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Towards a Comparative Study of International Experiences of Intelligent Territories

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ABSTRACT-The idea of smart territory (IT) is presented as a new way of conceiving territories, presenting innovative and creative proposals to build the new contemporary urbanism. It should be noted that the word territory makes it possible to go beyond the notion of city, understood as a geographical place delimited by borders. Thus, when it comes to territory, we can approach the concepts of super cities or urban diamonds, which consist of the union of different geographically interconnected metropolitan areas, as well as the integration of their markets (Fondation Métropolie and Microsoft, 2013).The different characteristics that correspond to this type of territory constitute a frame of reference for the design and implementation of development models, adapted to the specific conditions and requirements of each region. It is important to emphasize that the implementation of smart projects is not limited to territories belonging to developed countries; It also extends to small and medium-sized territories in developing countries which have, among other characteristics, a structured futuristic vision, good leadership and active participation of all actors in society. In this study, a review of the literature on smart city initiatives at the international level will be presented.

Keywords: Smart territories, Territorial intelligence, Smart cities

I. INTRODUCTION

The concept of smart territory, known in English as smart city or smart territory, can designate a city, a region or a municipality. To begin with, it is important to point out that since it is a concept of recent appearance, a precise and agreed definition is not yet found in the literature. Likewise, the existence of a considerable number of research and movements related to the notion of smart territory, such as the digital city, smart communities, the city of knowledge, the city of learning, among others, has given way to the construction of a diversity of concepts associated with this subject (Komninos, 2006).

This study explores the foundations of the smart territories approach, its characteristics and dimensions, as well as some successful experiences of its application as a territorial development strategy will be studied later. Before that, a brief description of the endogenous development paradigm is made, an analytical framework in which the smart territories approach can be circumscribed, as well as other models of territorial development [1].

II. Some experiences of smart territories

The analysis of specific experiences of cities classified as "smart" reveals how the processes that each territory is confronted with to become a smart place. This is mainly due to the fact that each territory is unique and, therefore, has its own potential or strengths and weaknesses, which directly influences the construction of its development vision. In this sense, the roadmap defined by each city or region will depend above all on the prioritization of the problems it faces and the components of excellence identified.

Below are various smart city success stories in Europe, Asia, North America and Latin America, which are developed from diverse ideologies, and whose initiatives include different components of a smart city. Thus, for example, there are cities that have developed their intelligent strategy framed in the establishment of technological platforms and in a complete offer of information and communication technologies. Other territories, meanwhile, have focused on the construction of a smart city based on innovation and knowledge management, or on the design of plans and policies aimed at mitigating the consequences of climate change. It is also important to highlight cities that have taken a slightly more holistic view by implementing smart strategies in various spheres of the city.

II.1 Smart city initiatives in Europe

Santander."SmartSantander" is a project that consists of providing the Cantabrian capital with a complete technological infrastructure. For this, a technological platform has been developed which has around 20,000 devices distributed in Belgrade, Guildford, Lübeck and Santander, such as sensors, cameras, communication networks and sensors, which are interconnected via the so-called "Internet of Things" [2], [3].

Bilbao. The strategy of smart city from Bilbaois based on building a city based on technology, innovation and knowledge management. One of the actions undertaken to achieve this objective consists in guaranteeing the entire population access to the information society, through the implementation of the "Bilbao Digital Agenda 2012". This project had an action horizon of five years (2007-2012), and allowed the establishment of strategic alliances between the public and private sectors, as well as the improvement of the internal efficiency of the municipal administration. Likewise, this strategy included 40 projects framed in nine lines of action, among which public services, formation of city groups, dissemination, public space, promotion of the ICT sector, strategic alliances, infrastructures and regulations, the improvement of internal management and the cooperation. Among the projects carried out, the creation of the electronic government Bilbao.net stands out, through which municipal procedures are carried out, the city council interacts with civil society and payments online are carried out; likewise, projects referring to the improvement of mobility, such as shared cars and bicycle loans and projects aimed at educating the population of Bilbao.

In addition to the above, there is the creation of the "Bilbao Innovation Agenda" project, whose main objective is to make Bilbao a more competitive city through the creation of community networks that promote entrepreneurship, creativity, attracting and retaining human talent. This innovation agenda is structured around six components or axes: government, quality of life, environment, mobility, citizenship and economy. Today, Bilbao is characterized by being a benchmark for a smart city model by carrying out a process of reinvention that has transformed the old industrial paradigm of the city into a technological, cultural and innovative city [4].

Malaga. Another recognized example of a smart city is Malaga, whose smart strategy focuses on energy efficiency. In 2014, the city managed to reduce its CO2 emissions by 4,500 tons, which is equivalent to an energy saving of 20%. To achieve these results, the "Málaga Smartcity" project has automated meters, efficient management of public lighting and the development and implementation of renewable energies. Therefore, this project is considered as an important European initiative for an eco-efficient city [5].

