

From Smart Cities to Smart Communities: a Conceptual Approach*

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ABSTRACT The following paper will briefly address the phenomenon of *smart communities*, the origin of which can be found in *smart city* initiatives, to then identify the key characteristics of this type of project and suggest a possible roadmap to follow for design and implementation.

1. Innovative strategies for improving quality of life: from smart cities to smart communities

1.1. Initial projects: smart planning applied to the urban sphere through smart city projects

Smart city initiatives have been used in recent years to improve the quality of public services provided by cities using Information and Communication Technologies (hereinafter, ICT).

The element that is traditionally used to define a smart city is the use of ICT for developing innovative projects. However, the concept of smart city and the role of technology in this type of initiative has evolved since the phenomenon first appeared in the 1990s. Since then, several attempts have been made to produce a comprehensive definition of smart city that would provide clear indicators for determining whether a given city can be categorised as such. Notwithstanding, it is important to point out that this is still a very open-ended concept¹,

due in part to the way in which it first appeared. Navarro Gómez and Navio Marco have observed that as the concept was not created following a top-down logic: no standardised and universally applicable criteria exist². Another reason for the lack of consensus is the way in which different areas are responding to this global trend, as we are dealing with localised and wide-ranging experiences³. We will now consider some of the most widely accepted definitions utilised in doctrine and soft law.

Initially it was thought that the most important pillar of this type of city was the use of ICT as a tool to improve energy sustainability. Among the definitions that have followed this line of thinking, we can highlight one in particular, which defines a smart city as a community that is implementing a project whose primary goal is to «improve the quality of life and the local economy, striving for a future with low carbon emissions». Likewise, in this project, «investment in efficient energies and local

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locales en zonas rurales despobladas, and D. Santiago Iglesias, *Smart communities: la planificación inteligente como posible instrumento de lucha contra la despoblación*, both in press.

Literal citations contained in this paper have been translated into English for easier reading.

¹ For a description of the smart city phenomenon and the existing lack of consensus on a comprehensive definition, vid. L. Vandelli, *Ville Intelligente, Ville Démocratique?*, Actes Colloque Berger-Levrault, Chaire MADP de Sciences Po, 13 February 2014, Paris, Berger-Levrault, 2014, 98.

² For an explanation of the advantages of not using top-down logic, see D. Schuurman, B. Baccarne, L. De Marez, and P. Mechant, *Smart Ideas for Smart Cities: Investigating Crowdsourcing for Generating and Selecting Ideas for ICT Innovation in a City Context*, in *Journal of Theoretical and Applied Electronic Commerce Research*, n. 7, 2012, 51 ff.

³ C. Navarro Gómez and J. Navio Marco, *De qué estamos hablando cuando hablamos de smart cities: nuevos entornos para las políticas públicas locales*, in *Anuario de Derecho Municipal*, n. 7, 2013, 213.

renewable energies, together with a decrease in the consumption of fossil fuels and carbon emissions, constitute tools that will help to achieve sustainability and improve the quality of life»⁴.

This continues even today to be the primary aim of a smart city, as shown in the European area through the European Innovation Partnership on Smart Cities and Communities (EIP-SCC), which promotes the transformation of cities «into places of advanced social progress and environmental regeneration, as well as places of attraction and engines of economic growth based on a holistic integrated approach in which all aspects of sustainability are taken into account»⁵.

However, definitions based on the exclusive application of ICT to improve the energy sustainability of a city have evolved towards more complex models which strive to achieve smart city management, and which also include areas such as governance or public services⁶. In this sense, Caragliu, Del Bo and Nijkamp have already provided a more comprehensive definition which includes other elements, based on the idea that the primary innovation of smart cities is the utilisation of ICT, on the one hand, to improve the efficiency of public programmes and policies with the aim of achieving the desired outcomes, and on the other, to efficiently manage such policies through a suitable relationship between the means and the results. Based on the definitions included in the doctrine, these authors have extracted some of the complementary requirements for identifying the conditions that would constitute a true smart city; they maintain that a city is deserving of this classification when⁷:

a) Network infrastructures are used to

improve economic and policy efficiency, encouraging social, cultural and urban development.

b) Special emphasis is placed on urban economic development and business models.

c) Said city strives to achieve socially equitable urban growth.

d) The high-tech sector and the creative director have prominent roles in long-term urban growth planning.

e) Particular attention is given to the role of share capital; a smart city is one in which residents have learned to assimilate, adapt and innovate, using and benefiting from technology.

f) The strategic importance of social and environmental sustainability is an essential element.

We should also point out that, according to the *Green Paper on Urban and Local Sustainability in the Information Age*, smart cities should be committed to their surroundings (environmental and socio-economic factors) and should be able to stay abreast of future needs: climate change, resource depletion, energy dependency and other material requirements, biodiversity loss, etc.⁸.

We can also cite the definition provided by the European Parliament, which compiles the previously stated elements, and according to which «the idea of smart cities is rooted in the creation and connection of human capital, social capital and ICT infrastructure in order to generate greater and more sustainable economic development and a better quality of life»⁹. This definition coincides in essence with the content of the National Plan for Smart Cities (*Plan Nacional de Ciudades Inteligentes*) – which accepts the definition put forward by Technical Group 178 of the Spanish Standardisation and Certification Association – AENOR (AEN/CNT178/SC2/GT1 N 003) – although it

⁴ This definition is found in the following document: Instituto para la Diversificación y el Ahorro de la Energía (IDAE), *Mapa Tecnológico “Ciudades Inteligentes”*, Madrid, Observatorio Tecnológico de la Energía, 2011, 3 ff. Available at: https://www.idae.es/uploads/documentos/documentos_Borrador_Smart_Cities_18_Abril_2012_b97f8b15.pdf (consulted in January 2021).

⁵ See *Communication from the Commission on Smart Cities and Communities – European Innovation Partnership*, [C(2012)4701/F1], 3.

⁶ See Directorate-General for internal policies (European Parliament), *Mapping Smart Cities in the EU (PE 507.480)*, Brussels, European Parliament, 2014, 23.

⁷ Cfr. A. Caragliu, Ch. Del Bo, and P. Nijkamp, *Smart cities in Europe*, presented at the *3rd Central European Conference in Regional Science-CERS*, Košicama, 2009, 47.

