European Commission

DIGITALISATION FOR DEVELOPMENT. A TOOLKIT FOR DEVELOPMENT COOPERATION PRACTITIONERS

INTERNATIONAL PARTNERSHIPS (INTPA)

Smart Cities

InfoSheet nº7

This InfoSheet is part of a series on digitalisation and its relevance to EU International Partnerships and development cooperation programmes. The Toolkit is designed to provide key definitions, main opportunities and challenges for global development presented by digital transformation, case studies and suggested further reading. Learn more on Cap4Dev

Smart city solutions

The concept of smart cities can refer to different models. A **smart city** uses information and communication technology (ICT) and Internet of Things (IoT[1]) devices to improve operational efficiency, share information with the public and provide a better quality of government service and citizen welfare.[2] In smart cities, traditional networks and services are made more efficient with the use of digital solutions; thus both citizens and businesses benefit. However, a smart city goes beyond the use of digital technologies. It means better resource use and less emissions, smarter urban transport networks, upgraded water supply and waste disposal facilities and more efficient ways to light and heat buildings. It also means a more interactive and responsive city administration and safer public spaces.[3] In this way, smart cities help to cope with urban challenges, promote local economies, and meet targets set in the European Green Deal. The EU is committed to the promotion of sustainable development and growth, and smart cities answer to those needs by promoting an integrated approach to urban development.[4] European cities have been leading the way on smart cities development, reinforcing the role of the EU as a credible partner in the international dimension.

This infosheet introduces the EU´s internal policy framework, recent developments in partner countries, challenges and opportunities of smart cities and finally it gives some relevant case studies in partner countries.

The EU approach: policies for achieving a smart city digital ecosystem

The European Commission is promoting smart cities through different initiatives. One of these aims to create a **smart city digital ecosystem** by combining different digital solutions for cities and improving their impact. The '**Join, Boost, Sustain**' movement supports the scaling up of interoperable, cross-sectoral and cross-border digital platforms and solutions across the EU.[5] A complementary approach is the **European Innovation Partnership on Smart Cities and Communities (EIP SCC)** which is a first step towards future EU policy on smart cities. Within the EIP SCC, the **Smart Cities Marketplace** is a major market-changing undertaking that aims to bring cities, industries, SMEs, investors, banks, researchers and many other smart city actors together. The common aims are to improve citizens' quality of life, increase the competitiveness of European cities and industry as well as to reach European energy and climate targets.[5]

Other relevant EU initiatives are:

- **EU Green Capital** which recognises the emerging frameworks and protocols for smarter cities, identifying steps which may be applied to create the ideal setting.
- **Smart Grids Task Force** for exploring the potential and possible scope of a common format for energy data exchange at EU level as a basis for an interoperability framework.
- **Smart-readiness indicator for buildings** in relation to energy efficiency, as a measure of the capacity of the buildings to use digital technologies and electronic systems.
- Horizon 2020 projects on **ICT and water efficiency** to provide an action plan that spelled out the activities, challenges, timeline, and tools for implementation of such technologies.
- Horizon Europe, mission on **'Climate neutral and smart cities'** to support cities to become more resilient and smarter by empowering citizens in digital social innovation and in policy making.

[1] The **Internet of things (IoT)** describes physical objects (or groups of such objects) that are embedded with sensors, processing ability, software, and other technologies that connect and exchange data with other devices and systems over the Internet or other communications networks. (https://en.wikipedia.org/wiki/Internet_of_things)
[2] https://www.twi-global.com/technical-knowledge/faqs/what-is-a-smart-city
[3] https://ec.europa.eu/info/eu-regional-and-urban-development/topics/cities-and-urban-development/city-initiatives/smart-cities_en
[4] https://digital-strategy.ec.europa.eu/en/policies/smart-cities-and-communities
[5] https://digital-strategy.ec.europa.eu/en/policies/smart-city-digital-ecosystem

- The **Digital Europe Programme** that includes the large-scale deployment of interoperable solutions for cities and communities.
- **Testing Pilots** for assessing the capacity of the smart approach, such as the '**Smart Tourism Destinations**' which aims to strengthen the cooperation between Member States/cities on mastering data for tourism. Some of the varied benefits of this pilot include: enhancing Europe's position as a tourist destination by deploying new forms of technology to create competitive services; integrating tourism in urban planning more effectively; and using data as a means of designing, changing and improving urban tourism policies.

