Smart City Planning

Subjects: Others
Contributor: Leonardo Juan Ramirez Lopez

The smart city concept is established as those “cities with an intelligent economic, institutional, social and physical infrastructure, which ensure the centralization of their citizens in a sustainable environment”, this being a great challenge to achieve.

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1. Introduction

Thus, ISO 37122:2019 “Sustainable Cities and Communities—Indicators for smart cities” establishes a series of integrated and interconnected strategies and systems to provide better services and increase quality of life [1][2][3], ensuring equal opportunities for all, protecting the environment, and including some development factors [4][5][6] and generating a great capacity for learning, innovation, and creativity alongside institutionalism, leading it towards an inclusive model [1][7]. This means placing the citizen at the center, giving them a role that supports technological development through a sustainable and participatory system, strengthening the collective intelligence about information and communication technologies (ICT) [1][8], and using governance to project a vision of the future with an intelligent combination of endowments and activities of independent and conscious citizens [9].

On the other hand, among the most outstanding considerations of a smart city in the measure of the integrated use of ICT are internet networks (IP), mobile, the cloud, big data, and the Internet of Things (IoT). This last one promotes the transition towards the smart city in a practical way, because it is applicable in small sectors of a population and enhances the areas of development of these [10].

2. Sustainability and Resilience in Smart City Planning

2.1. Planning

As has been stated throughout the document, planning is as old as man’s presence on earth. That is, it is almost in human beings’ DNA and was evidenced with, through common sense, the need to reorganize its territory for the common good. With the passing of time, this became a discipline of knowledge and political instruments as a mechanism in favor of an economic system.

It is evident that urban planning has an exponential dependence on existing natural resources, especially water resources, because the guarantee of the well-being of human settlements is focused on the environmental services that this resource provides [11], coupled with historical urban expansion and socio-economic conditions of territory leading to increased demand for natural resources, with negative impacts on the ecosystem.

On the other hand, the creation of political structures and organizations was important for the initiation of territorial planning instruments such as stratifications, categorization, and land use; the last two gave the guidelines for the emergence of equipment, influencing, in turn, cadastral valuations [12][13][14][15][16][11][17][18][19][20][21][22][23]. For this reason, these investments in development were initially exclusive to the elites, highlighting the territorial imbalance, framing the poverty belts, and reinforcing the phenomena of disorderly growth in the peripheries.

Although ecodevelopment aims to revolutionize urban planning, under its vision of sustainable development, to change the view of territory from anthropocentrism to bioregion [24][25], it seems that its implementation is becoming even more complex due to the growing demand of a consumer society, which expects to reach a representative level of development, even at the cost of the evident environmental sacrifice that we carry on our backs and which has been a protagonist in the construction of hasty corrective measures.

It is important to remark that the approach of environmental principles such as cooperation, precaution, prevention, biodiversity, and sustainable development discussed at the Rio Summit in 1992 [26] marked a real legal obligation in the instruments of territorial planning, providing important support for the implementation of public policies aimed at

sustainability.

Questions arise such as: What is the difference between ancient cities, that is, B.C. cities to those of today? Today the world is very different from that of the Industrial Revolution, with new economic realities, geopolitical tensions, technological advances, new actors involved, and innovative ways of waging wars that globalization has led us to.

In other words, one of the main causes of transformation in cities is due to population growth. That is, while today we have more than 50 megacities with approximately 10 million inhabitants, in ancient times only seven reached a million. Mesoamerican cities have shown growth patterns very similar to those of today, according to the urban scaling model. That is, as they grow, the community tends to inhabit smaller and more concentrated spaces [27].

On the other hand, for ancient cities the walls and fortifications that could be seen from a distance were synonymous with power and authority, something that is not far away today, where modern skyscrapers equipped with the latest technology reflect the fashion for sustainability [27]. However, it can be said that cities governed with a view to equitable distribution showed greater long-term prosperity and competitiveness compared to those governed in an authoritarian manner [28].