⁸ See Ministerio de Agricultura, Alimentación y Medio Ambiente y Agencia de Ecología Urbana de Barcelona, *Libro Verde de Sostenibilidad Urbana y Local en la Era de la Información*, Madrid, Ministerio de Agricultura, Alimentación y Medio Ambiente, 2012, 692. Available at: <https://www.mitma.gob.es/areas-de-actividad/arquitectura-vivienda-y-suelo/urbanismo-y-politica-de-suelo/urbanismo-y-sostenibilidad-urbana/libro-verde-de-sostenibilidad-urbana-y-local-en-la-era-de-la-informacion> (consulted in January 2021).

⁹ See Directorate-General for internal policies (European Parliament), *Mapping Smart Cities in the EU (PE 507.480)*, 18.

also integrates new elements, such that: «Smart city is the holistic view of a city that uses ICT to enhance the quality of life and accessibility of its residents, ensuring sustainable socio-economic and environmental development under continuous improvement. A smart city allows residents to interact with it from a multidisciplinary standpoint, adapting in real time to citizens' needs in a quality- and cost-efficient manner, and providing open data and people-oriented solutions and services to help mitigate the effects of urban growth in the public and private sphere through the innovative integration of infrastructures with smart management systems»¹⁰.

As stated in the doctrine, it is likewise essential to highlight the need for a thorough explanation of the primary indicators of a smart city, to avoid misuse of this term, which is often misappropriated by cities with a view to making them more attractive for tourism or industry. Hollands points out, firstly, that smart urban labelling can lead us to play down the potential negative impacts of developing the new technologies and network infrastructures required for a city to be considered “smart”; secondly, that insisting on the strategic interest of the concept may cause us to overlook other alternative paths towards promising urban development; and finally, that public administrators should consider other options that are not focused exclusively on entrepreneurial development¹¹.

A smart city is therefore based on the application of ICT to multiple areas grouped under different labels, referred to as “smart axes”, or “smart dimensions”, for which it is not possible to provide a unanimously adopted list; we can, at least, mention those included in the document published by the European Parliament, *Mapping Smart Cities in the EU*, which points to a smart city as one whose strategies and initiatives affect at least one of the following areas: governance, mobility, environment, living, people and economy¹².

¹⁰ See also the definition provided by R. Achaerandio, G. Gallotti, J. Curto, R. Bigliani, and F. Maldonado, *Análisis de las ciudades inteligentes en España*, Madrid, IDC, 2011, 6. Available at: <http://www.aeiciberseguridad.es/descargas/categoria6/8883484.pdf> (consulted in January 2021).

¹¹ Vid. R.G. Hollands, *Will the real Smart city please stand up?*, in *City*, vol. 12, n. 3, 2008, 303-320, cited by A. Caragliu, Ch. Del Bo, and P. Nijkamp, *Smart cities in Europe*, 49.

¹² See Directorate-General for internal policies (Europe-

The smart city phenomenon began to gain popularity in Spain in July 2015, when the National Smart Cities Plan was established within the framework of the Digital Agenda in order to proceed with the initiatives that had been launched in recent years for the various smart dimensions (primarily related to smart governance and the promotion of smart tourist destinations). So, far from obtaining a consolidated legal concept of smart city, this term was used to refer to cities that had created initiatives falling into one or more of the smart dimensions.

The goals of this plan were the following: firstly, to broaden the contribution of ICT to the GDP of the industrial sector. Secondly, to enhance the effectiveness and efficiency of local bodies in their ability to provide public services through the use of ICT, on the one hand, by assisting them in their transformation to smart cities and tourist destinations, and on the other hand, by monitoring and promoting standardisation activities for the technologies, metrics and services required to configure a smart city, with a view to promoting interoperability, creating scale economies and achieving greater efficiency from resource investment. Thirdly, to enhance the governance of smart city systems by encouraging partnerships between businesses, experts, sector associations, suppliers and local bodies for R&D solutions that can lead to more efficient and effective public services. And finally, to adopt measures for promoting or expediting the implementation of technological infrastructures that would facilitate more sustainable practices in cities and surrounding areas.

To achieve these objectives, the plan proposed a series of actions structured around five axes: a) facilitating the transformation towards smart city; b) projects which corroborate the efficiency of ICT in cost reduction, greater citizen satisfaction, and the creation of new business models, for which three types of financial assistance would be available: concessional loans, which would be granted to projects able to be fully funded during the period of repayment; stimulus packages for public-private partnerships,

an Parliament), *Mapping Smart Cities in the EU* (PE 507.480), 28; and C. Navarro Gómez and J. Navio Marco, *De qué estamos hablando cuando hablamos de smart cities: nuevos entornos para las políticas públicas locales*, 217.

including loans and grants for projects that can mobilize private capital; and innovative public procurement, consisting of helping cities, in cooperation with the industrial sector, to present models based on currently unavailable technologies or devices; c) growth and development of the ICT industry, including studies on the status of ICT sector companies associated with the concept of smart cities, or a general invitation to tender to encourage companies to develop innovative ICT that could be integrated into smart cities and tourist destinations, among other measures; d) communication and promotion of the National Smart Cities Plan, which includes actions focused on introducing the primary areas of intervention and the goals obtained, the assets created for cities, residents and administrations, and opportunities for the industrial sector, and e) follow-up of the plan through transversal actions, the aim being to ensure effective and efficient execution of the plan objectives through constant monitoring and evaluation of actions, enabling full awareness of advances and making it possible to adjust said actions to the needs and expectations of all agents involved.

This plan, which was developed by the Spanish Ministry of Energy, Tourism and Digital Agenda (MINETAD) with the support of the industrial sector, the city network (Spanish Network of Smart Cities - RECI, and the Spanish Federation of Municipalities and Provinces - FEMP), and the Spanish Standardisation Association (UNE), was introduced through a series of pilot schemes (EUR 4 million), two calls to tender for cities (EUR 15 million and 63 million), and a call to tender for islands (EUR 30 million). Technical Group 178 (CTN 178) of the Spanish Association for Standardisation (UNE) identified 23 standards for aligning industrial capacity with urban requirements.