Smart Cities: opportunities and challenges

Many countries have adopted the smart city approach to project an image of themselves as countries **attracting investment and encouraging innovation**. The ultimate aim is to attain economic progress by achieving scientific and economic development. In this sense, smart cities contribute to the **promotion of economic growth** and **the accommodation of population growth** making use of technical solutions. Smart cities also provide innovative solutions for traditional problems such as **pollution, traffic congestion and energy consumption**, and they also enhance the **efficiency of resource management** (e.g., land, energy, water and natural resources). By combining good planning and the use of smart technology, resource use can be streamlined, for instance to reduce polluting emissions and manage traffic. Furthermore, **overcoming administrative corruption** is also possible with the smart city approach, since smart cities mainly depend on electronic systems. As citizens have access to both government and private services via smart applications, the possibilities of corruption are reduced. With regards to surveillance systems and cameras in smart cities, it is understood that these can promote **citizens´ security** but they can also lead to illegal surveillance and data collection – for example by using facial recognition and other databases without democratic oversight.

Two examples are presented in this infosheet to illustrate the many benefits that smart cities can bring to their citizens.

Other issues of relevance to smart city implementation are:

Sustainability: Installing and maintaining IoT (Internet of Things) devices that are required to collect data may be complex and costly; the devices may become obsolete and need to be replaced. Furthermore, the installation process associated with these technical improvements may cause temporary problems for city residents. Sustainability of the projects and/or services also depends on ensuring project transparency and continuity in terms of contract awarding and longer term funding of operators that should outlast changes in government.[6]

Cybersecurity: Whereas this is not unique to smart cities alone, services are controlled by smart systems dependent upon artificial intelligence and the IoT. If these services are targeted by a successful cyber-attack, there will be consequences for both national security and people´s lives. To minimise or avoid this risk, smart cities need to properly address cybersecurity and data protection in their urban systems. In this way, city administrators will be better equipped to ensure service continuity and safety for both citizens and businesses.[7, 12]

Privacy: Although cameras and sensors installed on streets provide data that may increase quality of life and reduce criminal activities, they can also invade citizens´ privacy. If misused, by authorities, for example to monitor and carry out citizen surveillance, they can have political consequences in that they can threaten individual freedom and lead to disconnection from social and democratic norms. For instance, major private platforms possess big data which can be lucrative to exploit if not carefully regulated by local authorities. National governments should play an enabling role to support innovative solution delivery, capacity building and upscaling. Therefore, smart city developments must take into account 'privacy by design' from the start. This should include maintenance of database security and also include transparency of the digital solutions adopted in order to ensure trust from city residents.

Big Data and Artificial intelligence are the main focus of one of the accompanying Infosheets in this series.

Social innovation, inclusion and citizen participation: Smart city innovation is not only technological but social. Therefore, smart cities must promote new processes that enable citizens to transform their reality and find solutions to their problems. In developing countries where a youthful, urban population is growing and becoming increasingly connected, the use of digital tools is growing exponentially without government intervention. However, it is key that smart city development and planning takes into consideration all groups of people (including elderly and underserved people) with different levels of digital literacy. A culture of participation needs to be created and nurtured to help smart city implementation to be successful. This can be partly achieved by ensuring that opportunities are provided to reflect residents' proposals in cities´ public policies. However, a prerequisite is that there is a cohort of "smart" citizens who are involved and actively make use of new technologies. In this sense, part of the implementation process must involve educating the community on its benefits. People must be at the centre of smart cities therefore policies need to be co-constructed with residents throughout the policy cycle.[8]

Smart governance: A smart city roadmap should be jointly built with the private sector in order to identify e-government services and technologies needed at the city level such as IT connectivity, Internet of Things (IoT) utilities, digital civil registries, data management, etc. The application of digital solutions in cities contributes to increased transparency in processes, as well as promoting citizen engagement. Transformational processes are needed to encourage uptake of these new technologies but this may meet resistance from interested parties. Despite the clear opportunities for smart government, challenges such as resistance to changes, investments, security and privacy are discouraging factors.

e-Governance has been presented in an accompanying infosheet.

Monitoring: Smart city policies need to be designed, implemented and monitored through the use of appropriate indicators and data collection procedures (For example:; CITYKeys; Bosch et al. 2017) to ensure they improve well-being for all citizens. Furthermore, smart city policies should not be static and they should change and adapt according to the shifts in the priorities of the city and/or at the national level.

