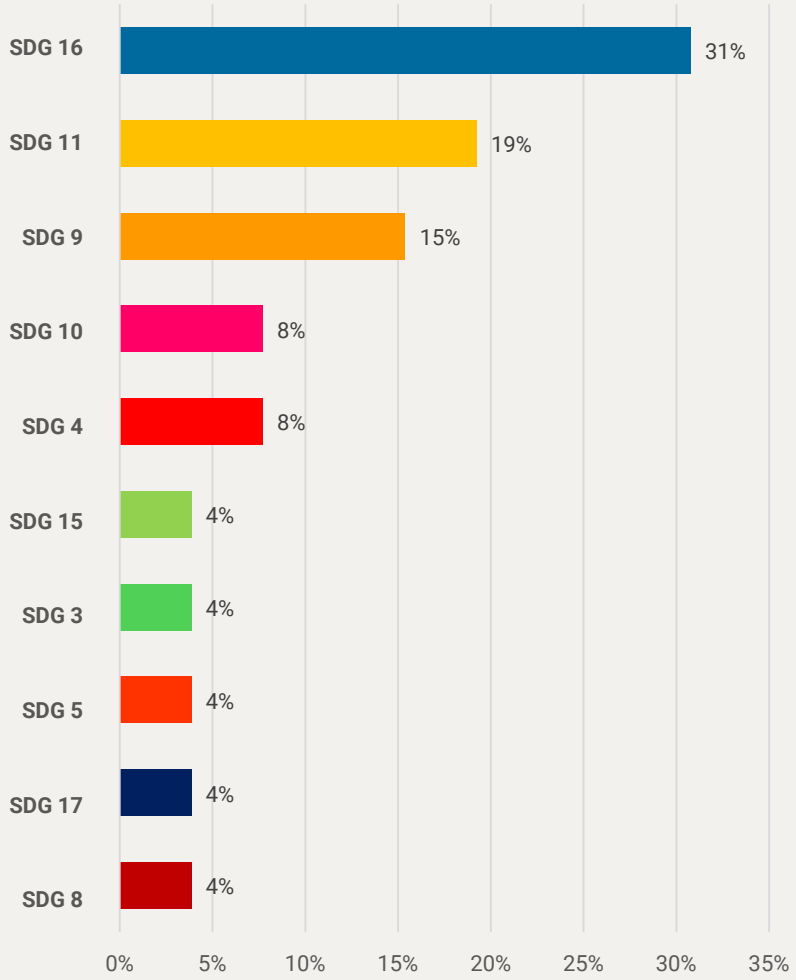
Smart Governance

El SDG 16. Finally, in the Smart Governance line of action, SDG 16 has been highlighted. Peace, Justice and Strong Institutions above the rest (31%), which seeks to promote just, peaceful and inclusive societies.

Specifically, its goals include building effective, transparent, and accountable institutions at all levels, ensuring responsive, inclusive, participatory, and representative decision-making at all levels; providing public access to information; and protecting fundamental freedoms under national laws and international agreements. This is closely linked to Smart Governance, primarily based on transparency and open data through ICT and e-government in participatory decision-making.

Once again, SDG 11 is also highlighted. Sustainable Cities and Communities, linked to the Smart Governance line of action. Specifically, it is linked to the goal of supporting positive economic, social and environmental linkages between urban, peri-urban and rural areas by strengthening national and regional development planning, as inclusive and sustainable urban planning is one of the main challenges addressed by the new smart cities, in a participatory and transparent manner.

SDGs highlighted in the **Smart Governance** line of action



Barcelona – Spain

Barcelona Provincial Council's Smart Region Platform

Smart Governance

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

Link:
https://www.diba.cat/es/web/smartregion/plataformasmartregion

OBJECTIVES:

To implement a technological platform based on IoT at the service of the municipalities of the province of Barcelona that allows the storage and analysis of territorial data to improve local governance in terms of innovation (new knowledge, new applications, etc.), efficiency (real-time data management, control of services and suppliers, etc.) and transparency.

DESCRIPTION OF THE ACTIVITIES CARRIED OUT:

Barcelona Provincial Council offers this platform as a multi-entity service in the cloud. The municipalities that request this service can connect sensors they have in their territory and connect them to this platform, thus being able to store, manage and analyse the data sent by the devices. Some of the sensors connected are: electricity, gas and water consumption monitoring sensors, electricity generation sensors, irrigation management sensors, mobility, municipal fleet management, waste container sensors, noise sensors, air quality sensors, temperature sensors, pedestrian flow, etc.