1.2. *The consolidation of the smart city phenomenon and the territorial extension of the concept: smart communities*

As we have just seen, initial smart city schemes were limited to urban areas. Based on the outcomes delivered by these initial plans, however, this type of initiative has been extended beyond city limits to embrace a broader term, that of “smart territory”.

As occurs with the term smart city, there is no universally agreed upon definition of the

concept of smart territory. Some authors understand the concept of smart territory as the convergence of different disciplines related, in particular, to urban planning, architecture, cultural heritage, environment and the economy, with sustainability as the key common element. Calderero, Pérez and Ugalde maintain that the concept of smart territory includes different perspectives; until now, and from an economic standpoint, development in recent years has been related to technological innovation, while other disciplines consider the design of new infrastructures to be a fundamental element of territorial design, such as architecture or urban planning. The authors point out that the environmental factor combines the concepts of economic development and territory, often considered separately until now, giving way to a new view of sustainable development. The territory likewise takes on a new dimension, derived from the need to compete in the global arena.

In Spain, the term was coined by the Spanish National Plan for Smart Territories (PNTI) and describes the actions that will be carried out based on the experiences and outcomes of the National Plan for Smart Cities (2015-2017), and guidance from different actors in the sector. This document is focused on three areas of action: territorial actions, support, and complementary actions, identifying the following priority areas of intervention:

a) Smart tourism: smart city policies have generally focused on the use of technology to improve a city’s response capacity to a growing demand for services. In Spain, where cities are deteriorating and losing population, this growing demand is linked to tourism, with a dual purpose: redefining the organisation and processes by which services are provided, and promoting peaceful coexistence between two communities of individuals (residents and tourists).

b) Urban objects: buildings, ports, airports and stations have a direct impact on the services provided by cities, and can furnish important data for improving public services.

c) 5G: there are cities, operators and manufacturers in Spain with the capacity to experiment with the applications of this new technology. The goal is to set up projects that will provide territories and industries with experience in managing 5G applications.

d) Smart rural territories: the aim is to

accommodate the types of services required by rural communities (processing and other proceedings, provision of services [e.g., health or education], and economic development).

e) Public service 4.0 for urban and rural platforms: the aim is to create increasingly personalised services through a deeper understanding of the needs and rights of people and an analysis of demand, complaints and relevance, thus maximising the potential that “urban platforms”, properly used, can provide for enhancing public services in both urban and rural settings.

2. Some suggestions for establishing a concept of smart community

2.1. The importance of conceptual specification

As we have already pointed out, there is currently no formal legal concept for defining a smart city, or for that matter, for simply defining a city¹³. Different definitions of smart city have been applied in recent years with a view to identifying the constituent elements of this concept, although no consensus has been reached to date¹⁴. Among these is the definition found in UNE Standard 178201:2016, “Smart cities. Definition, attributes and requirements”, according to which: “A smart city is a fair, equitable and people-oriented city that uses available knowledge and resources – and in particular, Information and Communication Technologies (ICT) – to continuously enhance sustainability and resilience, with a view to improving the quality of life, the efficiency of urban services, innovation and competitiveness, without compromising future socio-economic, environmental or

governance-related needs”¹⁵. Confusion regarding the scope of this term has increased, as we have seen, with new concepts such as smart territory or smart community – smart sustainable cities and communities –. All reflect constantly changing realities, and can be considered a work in progress.

As the requirements for what constitutes a smart city have yet to be legally defined, the adjective “smart” has often been misappropriated by local bodies (urban communities, provinces, or even individual districts within a city) in an attempt to make them seem more attractive to industry and tourism¹⁶. As mentioned above, the only criteria that has been considered for a city – and by extension, a territory – to be described as “smart” has been the model found in the previously referenced document from the European Parliament, *Mapping Smart Cities in the EU*, which consists of verifying the design or implementation of strategies or initiatives that affect at least one of the following areas¹⁷: governance, mobility, environment, living, people, and economy¹⁸. But is this criterion sufficient? What consequences are derived from describing a city or a territory as “smart”?

It is clear that defining the scope of both terms from a legal standpoint is essential; on the one hand, the description and classification of a pre-existing reality will allow us to identify territories or communities that can be defined as “smart”, as well as determine the legal repercussions of this classification, i.e. defining specific rights and obligations that may exist for the

¹³ Casanueva Muruais and Calvo López have shown that it is only possible to identify protoconcepts lacking in dogmatic rigour, the development and definition of which has not yet been properly addressed by doctrine and legislation [C. Casanueva Muruais and P. Calvo López, *Reflexiones sobre el concepto jurídico de ciudad inteligente: situación actual y posible evolución*, presented at the *XV Congreso de la Asociación Española de Profesores de Derecho Administrativo: La ciudad del siglo XXI: transformaciones y retos*, Ibiza, 2020. Available at: <http://www.aepda.es/AEPDAEntrada-2518-XV-CONGRESO-DE-LA-AEPDA.aspx> (consulted in January 2020)].

¹⁴ See S. Bolognini, *Epistemologia e politica del diritto nella prospettiva delle “smart cities”*, Milano, Giuffrè, 2016, 3, and M. Suárez Ojeda, *Smart cities: un nuevo reto para el derecho público*, in J.L. Piñar Mañas (dir.), *Smart cities. Derecho y técnica para una ciudad más habitable*, Madrid, Reus, 2017, 75 ff.

¹⁵ Cited in A. Brito Marquina, *Prólogo*, in J.L. Piñar Mañas (dir.), *Smart cities. Derecho y técnica para una ciudad más habitable*, Madrid, Reus, 2017, 7.

¹⁶ D. Santiago Iglesias, *Iniciativas para un futuro urbano sostenible: las smart cities*, 682.

¹⁷ Smart cities are based on the application of ICT to multiple areas grouped under different labels, called “smart dimensions”, for which no unanimously accepted list exists. Achaerandio, Gallotti, Curto, Bigliani, and Maldonado differentiate between the concept of “smart dimension” and that of so-called “facilitating aspects”, which are those elements that allow for the implementation of a smart city initiative: people, economy and technology (R. Achaerandio, G. Gallotti, J. Curto, R. Bigliani, and F. Maldonado, *Análisis de las ciudades inteligentes en España*, 1 ff.).