[6] https://publications.iadb.org/en/international-case-studies-smart-cities-medellin-colombia
[7] https://www.itu.int/en/ITU-T/focusgroups/ssc/Documents/website/web-fg-ssc-0090-r7-technical_report_on_ICT_infrastructure_for_resilience_security.doc
[8] https://ubidots.com/blog/the-key-challenges-for-smart-cities/

Other resources:

- The **Green City Development Toolkit** by the Asian Development Bank (ADB) provides a good reference for the '**smart environment**' (i.e., smart solutions to facilitate environmental data collection).
- The World Bank has a **Toolkit for Intelligent Transport Systems (ITS)**, a self-learning tool and guidance for **smart mobility** programme planning and implementation.
- The 2020 **People-Centered Smart Cities** flagship programme of UN-HABITAT supports policymakers worldwide with best practise in the field.
- The **Smart Cities Funding and Financing in Developing Economies** series by Deloitte offers research-based guidance on funding and procurement options with valuable insights from smart city projects worldwide.
- The Lee Kuan Yew School of Public Policy of the University of Singapore has published a paper entitled Smart City Governance in Developing Countries: A Systematic Literature Review, which includes links to numerous key resources on the topic and 56 case studies from partner countries worldwide.
- CITYKeys a H2020 project developed and validated a performance measurement framework to promote a common, transparent and comparable monitoring system for smart city solutions across European cities. The framework includes two levels of indicators: at city or neighbourhood level, and at project level.
- Innovation city index of 2Thinknow which encompasses 162 indicators based on predominately quantitative analysis.

Progress in Partner Countries

Smart cities have become a priority in the development strategies of many countries all over the world: smart cities can boost development, since they promote economic growth and they allow adaptation to population growth. The promotion of **sustainable urban development** is also a key element of EU regional policy which is implemented through the design and implementation of **tailor-made, integrated development plans** prepared where possible **in partnership with authorities in European cities.**

Africa – The urbanization rate of the African continent has increased from 15% to 40% between 1960 and 2010 and is expected to reach 60% in 2050 . The urban population in Africa will triple over the next 50 years. Africa must address this rapid growth in urban citizens to overcome its difficulties through better management of its cities. Challenges also need to be addressed in rural environments. *Smart Villages* in Africa is a relatively new concept that addresses complex problems of continuing poverty, inequality, and marginalization through new approaches and digital transformation in rural villages.[9]

Latin America – Latin America is also engaging in a more technological or 'smart' approach to urban management. It has the highest urbanisation rate in the developing world, which presents many opportunities. Although the region still lags behind advanced regions such as Europe and North America when it comes to policy making around integrating a digital approach to urban management and engaging citizens in the decision-making process, cities such as Santiago de Chile, Rio de Janeiro in Brazil and Medellín in Colombia are some of the smartest cities in the region; they have all undertaken a multi-tech approach in addressing pollution, public safety and promoting social change, respectively.[10]

Asia – In Asia, with improvements in spending power, digital literacy, and smartphone penetration, cities across the region are taking advantage of smart solutions and thus facilitating the process of digitising government departments and public-facing services. In Singapore, for example, dynamic congestion pricing has been implemented through the 'Electronic Road Pricing System', resulting in traffic congestion decreasing by 15% since its introduction in 1990 and public transit increasing from 45% to 65% of the city's commutes. Similar initiatives to address traffic congestion have also been a success in Malaysia and Indonesia.[11]

Ingredients of a smart city *– smart cities are cities that demonstrate integrated sustainable development.[12] In this sense, a smart city needs a range of contributing factors to come together to ensure digital innovation is being put to use and integrated into urban development policies; these include:*

- *comprehensive digital strategies, policies and legislation, and strong leadership to create a robust framework;*
- *engagement and cooperation mechanisms at government level and across different territorial levels, which engages with and involves citizens, civil society, businesses and academic institutions, for successful design and implementation;*
- *usage of the free flow of data and utilisation of data-driven intelligence, based on the concept of privacy;*
- *tools and infrastructure that engage and connect all relevant stakeholders, digital solutions and data to enable greater change and innovation.*

Ultimately, the long-term goal of how to be 'Smarter' needs to focus on the city's ability to validate and sustain itself as a smart city where soft infrastructure (stakeholders, relationships, consultation, etc.) can combine with hard infrastructure (capital, technology) to achieve a continuous process of reinvention and creativity.[13]

[9] https://www.euafricathejourney.com/challenge/smart-cities/
[10] https://ec.europa.eu/regional_policy/en/policy/cooperation/international/latin-america/urbelac/
[11] https://www.mckinsey.com/~/media/mckinsey/industries/capital%20projects%20and%20infrastructure/our%20insights/smart%20cities%20in%20southeast%20asia/mgi-smart-cities-in-southeast-asia.pdf
[12] https://www.revistaespacios.com/a20v41n15/20411523.html
[13] https://ec.europa.eu/environment/europeangreencapital/6-steps-to-a-smarter-city/

CASE STUDY

Digitization of Local Authorities - The Philippines

At the beginning of the 2000s, the Philippines developed a national programme to modernise procedures within its administrations to initiate a digital transformation. The programme was in time extended to different local authorities within the scope of the Government Information Systems Plan (GISP). Overall, the municipalities initially did not have Internet access, nevertheless, they devoted resources to introduce the programme and even created job opportunities for this purpose. Additionally, the municipalities ensured technical assistance was available to develop the skills of their departments such as enlisting private technicians and consulting software vendors. Depending on the particular localities, priorities were placed on e-governance by developing specific administrative applications on the Internet, needing user identification. The programme is based on the "Open-Source city" model and enabled the gradual modernisation of procedures as well as boosting the skills of local authorities. The Open- Source City model is focused on participatory planning, as mainly influenced by institutions and citizens with representative and participatory democratic values. Ultimately, the implementation of a national policy framework allowed the municipalities to develop systematic procedures in addition to peer learning.

