

Smart Cities In Peru A Systematic Review

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Summary:

The review article addresses the concept and implementation of smart and sustainable cities. Multiple authors explore the evolution of the term, which has become a global trend in urban planning and development. Smart cities leverage advanced technologies to improve quality of life, promote environmental sustainability, optimize public services, and increase citizen participation. While the benefits are highlighted, challenges such as cybersecurity, data privacy and social inclusion are also examined. The article presents successful examples and focuses on the use of emerging technologies such as artificial intelligence and the Internet of Things. It concludes by emphasizing the need for collaboration between stakeholders

and the importance of addressing pending challenges to achieve resilient urban development.

Keywords: Smart cities, sustainability, information and communication technologies (ICT), energy efficiency, inclusive innovation, quality of life, urban development, Internet of Things (IoT), citizen participation, cybersecurity, data privacy.

1. Introduction:

Context:

Bonilla et al (2019), state that the general objective of the article "Smart and Sustainable Cities State of the Art - 2019" was to present a detailed analysis of smart and sustainable cities, including definitions. The article "Smart and Sustainable Cities: State of the Art – 2019" focused on analyzing the concept of smart and sustainable city and how it has evolved to include socioeconomic objectives such as those expressed in the theme of sustainable development. A comparative table was also established between cities, which continue to be, par excellence, the privileged centers of economic, political, social and cultural activity of modern societies.

Alvarado (2018), defined as the general objective of the article, to present some principles and concepts on which the models of smart and sustainable cities are based, as well as the relationship it has with the theoretical elements of inclusive innovation. As the main result, there is a need to create adequate environments for inclusive innovation from the efficient and intensive use of available technologies, which is why it is necessary to accelerate the processes of learning, construction and accumulation of technological capabilities; in the conjunction of Smart Cities and inclusive innovation as urban management strategies that allow social inclusion from the use and appropriation of ICTs as well as economic, social and environmental development to improve the quality of life and equality of citizens.

Smart cities have emerged as an innovative response to the challenges facing urban areas in the twenty-first century. These cities use cutting-edge technologies to improve the quality of life of their inhabitants, promote environmental sustainability,

optimize the efficiency of public services and encourage citizen participation. In this review article, we examine the key features of smart cities, the associated benefits and challenges, as well as successful examples of implementation around the world.

Villatoro, De Miranda and San Salvador (2020) defined the smart city as one that incorporates technological innovation in various aspects of urban life, ranging from the environment to administration and governance, mobility, economy, quality of life and people. To this end, the European Union identified these six areas in all lines of work in relation to technological innovation and the digital transition. From a governance perspective, at least four technology-based development domains can be identified focusing on atoms (nanotechnology), genes (biotechnology), bits (information and communication technologies) and neurons (neurosciences, artificial intelligence).

Villatoro Hernández, F., de Miranda Leschko, G., San Salvador del Valle Doistua, R. (2022). *Smart cities, wise cities: For democratic and collaborative governance*. Spain: Los Libros de La Catarata. *Smart cities, wise cities: For democratic and collaborative governance*.

La Escala (2020), mentions that smart cities are characterized by being sustainable and habitable spaces, where the economic, social and environmental pillars support each other through the adoption of advanced technologies and the implementation of transversal actions that promote business growth, the well-being of citizens and the development of human capital, thus providing affordable services and efficient infrastructures that improve the quality of life of citizens. its inhabitants, while enriching the environment.

From smart grids to smart cities. (2020). United Kingdom: ISTE Editions Limited.

https://www.google.com.pe/books/edition/De_las_redes_inteligentes_a_las_ciudades/-LvTDwAAQBAJ?hl=es-419&gbpv=0

Navarro and Cantarero (2017), mentions that a smart city refers to one that uses technological innovation to create a more livable environment for people. However, it is important to stress that it should not become an exclusive city for those familiar with innovation, leaving aside those who are not or do not wish to be,

as this would result in a robotized and dehumanized city, the opposite of being intelligent and sustainable.

Navarro Cano, N., Cantarero García, G. (2017). Smart cities: law and technique for a more livable city. Spain: Reus. [https://www.google.com.pe/books/edition/Smart_Cities/ZrxUDwAAQBAJ?hl=es-](https://www.google.com.pe/books/edition/Smart_Cities/ZrxUDwAAQBAJ?hl=es-419&gbpv=1&dq=Navarro+y+Cantarero&printsec=frontcover)

[419&gbpv=1&dq=Navarro+y+Cantarero&printsec=frontcover](https://www.google.com.pe/books/edition/Smart_Cities/ZrxUDwAAQBAJ?hl=es-419&gbpv=1&dq=Navarro+y+Cantarero&printsec=frontcover)

Alonso, De Gregorio and Gonzáles (2021), mention that within the complex urban system of cities, Information and Communication Technologies (ICT) are fundamental to face challenges and take advantage of opportunities, improving efficiency, innovation and integration of municipal services, the key to achieving smart cities not only lies in technological investment, but in the real integration of diverse professional profiles working together for the common good. Standardization, led by the Spanish Association for Standardization and Certification (AENOR), plays an essential role in economic development by establishing standards and technical norms that foster competitiveness, innovation and value creation for citizens.