¹⁸ See Directorate-General for internal policies (European Parliament), *Mapping Smart Cities in the EU* (PE 507.480), 28; and C. Navarro Gómez and J. Navio Marco, *De qué estamos hablando cuando hablamos de smart cities: nuevos entornos para las políticas públicas locales*, 217.

residents/members of the territory or community¹⁹, and on the other, it will enable us to properly measure this type of initiative and establish new analytic perspectives for this reality which may help minimise potentially negative spillover effects resulting from this type of project²⁰ as a consequence of the use of new technologies and network infrastructures required for their implementation, including in particular those issues that may arise in the area of data protection and privacy²¹.

The following sections will attempt to provide insight into the process of creating and developing these concepts.

2.2. Defining elements

2.2.1. Territory

2.2.1.1. Defining territorial application

¹⁹ The arguments outlined by Almeida Cerredá in relation to smart cities are clearly applicable to smart territories as well: «The creation of a legal concept to define “city” and “smart city” would enable the city to enjoy certain rights, and by extension would facilitate the concession of specific rights and faculties to its residents. Greater benefits would be derived from a legally defined concept of smart city; once the right to the smart city has been established, it will generate and encourage the concession of a series of second-generation rights for its inhabitants (the right to higher-quality public services based on the use of ICT, the right to participate in urban public life using these technologies, etc.)». See M. Almeida Cerredá, *Ordenación urbana y ordenación territorial: un par de conceptos y un concepto dual*, in J.I. Rincón Córdoba and N. Cabezas Manosalva (coords.), *Ordenación del Territorio, Ciudad y Derecho Urbano. Competencias, Instrumentos de Planificación y Desafíos*, Bogotá, Universidad del Externado de Colombia, 2020, in press.

For the relation between the right to the city and smart territorial management, see C. Mialot, *El derecho a la ciudad en la gestión inteligente del territorio*, in V. Aguado i Cudolà, V. Parisio, and O. Casanovas i Ibàñez (dirs.), *El derecho a la ciudad: el reto de las smart cities*, Barcelona, Atelier, 2018, 24 ff.

²⁰ For the functions of legal concepts, see S. Diez Sastre, *La formación de conceptos en el Derecho público*, Madrid, Marcial Pons, 2018, 142 ff.

²¹ This author has also pointed out that placing undue importance on strategic interests may cause us to overlook alternative paths for promising urban development (R.G. Hollands, *Will the real Smart city please stand up?*, 303-320, cited in A. Caragliu, Ch. Del Bo, and P. Nijkamp, *Smart cities in Europe*, 49). See J.-B. Auby and V. De Gregorio (dirs.), *Donnés urbaines et smart cities*, Boulogne-Billancourt, Berger-Levrault, 2017; J. Priol, *Le big data des territoires, Open data, protection des données, smart city civic tech, services publics... Les nouvelles stratégies de la donnée au service de l'intérêt général*, Limoges, Fyd Editions, 2017; and C. Velasco Rico, *La ciudad inteligente: entre la transparencia y el control*, in *Revista General de Derecho Administrativo*, n. 50, 2019.

As previously indicated, smart schemes were initially designed to focus exclusively on the city, under the name “smart cities”. However, the city as a territorial application for smart schemes has shown to be insufficient, and we may now refer to smart territories, or integrated networks of interconnected centres of population. The smart “territory” can therefore refer to any type of space of varying nature, and may include rural and urban areas of different sizes²². In Spain, for example, it is typical for population centres to be spread out, and generally small or mid-sized, which often does not adhere to the traditional concept of city, understood to be an urban network of specific dimensions – e.g., 75,000 inhabitants or more, if we apply the criteria for identifying large municipalities found in Art. 121 of Law 7/1985, of 2 April, regulating the basis of local government (hereinafter, LBRL)²³.

We should also point out that this territory does not necessarily have to coincide with the administrative organisation responsible for its management (autonomous community, province, county, metropolitan area, consortium, etc.)²⁴, and criteria related to the feasibility and efficacy of each individual project should be used when defining the space.

We should, however, point out that although the pre-existing administrative organisation shouldn't determine the design, in a legal system as complex as the Spanish one it should at least be considered, as the ownership of public services and

²² M. Almeida Cerredá, *Ordenación urbana y ordenación territorial: un par de conceptos y un concepto dual*.

²³ While no legal concept of city has been defined, doctrine has identified a series of essential elements, which Almeida Cerredá has compiled in the following definition: «the portion of a territory which, independently of the administrative organisation responsible for its management (city council, consortium, metropolitan area, ...), is characterised by being a close urban network inhabited by a large and highly-concentrated group of citizens (according to the OECD, cities must have a minimum of 50,000 inhabitants and a density of 1,500 inhabitants per square kilometre), who are connected to the city not by a single status (that of resident person), but by multiple possibilities (resident person, permanent resident or temporary resident), all of whom are conceded the same rights to enjoy the city» (M. Almeida Cerredá, *Ordenación urbana y ordenación territorial: un par de conceptos y un concepto dual*).

²⁴ M. Almeida Cerredá, *Ordenación urbana y ordenación territorial: un par de conceptos y un concepto dual*.

infrastructures involved may correspond to administrations other than those that wish to promote and fund a project of this nature, or even those that will provide the actual services included in the project. Coordination, cooperation and collaboration among the different administrations involved is essential in the design and implementation of these schemes, particularly when they are used to minimise the problem of depopulation²⁵.

2.2.1.2. Taxonomy

While the territory is not an essential element, it may be used as a criterion for classifying smart territory projects, as the territorial application characteristics for this type of initiative will determine, to a great extent, the content, i.e., the type of actions to be included.

This classification is based on the idea of community, which, according to the Royal Spanish Academy, can be understood as a group of persons united by common characteristics or interests; we have just seen that the spatial definition of this type of scheme is not determined by existing territorial organisation – although in practice, this organisation does indeed influence the design –, and that it is the person, and not the territory, around which these initiatives should be designed. We will return to this idea in the coming section. We therefore propose using the term smart community to refer in general to initiatives that aim to provide a higher quality of life through the use of ICT, and which, to date, have been referred to as smart territories²⁶.