KEY SUCCESS FACTORS:

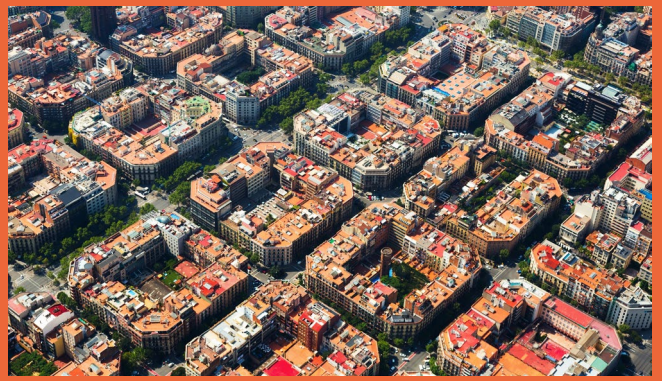
By making use of this platform, urban projects have a greater potential for replicability and transferability to other cities since they adopt the same standard language (the same API (Application Protocol Interface) and data standardisation) for all cities in the territory, which facilitates the implementation from the public sector, and the provision of services from the private sector. Similarly, another key factor is sharing information between municipalities so technical managers can share knowledge.

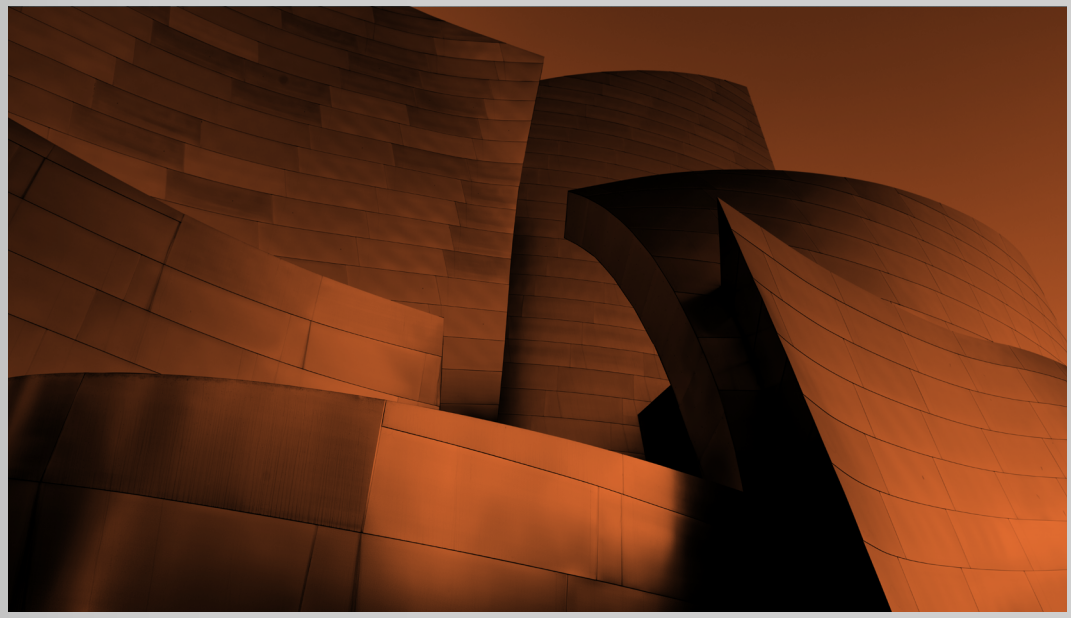
MAIN OUTCOMES OBTAINED:

On 1 June 2023, 67 municipalities in the province were using the platform with more than 14,000 connected sensors. This has led to increased cooperation between the different levels of government and municipalities. In addition, some data are public, thus improving transparency and collaboration.

The data sent to the platform are used by the different teams in different areas of each city council to manage various services (Environment, Urban Planning and Mobility, Infrastructures, etc.). Barcelona Provincial Council conducts annual surveys on the service provided to municipalities by the platform, and the feedback collected is generally positive.

An IoT-based technological platform at the service of the municipalities of the province of Barcelona that allows the storage and analysis of territorial data to improve local governance.