CASE STUDY

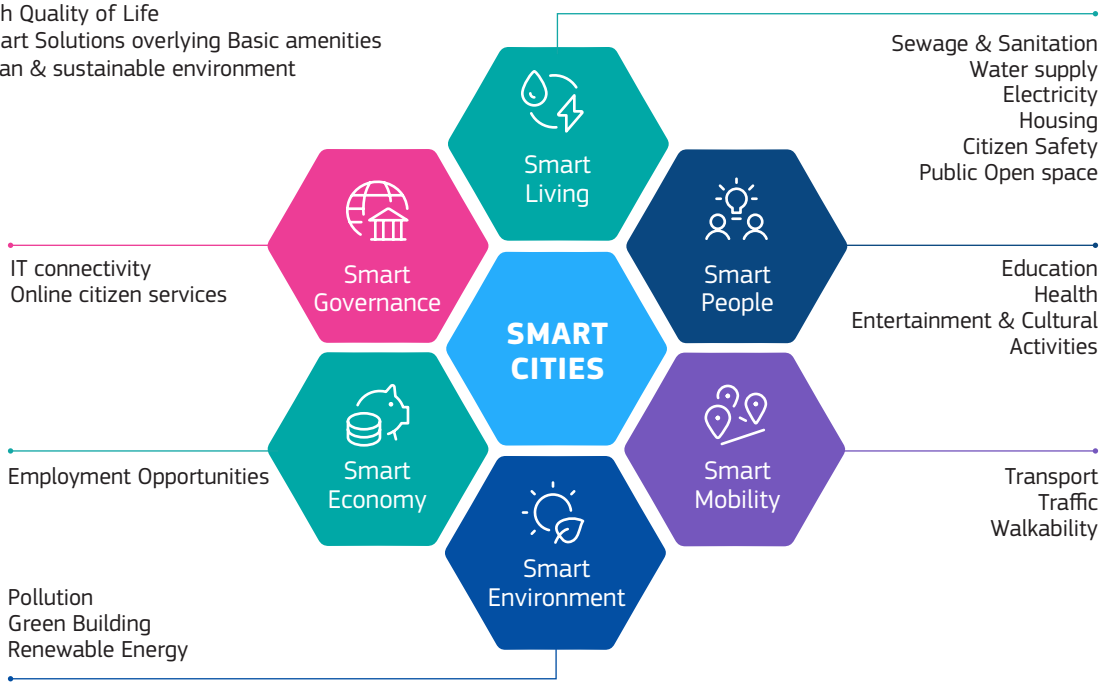
Medellín Smart City Programme – Colombia

Medellín, the capital of the province of Antioquia, is the second most populous city in Colombia. This city has changed from being known for its security problems to become an international reference for technological and social innovation, urban transformation, equity, and citizen participation. In this sense, Medellín was recognized as the most innovative city in 2013 (recognition awarded by the Wall Street Journal, Citi, and the Urban Land Institute) and received the Lee Kuan Yew World City Prize in 2016 (given by the Urban Redevelopment Authority -URA- and the Centre for Liveable Cities). The city has implemented a series of strategies that have made it a smart city through developing capacity and organic structures within the entities that control mobility, the environment, and security. Specifically, the 'MDE: Medellín Smart City' programme consolidates ICT adoption processes, content generation, design of services, and support for public connectivity strategies with the aim of improving the relationship between citizens, their environment, and the municipal administration. Through the programme, Medellín is implementing projects to create free Internet access zones, open data, online transactions, and other services that aim to achieve citizen participation, open government, social innovation in problem solving, and project sustainability[14] (Amar Flórez, 2016).

[14] https://publications.iadb.org/en/international-case-studies-smart-cities-medellin-colombia

What all contribute towards making a city smart?

- Core infrastructure
- High Quality of Life
- Smart Solutions overlying Basic amenities
- Clean & sustainable environment



Videos

- MDE: Medellin Smart City
- Smart Mobility System (Sistema Integrado de Movilidad de Medellin, or SIMM)
- Medellin Integrated Metropolitan Emergency and Security System (Sistema Integrado de Emergencia y Seguridad Metropolitana or SIES-M)
- Medellin Early Warning System (Sistema de alertas tempranas, or SIATA)

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