Within this genre, we can distinguish between two types depending on the specific characteristics of the territory where the initiative is to be designed and implemented: smart cities and smart territories. While the territorial application of a smart city scheme focuses primarily on large urban areas (smart

urban communities), in the case of smart territories, the area is much more heterogeneous, and may include small or medium-sized urban or rural communities, such that depending on the territorial boundaries, we can refer to smart villages, smart counties, smart provinces, etc.

This second group of projects, which have been generically referred to as smart territories, can be applied to areas with very different socio-economic and demographic characteristics²⁷, although rural areas must be properly differentiated according to the specific characteristics of the region in order to best design the initiatives to be promoted in these areas.

2.2.2. Means

The primary means is the use of ICT. As we have shown above in relation to smart cities, while no universally agreed on definition exists (nor for smart territory), it is true that all those that have been put forward share an element that is common to any smart community project: they are based on the use of ICT as a basic pillar for achieving efficient and sustainable city management in the information age²⁸.

The rendering of public services in a smart community must be governed by the principal of “digital by default”²⁹, in which the use of ICT takes preference, and in particular, the most state-of-the-art technology available for achieving effective and sustainable services³⁰. As pointed out by Cerrillo I Martínez regarding smart cities (an idea which is

²⁵ The Opinion of the European Committee of the Regions on *The EU response to the demographic challenge* (2017/C 017/08) considers that the demographic change that Europe is experiencing is on such a large scale that if it is to be tackled, strong vertical cooperation initiatives are also required, which back up action taken at regional and local level by means of measures designed at national and supra-national level.

²⁶ Regarding the concept of smart community, see H. Lindskog, *Smart communities initiatives*, in *ResearchGate*, January 2004. Available at: https://www.researchgate.net/publication/228371789_Smart_communities_initiatives (consulted in December 2020).

²⁷ Regarding the rural-urban contrast, see C.J. De Las Heras Rosas, *Demografía y territorios. Conceptos y tipologías de entidades poblacionales*, in T. Cantó Pérez (dir.), *Los territorios rurales inteligentes: administración e integración social*, Cizur Menor, Aranzadi, 2019, 134 ff.

²⁸ See the definition of smart city found in *Norma UNE 178201:2016, Ciudades inteligentes. Definición, atributos y requisitos*, UNE - Asociación Española de Normalización, 2016, available at: <https://www.une.org/encuentra-tu-norma/busca-tu-norma/norma?c=N00565-04> (consulted in October 2020); and Asociación Ametic, *Smart Cities 2012*, presented in *Foro TIC para la sostenibilidad*, Sevilla, 2012, 6. Available at: http://ametic.es/sites/default/files/Informe_Smart_Cities.pdf (consulted in October 2020).

²⁹ F. Bria and E. Mozorov, *Ripensare la smart city*, Torino, Codice, 2018, 112.

³⁰ See J.L. Piñar Mañas, *Derecho, técnica e innovación en las llamadas ciudades inteligentes. Privacidad y gobierno abierto*, in J.L. Piñar Mañas (dir.), *Smart cities. Derecho y técnica para una ciudad más habitable*, Madrid, Reus, 2017, 17.

equally applicable to the concept of smart community), these urban areas «use technology in an intensive, innovative and collaborative fashion in order to compile and analyse data and provide inclusive, efficient, resilient and sustainable people-centred services»³¹. The technology used should enable flexible management of public services and continuous interaction with users, and should be accessible, such that any person can use it, including those with limited technological skills and persons with disabilities³². As pointed out by Piñar Mañas, we must bear in mind that while Internet access should be considered a fundamental right associated both with the freedom of expression and information and with the right to have and develop a personality, we should also recognise the right to live without Internet, i.e. that Internet should not become an obligation or a necessity, such that the individual who opts to live in this way, aware even of the possibilities they are foregoing, will not find their relationship with the general public or with the public administration to be affected.

Secondly, it is important to highlight that a community cannot be categorised as smart unless previous planning exists, i.e., a comprehensive plan covering the objectives of the initiative, the actions to be implemented, and the means required to fulfil this goal. The occasional and isolated use of ICT to provide services does not constitute a smart territory. We shall return to this idea in the coming section.

2.2.3. Object

Smart communities are based on the use of ICT in multiple areas, grouped under different labels generally referred to as “smart dimensions”³³: governance, mobility,

environment, living, people and economy³⁴. From an objective or material standpoint, it seems that there are no differences between smart city and smart territory initiatives.

Smart governance. Smart governance strategies are designed to increase citizen participation in public management through the use of ICT, with a view to enhancing the transparency of public administrations and providing citizens with more data for informed decision-making, and to compound the accountability of public figures for their actions³⁵.

Smart mobility. This dimension includes the design of a global urban and inter-city mobility strategy which includes a high-quality, efficient, sustainable, safe and interconnected transport network based on ICT. Through these systems, citizens can access information in real time on the operation of these means that will allow users to access the service, save time, and reduce costs and carbon emissions, while at the same time, system managers will have the data required to continue improving these systems and services in the long term.

Smart environment. The term smart environment refers to all measures designed to enhance energy efficiency and effectiveness in a territory, such as promoting renewable energy sources; or using ICT to achieve energy-sustainable buildings – including public buildings, factories and homes –, to monitor pollution levels, or to improve the efficiency of certain public services, such as lighting, waste management or water supply in order to reduce the environmental footprint.

Smart living. This dimension includes initiatives designed to encourage safe and healthy consumer habits and behaviour through the use of ICT, within the framework of a territory that offers high levels of social cohesion.

³¹ A. Cerrillo I Martínez, *Los servicios de la ciudad inteligente*, presented at the *XV Congreso de la Asociación Española de Profesores de Derecho Administrativo: La ciudad del siglo XXI: transformaciones y retos*, Ibiza, 2020, available at: <http://www.aepda.es/AEPDAEntrada-2518-XV-CONGRESO-DE-LA-AEPDA.aspx> (consulted in October 2020)

³² F. Bria and E. Mozorov, *Ripensare la smart city*, 112.

³³ The identification of smart dimensions and a definition of each can be found in Directorate-General for internal policies (European Parliament), *Mapping Smart Cities in the EU (PE 507.480)*, 28; and in C. Navarro Gómez and J. Navio Marco, *De qué estamos hablando cuando hablamos de smart cities: nuevos entornos para las políticas públicas locales*, 217.