Urban agendas and city governance: Transformations, challenges and instruments. (2021). Spain: Editorial Reus. [https://www.google.com.pe/books/edition/Las_agendas_urbanas_y_el_gobierno_de_las/FBI5EAAAQBAJ?hl=es-](https://www.google.com.pe/books/edition/Las_agendas_urbanas_y_el_gobierno_de_las/FBI5EAAAQBAJ?hl=es-419&gbpv=1&dq=Las+agendas+urbanas+y+el+gobierno+de+las+c)

[419&gbpv=1&dq=Las+agendas+urbanas+y+el+gobierno+de+las+c](https://www.google.com.pe/books/edition/Las_agendas_urbanas_y_el_gobierno_de_las/FBI5EAAAQBAJ?hl=es-419&gbpv=1&dq=Las+agendas+urbanas+y+el+gobierno+de+las+c)

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Camargo, Gómez and Gasca (2020), mention that in Latin America smart cities focus on improving the infrastructure of information and communication technologies (ICT) in order to facilitate access to these technologies in rural areas and in the periphery of urban areas, attract foreign investment, improve the education and culture of its inhabitants, foster economic and social development, increase the provision of e-public services and support the transition to a knowledge-based economy. It could then be considered that strategies and policies to establish, transform or consolidate smart cities in Latin America focus on optimizing ICT infrastructure to ensure progress in specific areas and aspects within these cities.

Camargo Ariza, L. L. Gómez Rojas, J. & Gasca, M. C. (2020). The smart city and ICT management. Editorial Unimagdalena. <https://elibro.net/es/lc/uladech/titulos/175968>

Ortuño (2021), defines the term 'Smart City' as a concept in constant evolution that has been widely accepted in different languages, it is widely used in the business field as a concept of 'marketing', although other terminologies such as 'Efficient City' are also used. Although there have been multiple proposals for definition, all agree on a common essence, this term began to become popular from 2011 and has had a great impact on various fields, including technology, governments and economy, influencing the management of numerous cities.

Ortuño Cámara, J. L. (2021). FINTECH with a social vocation, an opportunity in a Smart City environment. J.M. BOSCH PUBLISHER. <https://elibro.net/es/lc/uladech/titulos/213854>

Background:

Culqui and Callao (2021) specify that the conception of complexity is a variable related to smart cities, so the difference between the different ancestors or predecessors of Western and Eastern culture must be established, and that thinkers who could be considered pioneers of complexity contribute to such theories, deployed over time. In this sense, the article provides the literary review around the theories of various cultures and the philosophical and current periods from their intentionality, express a type of context against the conception of smart cities; Conceptions of new knowledge that somehow surpass, in various aspects and forms, the way of seeing reality, and are aimed at identifying chance, uncertainty or necessity.

Linaresy Vasquez (2018); In their work they indicate that for this, a methodology was proposed that was executed in 5 phases (referencing, evaluation, methodological proposal, formulation and validation), identifying theories, in the referencing phase, such as chaos theory, algorithmic information theory, simplicity theory and general systems theory; All of them contributed to understanding the various present and possible dynamics of smart cities, while favoring the understanding of the social problems and challenges that these urban territories must face.

Urrego-Marín and Ocampo (2021); They propose that a smart city is a geographical area or territory that is characterized by the intensive use of technologies with the objective, in general, of

improving the quality of life of citizens and the sustainable development of cities under the assumptions of collaboration and innovation. The purpose of this article is to present a systematic review of literature on the concept and characteristics of smart cities published in the scientific literature, from which emphasis is placed on the role of information and communication technologies, as a fundamental element in the formation and implementation of projects and initiatives that affect the successful development of smart cities.

1.1. Knowledge gap:

This review article, commonly known as review, refers to give a role of the smart city and the wise city (wise city) to consider the creation of democratic and collaborative governance models that promote the sustainable human development of cities, territories and communities respectively.

1.2. Contribution:

A smart city will allow a democratic and collaborative city to be realized that promotes the sustainable human development of cities, territories and communities; as well as helping the economic and technological growth of countries.

A smart city optimizes energy consumption, resorting to renewable sources of energy, implementing actions to reduce harmful emissions for the natural environment. Its resource management is based on the concept of sustainable development.

A smart city favors social development since it offers diverse spaces to innovate, create new businesses and generate ideas. It reduces the public expenditure that the government has for the correct management of public services. It offers quality and efficient services thanks to the proper management of processes.

A smart city improves energy savings, energy efficiency improvements ... etc. Improvement in the management of mobility and urban parking, to improve traffic and reduce parking space search times, reduction of queues and waiting times in municipal offices and health centers, etc.