2.2. Sustainability

The Brundtland Summit established the concept of sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” [29], identifying two notions, the first framed in the environmental footprint and the second in the carrying capacity by assigning a time variable.

Sustainable development is based on a territorial approach aimed at the bioregion, in which the maintenance of essential ecological processes and life support systems, the preservation of genetics, and the sustainable use of species in accordance with their carrying capacity are seen as vitally important [30][31]. In other words, it pursues a biocentric vision where the human being is no longer the center and forces urban planning to reevaluate the ordinance of the territory as an instrument that harmonizes with the dynamics of an ecosystem and allows for the evaluation of its carrying capacity and thus guaranteeing long-term planning.

Thus, the declaration of Tbilisi becomes important, establishing the five objectives of environmental moral education [32] [33]. These were created because it was useless to establish public policies of a police order in the pursuit of compliance with environmental duties if the community was not educated with a vision of taking roots in their territory.

The Millennium Development Goals allowed the establishment of eight objectives, strengthening environmentalist demands and opening doors so that in the UN Conference on Environment and Development Rio+20, special emphasis was placed on green economy issues [34], strengthening as a determining evaluation tool for sustainability, the measurement of the footprint, and the economic valuation of environmental services, which allow for the establishment of a consumption quantification. However, implementation did not guarantee sustainability, because, in addition to a diagnosis, the Conference did not have a robust legal framework that required corrective measures.

2.3. Resilience

Territorial planners relate urban resilience to intra-urban processes that are mainly associated with natural disasters [35], perceiving it as an isolated unit and therefore focusing mainly on internal interactions, without giving importance to the fact that the dynamics of these interactions must also be associated at a macro level, which is the relations with other cities.

This allows us to consider cities with a complex systems approach that functions as a network of relationships composed of their internal components and external networks [29]. This works like a gear—that is, each component of its extension fulfills a function and, to the extent that it harmonizes with this internal and external network, it is magnified with a common objective to make this complex system work effectively. These interactions at the local and regional level allow the city to develop further in a multilevel approach.

Hence, a city is seen as a connective element between inter- and intra-urban processes that allows resilience to be raised as a result of their interactions [36]. In these multi-level interactions, “new properties emerge and characterize the city as a collective entity” [34]. It is clear that relationships are the key factor in understanding resilience, but how can each level be measured? Can an analysis of interactions between them be carried out? This is only possible when the point of interconnection and synchronization is understood.

The concept of “panarchy” is postulated as one of the tools to explain the multilevel synchronization of complex systems, as proposed by Hollings in his most recent speech [37]. Thus, urban resilience could be analyzed in its long-term interactions from its key formation factors (exploitation, conservation, liberation, or reorganization). The analysis of these

interactions will allow for the contribution of new tools for concepts such as carrying capacity and the measurement of the environmental footprint.

It is important to emphasize that the adoption of measures aimed at implementing resilience is related to risk management from a natural disaster perspective in order to improve the quality of life of citizens . Nevertheless, it would seem that resilience is a magic formula for reducing the vulnerability to which cities are exposed, without considering that it is a concept that is still under construction and is still in search of its key training factors.

Sustainability and resilience are two concepts that will allow a strategic functionality in urban planning, because whereas the first one prioritizes results, the second one analyzes processes, demonstrating that a partnership between these two concepts will allow for a widening of the focus to anticipate anthropocentric and natural uncertainties.

2.4. The Smart Cities

The complexity of the administration of cities makes it imperative to develop smart cities as a tool through which technology is put at the service of citizens, allowing not only for the collection of data but also for the processing of them for the benefit of government entities under the principle of governance.

The smart city is measured in six dimensions: economy, transportation and communications, environment, community, quality of life, and smart management and administration [3]. For this reason, a smart city is a territory with the capacity to learn using technologies as a differentiating element in the hands of institutions dedicated to research and development to improve the quality of life of the community.

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