³⁴ See D. Santiago Iglesias, *Iniciativas para un futuro urbano sostenible: las smart cities*, 682 ff.

³⁵ See Organisation for Economic Co-operation and Development (OECD), *Modernising Government: The Way Forward*, OECD Publishing, 2005. Available at: <http://www.oecd.org/gov/modernisinggovernmentthewayforward.htm> (consulted in October 2020). Translated by the Instituto Nacional de Administración Pública as *La modernización del Estado: el camino a seguir*, Madrid, INAP/OCDE, 2006, available at: [http://www2.congreso.gob.pe/sicr/cendocbib/con4_uibd.nsf/60215C4F9-EE653E105257DE700740989/\\$FILE/1685.pdf](http://www2.congreso.gob.pe/sicr/cendocbib/con4_uibd.nsf/60215C4F9-EE653E105257DE700740989/$FILE/1685.pdf) (consulted in October 2020); and A. Casinelli, *L'e-government*, in *Giornale di diritto amministrativo*, n. 3, 2013, 234 ff.

Smart people. This concept refers to training and information sessions designed to support and expand citizen knowledge in the digital sphere so that individuals can fully benefit from the services offered by a smart territory and access the information required to fully participate in local governance³⁶.

A final point to mention regarding this dimension is that some authors consider that a smart citizen is, in effect, a facilitator, i.e., an element that plays an active role in helping to transform an area into a smart territory³⁷.

Smart economy. This dimension includes all actions designed to promote the economic growth of a territory and its external image through the use of ICT for goods production, rendering of services and the design of new products and business models. According to outcome indicators obtained from recent studies, economic growth and job creation is related to improved productivity (60%) and an improved quality of life and services (40%)³⁸.

What we can ask ourselves given the wide range of actions that fall under the previously mentioned labels is when we can use the term “smart” to describe a territory, depending on the object.

The first requirement should be that all actions be performed as part of an overarching scheme. Specifically, and using the terminology described in the following section of this paper, a smart territory project should exist, which precisely identifies and plans the actions to be performed, and at the same time mobilises the resources required to put the project in motion.

The second requirement would be for the project to include measures for all of the

previously identified smart dimensions, although there may be different phases for implementation – levels of maturity – which do not require simultaneous execution.

2.2.4. Purpose

The idea of smart cities is rooted in the creation and connection of human capital, social capital and ICT infrastructure in order to generate greater and more sustainable economic development and a better quality of life³⁹. It includes the use of new technologies with the aim of achieving more efficient management of the resources available⁴⁰. This is, in fact, the ultimate overarching purpose of any project of this nature, regardless of the territory where it is to be carried out: to improve the quality of life in the community in which the initiative is to be implemented.

Notwithstanding, the heterogeneous nature of smart communities from a geographic and socio-demographic standpoint determines that the specific goals assigned to each scheme may be slightly different, although generally complementary.

Almeida Cerredá has pointed out that smart city schemes fulfil the purpose of ensuring that residents in the city can fully benefit from the individual rights which are granted to them by the right to the city⁴¹, which results in the availability of high-quality public services⁴². Mialot has highlighted that the right to the city stands in opposition to IBM’s concept of smart city, in that the city’s digital meta-infrastructure should not be designed independently of the citizen, but rather, the citizen should be the focus of said design⁴³.

Notwithstanding in the case of smart rural

³⁶ For more on the interrelationship between the various components of a smart city, and in particular, between human and social relations and intellectual capital, wealth and governance, see P. Lombardi, S. Giordano, A. Caragliu, Ch. Del Bo, M. Deakin, P. Nijkamp, and K. Kourtit, *An Advanced Triple-Helix Network Model for Smart Cities Performance*, in *Research Memorandum 2011-45*, Amsterdam, Vrije Universiteit. Available at: http://www.researchgate.net/profile/Andrea_Caragliu/publication/241755976_An_advanced_triple-helix_network_model_for_smart_cities_performance/links/0c96052d5206e11167000000.pdf (consulted in January 2021).

³⁷ See R. Achaerandio, G. Gallotti, J. Curto, R. Bigliani, and F. Maldonado, *Análisis de las ciudades inteligentes en España*. See, also, *Hoja de ruta para la smart city*, Barcelona, Cercle Tecnològic de Catalunya (CTecno), 2012, available at: http://www.ctecno.cat/wp-content/uploads/2012/03/Hoja-de-Ruta-Smart-Cities_def.pdf (consulted in January 2021).

³⁸ See Asociación Ametic, *Smart Cities 2012*, 55.

³⁹ See Directorate-General for internal policies (European Parliament), *Mapping Smart Cities in the EU (PE 507.480)*, 18.

⁴⁰ See A. Calegari, *Smart cities e pianificazione urbanistica «intelligente»*, in V. Aguado i Cudolà, V. Parisio, and Ó. Casanovas i Ibàñez (dirs.), *El derecho a la ciudad: el reto de las smart cities*, Barcelona, Atelier, 2018, 66.

⁴¹ Regarding the notion of the right to the city, See J.-B. Auby, *Droit de la ville: du fonctionnement juridique des villes au droit à la Ville*, II ed., Paris, Lexis Nexis, 2016.

⁴² As Cerrillo i Martínez has pointed out, together with the general principles governing public services, the services provided by a smart city are characterised by four elements which are directly derived from the definition of smart city itself: people-focused, the use of data-intensive applications, the innovative and disruptive use of technology, and smart governance (A. Cerrillo i Martínez, *Los servicios de la ciudad inteligente*, 12 ff.).

⁴³ C. Mialot, *El derecho a la ciudad en la gestión inteligente del territorio*, 26.

territories, the primary specific goal will depend on the type of rural area, and may include equal opportunities for the inhabitants of the territory, which often means guaranteed access to essential services, or improving the quality standards of the services where access is already guaranteed⁴⁴. Often times, the implementation of the corresponding actions looks to achieve these goals simultaneously⁴⁵.

In short, all actions designed for this type of project should be focused on the individual and the community, with a view to transforming the territory in question into a place where people will want to live⁴⁶.