1.3. Justification:

It is important since the need is to provide adequate environments for inclusive innovation from the efficient and intensive use of

available technologies, in order to improve didactic learning processes to obtain technological capabilities; in the conjunction of Smart Cities and inclusive innovation as urban management strategies that allow social inclusion from the use and appropriation of ICTs as well as economic, social and environmental development to improve the quality of life and equality of citizens.

Smart cities represent a holistic approach to urban development, leveraging technologies to improve the management of urban resources and services. This segment provides an overview of the fundamental concepts and goals of smart cities.

Smart cities are those that justify their importance in technology as a tool to optimize the efficiency of the city and its economy, as long as it serves to improve the quality of life of citizens and protect nature.

In the current context in which we live it is essential that cities and countries rely on the use of technologies to generate job opportunities and improve the quality of life of citizens, in light of what many authors have written on this subject it is important to continue researching and providing knowledge so that smart cities can be implemented that allow the articulation of the state, to academia and society.

1.4. Objective:

Carry out the documentary analysis of articles related to smart cities and sustainability of the city in order to generate discussion and contributions, based on the results obtained.

1.4.1. Specific objectives:

Collect information or articles about smart cities their implementation as well as the advantages and disadvantages
Perform the tabulation of the results found in the literature review, generate discussions and draw conclusions for the implementation of smart and sustainable cities.

2. Materials and methods:

2.1. Design:

The research design is quantitative non-experimental design, descriptive and cross-sectional.

2.2. Population and sample:

To carry out this literature review on smart cities, 17 digital documents have been made on the web, which appear as bibliographic references respectively.

2.3. Procedures:

Non-probabilistic sampling for convenience will be considered, where a direct selection was made. In this sense, it states that this procedure consists of selecting the most convenient sample units for the study or allowing the participation of the sample to be completely voluntary. They also consider that the procedure depends on the decision-making process of a researcher or a group of researchers and the selected samples obey other research criteria. (Hernández et al., 2014) (Hernández et al., 2014)

2.4. Variables, instruments and materials:

Smart cities

2.5. Development and Discussion

As it is a project for the development of a review article, the most outstanding details of the reviewed articles and the discussed and argued synthesis of the results are presented.

1. Smart City Components: Smart cities are supported by a variety of technology components. This section examines key elements such as information and communication technology (ICT) infrastructure, smart energy management, smart transport, e-governance and citizen participation.
2. Benefits of smart cities: Smart cities offer a wide range of benefits for residents and the environment. In this section, benefits such as improved quality of life, energy efficiency, sustainable mobility, pollution reduction, public safety and job creation are highlighted.
3. Challenges and considerations: Despite the numerous benefits, smart cities also face significant challenges. This section explores the technical, economic, social and ethical challenges associated with the implementation of cities.

4. smart, including cybersecurity, data privacy, the digital divide and social inclusion.
5. Smart City Examples: This section presents outstanding examples of smart cities globally, such as Singapore, Barcelona, Songdo, Copenhagen and Toronto. The specific strategies and solutions implemented in each city and the results obtained are examined.
6. Future of smart cities: The future of smart cities is promising, and this part of the article discusses emerging trends such as the use of artificial intelligence, the Internet of Things (IoT), and the data-driven approach to further improve efficiency and quality of life in urban areas.
7. Conclusions: This section summarizes the main findings of the article and highlights the importance of smart cities as a model of sustainable and resilient urban development. The need to address outstanding challenges and promote collaboration between the different actors involved is emphasized.

3. Conclusions

In summary, the documentary analysis carried out in this review article highlights the growing importance of smart and sustainable cities in the global context. As urban areas face increasingly complex challenges, information and communication technologies (ICTs) have become critical tools for improving efficiency, quality of life and sustainability in these environments.

The concept of smart city has evolved over time, encompassing not only the optimization of resources and services, but also active citizen participation and the promotion of inclusive development. Advances in areas such as artificial intelligence, the Internet of Things and data management have further boosted the potential of smart cities to transform urban life.

While the benefits of smart cities are evident, it is essential to address the challenges that come with their implementation. Cybersecurity and data privacy have become key concerns in an increasingly connected world, and finding equitable solutions for digital and social inclusion remains a major challenge.

Examples of successful smart cities around the world demonstrate that effective implementation of these strategies can lead to

significant improvements in areas such as transport, energy, air quality and citizen participation. However, it is crucial to recognise that the transformation towards smart cities should not exclude those who are not familiar with the technology, but should be inclusive and focused on the well-being of all citizens.

As we move into the future, the role of smart cities in shaping our urban environment is undeniable. The focus on collaboration between different actors, such as governments, businesses, academics and citizens, is essential to address the challenges and capitalize on the opportunities presented by this trend. Only through coordinated cooperation and a comprehensive approach will we be able to fully harness the potential of smart and sustainable cities to improve the quality of life, equality and sustainability in our urban areas.

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