Barcelona. In Spain, the case of Barcelona also stands out, whose vision of the smart city is based on guaranteeing citizens a better quality of life and achieving economic growth through the efficient management of city services and resources. town. Barcelona's smart initiatives are part of a cross-cutting dimension, which includes the development of strategic projects in different areas, including public and social services, environment, mobility, business, research and innovation, communications , infrastructure, tourism and citizen collaboration. Barcelona projects itself into the future as a city that is self-sufficient, respectful of the environment, productive, open, inclusive and endowed with entrepreneurial and innovative human talents. Among the projects that have been developed as part of the construction of Barcelona as a smart city, the promotion of the use of electric vehicles as individual, collective, public and private transport stands out, in terms of sustainable mobility. For this, the city is equipped with 3,000 free charging stations and 180 car parks [6], [7].

With regard to the management of public administration, among other projects, the government open data system is presented, in order to be used by the whole of society, as well as the provision of various channels through which they offer citizen attention services to deal with complaints, incidents or their management. On the other hand, an example of urban regeneration is the Smart City Campus, whose main objective is to bring together, in the same physical space, companies, technology and innovation centers and universities, in order to create synergies favoring the development of incubators, laboratories and test benches which make it possible to design solutions to the problems of the city.

Madrid. Madrid's strategy to become a smart city is to create a sustainable and innovative city, emphasizing the quality of life of the population and the efficient management of public services. For this, the town hall of the Spanish capital has developed a management model for public service providers, which proposes a new form of contracting (global contracts) centered on the quality of the service provided. Among the urban services governed by this type of contract, the management of urban waste, irrigation systems, maintenance and preservation of green spaces stand out; management of urban equipment (public lighting, traffic lights, traffic control cameras); and road infrastructure management (bridges, roads) [8].

Palencia and Valladolid. To the above it is important to add the case of the "Smart City VYP" project, focused on promoting the union of the cities of Valladolid and Palencia, which are geographically close, but have different characteristics. The main objective of this initiative is to take advantage of the potential of each of these cities in order to define innovative projects that generate a positive impact. In the development of the "Smart City VYP" initiative, various community actors participate, among which,public education, private sector companies, research centers and citizens.Thissmart city strategy revolves around five lines of action: energy, environment, logistics and transport (ICT), citizenship (social and human capital, quality of life); and tourism.

First, the thematic axis of energy includes the implementation of the smart grid through the development of energy efficiency programs and the construction of sustainable buildings. Second, the environmental component includes waste management and air pollution reduction. The third axis of logistics and transport proposes the use of green vehicles, the development of an intelligent transport system and interconnected urban mobility.

In the line of action that involves the citizen, the development of projects that promote communication and interaction between the government and the population stands out. For example, electronic administration, digitization of information, administrative modernization, integration and interoperability of digital services. Finally, the tourism component includes the promotion and implementation of ICTs in new tourism services, such as cultural tourism. Within the framework of the "Smart City VYP" initiative, various projects have been launched, among which the implementation of an efficient lighting system based

ontechnologyLED and with telematics control, which allows the light intensity to be varied according to specific needs in mobility management, through technological platforms that allow the detection of parking spaces available for electric vehicles. The creation of the EDIDD center (Space for Training, Innovation and Sustainable Development), whose objective is to promote the development of the spirit of enterprise, innovation, socio-professional training and environmental and social sustainability [9].

Copenhagen. Copenhagen is considered one of the smart citiesthe most importantin the world, due to its smart city model based on environmental sustainability. For this, it has developed projects based on efficient water management, through the implementation of technologies that allow adequate management of water resources and the modernization of the system. The design of sustainable mobility systems, with particular emphasis on the use of the bicycle as a means of transport and the use of a public transport network; as well as the promotion of the recycling of urban waste and the production of energy from wind turbines [10].

Helsinki. On the other hand, the so-called "Forum Virium Helsinki" encompasses thestrategysmart cityofthe Finnish capital. The main objective of this project consists in the deployment of the fundamental factors for the construction of smart cities. As part of its development, several smart initiatives have been implemented, among which the opening of public data through the Helsinki Region Infoshare program stands out; the transformation of the Kalasatama area into a residential and business district, becoming a reference model for smart urban development, and taking advantage of the innovation capacity of all citizens, by promoting the development of mobile applications aimed at solve the city's problems [11].