2.2.5. Form: smart planning⁴⁷

Providing an improved quality of life through smart communities requires proper advance planning. Transforming a city or territory into a smart community is a long and complex process, particularly when the goal is to achieve maximum development. Depending on its characteristics, each territory that wishes to become a smart community must have a unique strategy for reaching this goal; however, the strategy must not be designed in isolation, but rather within the framework of other, broader initiatives of the same nature, extending even to the area of the European Union.

In this paper, we will use the term planning to refer in general terms to all forms of administrative organisation and intervention, and the terms strategy, scheme and plan as subsets of this general term, according to the classification set forward by Almeida

Cerreda⁴⁸. These planning instruments are considered to be smart when the means used to achieve the objectives they propose are based on intensive data use, with the aim of fulfilling the purpose identified for smart territories: that of achieving a more sustainable economy and improved quality of life through more efficient management of existing resources⁴⁹.

3. Building a smart community

3.1. Phase one: designing smart territory strategies and schemes

The term smart strategy refers to the document, of a fundamentally political nature, in which the higher-level bodies of public administrations, endowed with democratic legitimacy, establish aims of general interest to be pursued in the long term, following the preliminary assessment of multiple aspects and circumstances of a territorial, environmental, socio-economic and political nature, achieved by means of data-intensive applications and state-of-the-art data processing technology. This type of generic document should include guidelines for fulfilling these aims, prioritise the actions required, and provide indicators for measuring the degree of compliance⁵⁰.

The first phase of the process for implementing a smart community should be to design the corresponding national, regional and local strategies from a transversal standpoint⁵¹. Notwithstanding, the strategy designed at state level should fit within strategies with a wider scope, e.g., at EU level.

It will be necessary to ensure the

⁴⁴ Art. 18.1 g) of the LBRL recognises the right of residents to demand the supply of public services, or the creation of a specific service, when such service constitutes a mandatory municipal responsibility.

⁴⁵ See *Directrices Generales para la elaboración de la Estrategia Nacional frente al Reto Demográfico* (DGENRD) designed by the Government Commissioner for addressing the Demographic Challenge, and created by Royal Decree 40/2017, of 27 January, and approved by the Council of Ministers of 29 March 2019, 37. The DGENRD has established that the general goal of these guidelines should be to ensure equal opportunities and free exercise of citizens' rights throughout the entire territory, through the coordination and cooperation of all public administrations, the sustainable use of endogenous resources and public-private partnership.

⁴⁶ See A. Brito Marquina, *Prólogo*, 7.

⁴⁷ The classification of administrative planning tools has been extracted from the following paper, written within the framework of the same research project: M. Almeida Cerreda, *Colaboración y planificación interadministrativa para la consecución de una distribución equilibrada de la población en el territorio*.

⁴⁸ M. Almeida Cerreda, *Colaboración y planificación interadministrativa para la consecución de una distribución equilibrada de población en el territorio*. Regarding this idea, please also see: V.M. Arnáez Arce, *La potestad planificadora de las administraciones públicas*, Bilbao, Gomylex, 2013, 36.

⁴⁹ The adjective "smart" applied to planning is becoming more frequent. See A. Calegari, *Smart cities e pianificazione urbanistica «intelligente»*, 65 ff.

⁵⁰ Definition based on the proposal for the term "strategy" put forth by M. Almeida Cerreda, *Colaboración y planificación interadministrativa para la consecución de una distribución equilibrada de población en el territorio*. Regarding this idea, please also see: V.G. Arnáez Arce, *La potestad planificadora de las administraciones públicas*, 36.

⁵¹ In this paper, the term "smart territory" will be reserved for the strategic design, and where relevant, for the scheduling of interventions for putting the strategic design in motion.

compatibility and complementarity of strategies designed at state, regional and local levels, establishing coordination, cooperation and collaboration mechanisms and designing procedures that allow for the participation of other public administrations, who will contribute data and promote their own initiatives in order to reach an understanding, following a scheme that is similar to the “concertation” proposed by Zafra⁵², such that a robust consensus is reached on the main lines of action⁵³. During this phase, it is crucial to perform preliminary studies regarding the socio-economic and demographic characteristics of the areas of intervention, from which it will be possible to establish priorities for action, where relevant, for those areas which are more appropriate due to their specific characteristics.

In terms of strategy effectiveness, it is important to establish both a tentative set of objectives to be fulfilled in a set period of time, and a cost-benefit analysis; notwithstanding, this is a self-binding instrument, the effects of which are produced solely *ad intra*, guiding the actions of the signatory administration without prejudice to the recommendation that the preparation process should include mechanisms to facilitate the participation of other public administrations, particularly local bodies, and of the general public⁵⁴.

Once the relevant state, regional or provincial strategies for smart territories have been approved, the scheme for carrying out these strategies and the resources required will be defined in a technical-political document which outlines the specific actions to be performed and establishes a timeline for carrying out these strategies, which are based on data-intensive applications and state-of-the-art data processing technology⁵⁵. As

occurs with smart strategies, the smart territory scheme will not have specific effects *ad extra*, but shall merely serve as a roadmap for citizens⁵⁶.

From a legal standpoint, the creation of smart community strategies and schemes will not constitute a mandatory preliminary step to project design.

3.2. Phase two: project approval

The specific smart community – smart city or smart territory – projects will be designed within the framework of approved strategies and schemes; these projects are scientific-technical documents which provide a detailed timeline of actions to be carried out in compliance with the strategies and schemes, with the aim of transforming an urban or rural area into an authentic smart community, mobilising all human, economic and material resources required⁵⁷.

Citizen participation should be guaranteed for approval, as has been previously highlighted for smart strategies and schemes.

Smart community – smart city or smart territory – projects are binding, both for the public administration that approves them, as well as for citizens. The term smart should only be used for those cases in which preliminary planning exists, i.e., for which a project has been previously approved.

Said project must establish criteria for measuring the degree of project implementation, such that the degree of maturity of the smart community can be determined, e.g., by considering the alignment of actions implemented in one or more smart dimensions, following a model similar to that described in earlier sections.

In keeping with the terminology proposed in this paper, from a spatial standpoint, we can distinguish two subtypes of smart community projects: smart cities and smart territories.

The term smart city should be reserved for projects involving large urban communities,

cación interadministrativa para la consecución de una distribución equilibrada de población en el territorio.