4

MAIN BARRIERS AND ENABLERS

This chapter identifies the main barriers and enablers to developing innovation projects around the smart city axes to promote their future growth.

4. MAIN BARRIERS AND ENABLERS

The cities participating in Smart Cities 2023 have identified a series of elements, some specific and the vast majority common, that are either a barrier or, on the contrary, a driver or enabler regarding the development of innovation projects around the smart cities lines of action; to promote their future growth.

4.1. Barriers

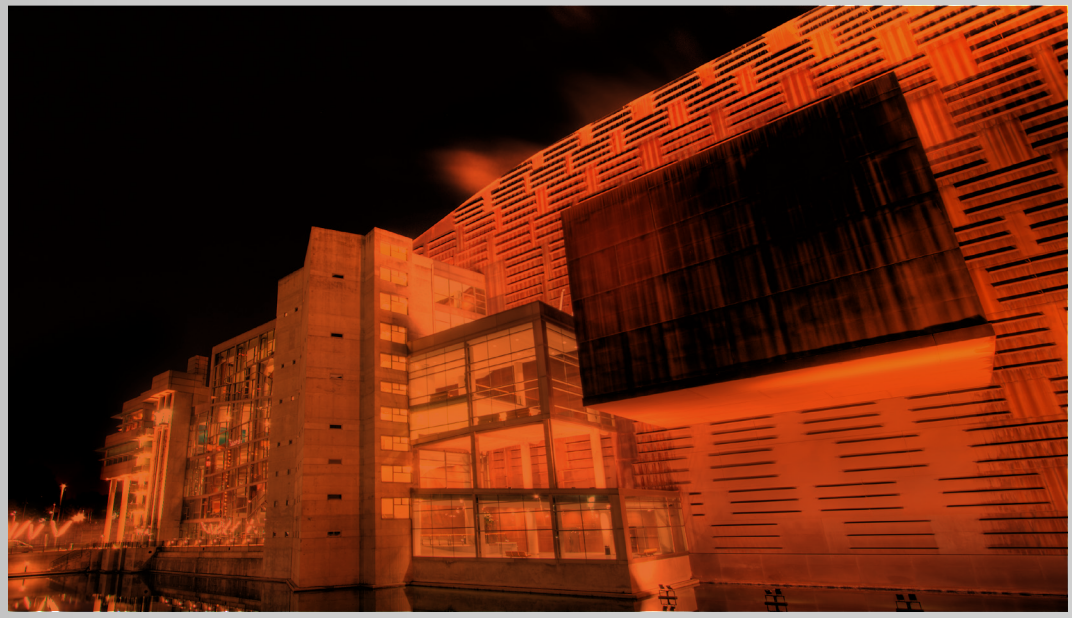
The main barriers limiting the development of innovative projects in city ecosystems globally are the following:

- Lack of resources to implement projects. This results in the technical inability and time constraints to carry out projects at the local level.
- Lack of funding sources and investors' absence and/or lack of knowledge to provide support.
- Lack of articulation of 4 innovation helices at a local level causes a lack of impact on innovation projects, low efficiency in R&D&I investment, and loss of synergies. The need to align public innovation policies is evident.
- Need to develop digital infrastructure in line with current needs and lack of digital skills and skilled labour.
- Digital inequalities. In particular, the existing urban-rural divide and the lack of means to support areas that are poorly accessible from urban areas.
- Disruptions and external factors as barriers to the promotion of innovative projects. Specifically legal, environmental, economic and social factors that generate market changes.

4.2. Enablers

The main enablers that drive the development of innovative projects in city ecosystems globally are as follows:

- Use of new enabling technologies, such as AI, IoT, Machine Learning, and Data Analytics, which promote data-driven management.
- Collaborative green spaces and platforms, such as open spaces dedicated to digital creation and fabrication and critical use of technology, which facilitate strategic alliances for the design and execution of projects.
- Improved connectivity and advanced telecommunications as other enablers in smart cities.
- Driving projects at the local level is the design of user-focused processes and services through technologies that predict user needs.
- Political decisions to promote these innovative projects, in line with citizens' demands, are essential in their transition to becoming smart cities.
- New sectoral and knowledge associations and clusters which support the business fabric.



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CONCLUSIONS

Lastly, the main conclusions of this fifth edition of the Smart Cities Study are set out below.