Vienna. In the Austrian capital, a strategy called "Wien Smart City" has been established, which includes the future vision of the city for 2050. This initiative consists of the development of innovative solutions aimed at achieving efficient and sustainable management of resources, as well as to ensure a better quality of life for the citizens of Vienna. However, Vienna's Smart City strategy has a more global approach, proposing solutions that cover the different spheres of the city: environment, energy, transport, health, infrastructure and communication [12].

Amsterdam. A fundamental factor in building Amsterdam as a smart city is the work carried out by the Amsterdam Smart City Association (ASC), which includes businesses, government institutions, knowledge centers and citizens. The philosophy of this association is to create a livable city in which it is pleasant to live and work. Today, ASC is a platform with more than 100 partners who have developed more than 75 innovative projects framed in the areas of mobility, quality of life, society and the economy [13].

II.2 Smart city initiatives in Asia

Hsinchu City. This city, located in northern Taiwan, seeks to become a smart city with high levels of sustainability and quality of life, taking innovation in all spheres of daily life as a fundamental pillar. In addition, the city has developed an extensive digital education program, making it a pioneer throughout the Taiwan region in implementinglearning platforms online and e-books [14].

New Delhi. The New Delphi City Council has developed a series of initiatives for the city's transformation into a smart city, including the design of an LED street lighting system, the development of a production plan solar energy and the use of urban waste in the production of energy and gas [15].

II.3 Smart City Initiatives in North America

San Diego. San Diego's smart city strategy focuses on harnessing the city's potential and resources to develop initiatives to improve environmental quality, promote economic growth, and reduce dependence on electricity. oil as fuel. Various city officials participate in the construction of the smart cityof San Diego: companies such as San Diego Gas & Electric,GE, UC San Diego, and Cleantech San Diego, as well as government institutions, educational centers, and

nonprofit organizations. Among the initiatives developed are the smart construction of the Port of San Diego through the installation of sensors that monitor energy consumption; promoting the use of electric public vehicles and installing charging stations using solar energy; car sharing systems; efficient management of public lighting through the installation of LED lamps; and the construction of an apartment complex called "Solterra", which uses solar energy as a source of energy [16].

San Francisco. The construction of a smart city in San Francisco is based on two main axes: technological innovation and the development of ecological and sustainable initiatives. These include the promotion of recycling, energy conservation and the use of hybrid vehicles and electric. As part of this second axis, a program called “Eco-quartier was created in San Francisco, through which the city is committed to reducing energy consumption and managing water efficiently [17].

Chicago. Chicago is considered a leading city in eco-smart construction; it now has around 405 buildings with LED certificates. In addition, it has developed a sustainable mobility plan through the use of shared bicycles and launched an electronic government program through the creation of databases open to the public. However, it is important to underline that the smart strategy of Chicago is part of the use of information and communication technologies as the main factor for improving the quality of urban life, since these favor the citizen participation, inclusion and innovation [18].

Toronto. This Canadian city is characterized by hosting a wide variety of economic activities (financial industries, high technology, film production) and by being a pole of attraction for immigrants from different countries. This led to the emergence of an initiative called "Toronto Waterfront", considered the largest urban renewal project in North America, creating industrial centers, homes, parks and commercial offices in an abandoned area. , and encouraging the creation of new jobs and access to broadband systems for the low-income population. Likewise, other smart initiatives stand out, such as "The Mars Discovery District", focused on creating business incubators.

II.4 Smart city initiatives in South America

Rio de Janeiro. The smart city strategy in Rio de Janeiro began in 2010, when thesocietyIBMhascreated an integrated operations center in the city, equipping it with a network of sensors as part of a rapid response system for different types of emergencies. This system integrates data from various places in the city, used in security and transport issues, and in the prevention of possible disasters (floods) [19].

Curitiba. The development of smart initiatives in Curitiba is presented as a response to the main problems of the city, among which mobility, the absence of green spaces, the deficiency of urban waste collection systems and social unsustainability stand out. . First, a plan has been designed to guarantee good traffic management through the construction of three lanes: one to enter the city, another to leave it and the third for the exclusive use of public transport. Likewise, cycle paths have been created to encourage transport by bicycle and significantly reduce air pollution levels. With regard to green spaces, Curitiba has designed an environmental policy that encourages the creation of wooded areas with abundant native vegetation, which reduces the risk of flooding. In addition, innovative campaigns are developed aimed at promoting the recycling of urban waste. An example of the above are the so-called “waste collection points”, where people deliver rubbish and receive fresh vegetables or bus tickets in return [20].

Conclusion

In this study, a review of the literature on smart city initiatives at the international level has been presented. This article has shown the foundations of the smart territories approach, its characteristics and dimensions, as well as some successful experiences of its application as a territorial development strategy that will be studied later. Before that, a brief description of the endogenous development paradigm is made, an analytical framework in which the smart territories approach can be circumscribed, as well as other models of territorial development.

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