⁵⁶ See M. Almeida Cerredá, *Colaboración y planificación interadministrativa para la consecución de una distribución equilibrada de población en el territorio.*

⁵⁷ Definition based on the proposal for the term “strategy” put forth by M. Almeida Cerredá, *Colaboración y planificación interadministrativa para la consecución de una distribución equilibrada de población en el territorio.* Regarding this idea, please also see: V.M. Arnáez Arce, *La potestad planificadora de las administraciones públicas*, 36.

⁵² See M. Zafra Víctor, *Relaciones entre municipios y provincias*, in *Cuadernos de Derecho Local*, n. 29, 2012, 139.

⁵³ In preparing these studies, mechanisms should be provided to facilitate the participation of other administrations, as proposed in later sections regarding strategies for addressing depopulation, such that reasons, data, information and knowledge may be shared with a view to ensuring compatibility and complementarity between actions performed at different levels, following a scheme similar to the “concertation” concept proposed by Zafra Víctor (M. Zafra Víctor, *Relaciones entre municipios y provincias*, 139).

⁵⁴ See M. Sánchez Morón, *Derecho Administrativo. Parte General*, Madrid, Tecnos, 2020, 673.

⁵⁵ See M. Almeida Cerredá, *Colaboración y planifi-*

which may include not just the city itself, but also the surrounding metropolitan area, understood in the broadest sense of the word rather than in a legal sense⁵⁸.

The term smart territory, however, can be used to refer to initiatives designed for blended areas comprising small and intermediate-sized urban hubs and rural areas, which have been approved at supra-municipal level (provincial, county, etc.), or even by certain municipalities in whose territory we can find urban hubs that do not fit the description of city (smart villages).

4. *Smart community project maturity*

Here we shall discuss one of the possible systems that can be used to determine the degree of maturity of a smart community project, which may be useful for establishing a roadmap to follow when implementing a comprehensive smart project⁵⁹.

We must first remember that proper mention of the concept of smart community is only possible when a comprehensive preliminary project exists, defining the transformation a territory must undergo to become smart.

Without this initial planning stage, a territory (urban or rural) cannot be defined as smart. These criteria avoid grouping a

territory that has been designed and implemented according to a comprehensive plan of action in all six areas described above (smart dimensions), in the same category as another territory that has only implemented actions in one of these areas (e.g., a district within a city that has installed parking sensors or a smart waste collection scheme).

For cases that do not fulfil these criteria, we can use the term “smart pilot community”, i.e., those in which specific actions falling into one or more dimensions have been designed and implemented, such as the introduction of smart mobility systems or smart waste management schemes, but whose initiatives are administered independently by different municipal services, and which in general represent a solution to a specific problem.

We can also identify “smart proto-communities”, which are an intermediate stage involving a more extensive coordination of initiatives with a view to creating synergies, thereby achieving much greater benefit from the implementation of these projects⁶⁰. This stage focuses all actions on a common goal, independently of the dimension they represent, and this goal will differ depending on the type of territory in question (urban or rural). An eminently urban project, for instance, might be to reduce carbon emissions, while a rural project might be to provide access to a wide range of public services.

In cases where a comprehensive project exists and we can indeed refer to a smart community, the project itself must provide for instruments for measuring the degree of maturity of the smart territory, and by extension, compliance with the objectives established therein.

One possible criterion would be the number of smart dimensions for which actions have been carried out. As pointed out at the beginning of this paper, the EU has been using these criteria to define a smart city (*Mapping Smart Cities in the EU*), considering that cities in which actions have been carried out in only one of these dimensions can be referred to as smart. However, for reasons that have been previously explained, this should not be a definitive criterion, although it can indeed be useful for evaluating the maturity or degree of implementation of a comprehensive smart

⁵⁸ While no legal concept of city has been defined, doctrine has identified a series of essential elements, which Almeida Cerrada has compiled in the following definition: «the portion of a territory which, independently of the administrative organisation responsible for its management (city council, consortium, metropolitan area, ...), is characterised by being a close urban network inhabited by a large and highly-concentrated group of citizens (according to the OECD, cities must have a minimum of 50,000 inhabitants and a density of 1,500 inhabitants per square kilometre), who are connected to the city not by a single status (that of resident person), but by multiple possibilities (resident person, permanent resident or temporary resident), all of whom are conceded the same rights to enjoy the city» (M. Almeida Cerrada, *Colaboración y planificación interadministrativa para la consecución de una distribución equilibrada de la población en el territorio*). We can also use the criteria for identifying large municipalities found in Art. 121 of Law 7/1985, of 2 April, regulating the basis of local government.

⁵⁹ The evaluation criteria for determining the degree of maturity of a smart city described in this section have been taken from: R. Achaerandio, G. Gallotti, J. Curto, R. Bigliani, and F. Maldonado, *Análisis de las ciudades inteligentes en España*; and Cercle Tecnològic de Catalunya (CTecno), *Hoja de ruta para la Smart City*. See, also, D. Santiago Iglesias, *Iniciativas para un futuro urbano sostenible: las smart cities*, 690 ff.; and S. Bolognini, *Dalla “smart city” alla “human smart city” e oltre*, Milano, Giuffrè, 2017, 7 ff.

⁶⁰ Regarding this idea, vid. R. Achaerandio, G. Gallotti, J. Curto, R. Bigliani, and F. Maldonado, *Análisis de las ciudades inteligentes en España*.

project.

Other criteria could refer to data availability such that, during an initial stage, great effort would be made to provide citizens with data regarding different areas through the appropriate websites, although this information would not be sufficient to fully address their needs. A second stage would make it easy to access and use open data sources, which would be contextualised, thus facilitating use for citizens and businesses. And finally, there is a third stage in which this ubiquitous information, which is the final goal of this type of project, is based on two pillars: open data storage and sensor connectivity – the Internet of Things – which, when combined with individual citizen profiles, makes it possible to provide individualised user data to those persons who so desire. This final level is the ultimate goal to be achieved by any smart community; notwithstanding, the implementation of this type of initiative is very complex indeed, and is limited by the geographic and socio-demographic characteristics of the area for which it is envisioned⁶¹.

⁶¹ See R. Achaerandio, G. Gallotti, J. Curto, R. Bigliani, and F. Maldonado, *Análisis de las ciudades inteligentes en España*.