5. CONCLUSIONS

“Building an inclusive and smart city means strengthening the delivery of all local public services, facilitating equitable access to technology and the Internet, ensuring that technology reduces inequalities, and transforming the relationship with the planet. Digital rights are a new horizon that we will have to build with pragmatism and determination. With the Pact for the Future of Humanity, UCLG intends to explore the new frontier of public services. We are confident that this study will inspire us with concrete cases and experiences to leave no one and nowhere behind”. - Emilia Saiz, Secretary General of UCLG.

Smart cities are advancing and evolving in line with the technological transition they are undergoing. This is why their priorities have changed, positioning well-being and care, digital rights, environmental sustainability, and the liveability of their cities as the top priorities in their medium- and long-term policies, in line with UCLG’s Pact for the Future.

In the transition process towards a Smart City, a participatory approach will be increasingly necessary, which considers the multiple public-private stakeholders and where interaction must be concerted and stimulated, creating synergies that optimise investments to generate new innovative products and services, which allow gaining competitiveness at local, national and international level.

In this process, Local and Regional Governments play a key role as the main driving forces and articulators of innovation ecosystems, incorporating a multidimensional prism that considers the interests of the quadruple helix agents at a local level.

In line with the lines of action of growth of smart cities, it has been found that the cities participating in the study have developed projects, initiatives and/or good practices in line with current trends in each of the lines of action. However, the main lines of action in which projects, initiatives and/or good practices are being carried out are Smart Economy (27%) and Environment (20%). This is due to the nature of the lines of action, as they address cross-cutting and multi-sectoral issues, which, compared to more specific lines of action such as New Mobility or Digital Citizenship, receive more attention in most Local Governments.

It is also worth noting that the Quality-of-Life line of action is the least addressed by participants. This is surprising from the point of view that improving the quality of life in cities is the main goal of a smart city or a smart territory in itself. However, seen from the other side of the coin, all innovative projects developed around the other Smart City lines of action positively impact improving the quality of life in cities, thus indirectly supporting the development of the Quality-of-Life line of action.

Concerning the typology of good practices provided by participants in each of the lines of action, these are aligned with the main trends identified, and all lines of action are addressed in most cases:

Smart Economy: mainly initiatives focused on fostering a culture of local entrepreneurship and innovation to address cities' most pressing social and environmental challenges. In addition, programmes that grew out of the new economic paradigm after the COVID-19 pandemic have also been proposed.

New mobility: the initiatives focus on improving the efficiency and sustainability of transport systems, aiming to increase accessibility to public transport and reduce traffic congestion within the city.

Environment: cases related to the efficient management of resources, biodiversity conservation, and the promotion of renewable energies through incentives or communities are collected..

Digital citizenship: initiatives to reduce the digital divide in society, including specific programmes for older people and implementing tools for fully digital building permits.

Quality of Life: Quality of life: focus on setting up public spaces that improve the population's quality of life and implementing neighbourhood models that promote the deceleration and protection of the urban environment and its spaces.

Smart governance This line of action brings together initiatives related to designing and implementing data-driven public policies and smart planning.

From the point of view of how cities contribute to the achievement of the SDGs, it was found that a large proportion of the cities taking part in the study (46%) indicated that the projects they develop at the local level respond to the achievement of SDG 11. Sustainable Cities and Communities aims to make cities more inclusive, safe, resilient, and sustainable. In second place, they also highlighted SDG 9. Industry, Infrastructure and Innovation that focuses on building resilient infrastructure, promoting sustainable industrialisation and fostering innovation (45%). This shows that Smart Cities focus more on technological and innovation than specific basic issues.

Regarding the lines of action on which these projects work, there are differences in the SDGs to which they are linked. Under their local strategies, they are contributing to achieving them. This is because the targets of each of the Sustainable Development Goals are, to a greater extent, related to one or other of the lines of action that make up smart cities and on which the different initiatives shown during the Study have been developed.

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The main SDGs to which innovative projects at a local level are contributing are **SDG 9**, related to the smart economy line of action; **SDG 11,** related to new mobility; **SDG 13** in the environment line of action, **SDG 4**, related to digital citizenship, **SDG 3** related to quality of life and **SDG 16** related to smart governance.

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CITIES AS INNOVATION ECOSYSTEMS THAT CONTRIBUTE TO ACHIEVING THE SDGs

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