Conceptual Model of Information Technology Management for Smart Cities: SmarTICity

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ABSTRACT

This article presents a proposal of conceptual model for public administrations that allows analyzing the level of IT management capacity as an enabler of smart cities from a multidimensional and dynamic approach taking into account technological, institutional and innovation aspects. The model includes five domains (e-government strategy, Public Innovation, Data Management, IT Services and Infrastructure) that are described in terms of key domain areas, objectives and questions. The model was conceptually validated with four IT offices in Colombia and a pilot test was developed in the Atlantic department. A profile of information technology management capabilities was obtained from public data of the Ministry of ICT in Colombia.

KEYWORDS

Digital, E-Government, Emerging Technology, Government, Innovation, Intelligent, Public Administration, Technological Capability

INTRODUCTION

Current city dynamics are characterized by a diversity of complex problems and the rise of expectations in smart governments that set new challenges for public governance systems. Finding new forms of operation and collaboration supported by Information Technology (IT) is a key challenge for cities. These findings should achieve sustainable growth in an effective and efficient manner, guarantee integrity and build trust, improving relationships and interaction of its citizens with the state. Therefore, attention to the initiatives and projects of smart cities around the world is undeniable. Europe and Asia have been pioneers in these initiatives and have made significant progress; Latin America has recently begun to lead this type of projects as well.

A smart city can be generally assumed to be a territory characterized by the intensive use of information and communication technologies to promote collaboration, innovation and efficiency, improving the quality of life of citizens and the sustainability of the cities (Maestre, 2015). For Nam and Pardo (2011a), the goal of smart cities is to create an environment for the exchange of information,

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collaboration, interoperability and make perfect experiences for all inhabitants. Smart cities should assume innovation as a mechanism to change and improve technological tools, providing better services and creating conditions to use them better (Nam & Pardo, 2011b).

In this sense, technology management in smart cities must facilitate and promote access to information and services as a key element for their development (Maestre & Nieto, 2015). Information technology capacity can be defined as an organization’s ability to acquire, deploy and leverage its resources in information technologies, combined with other resources, in order to achieve its business objectives through ITs (Zhang, Sarker, & McCullough, 2008). Young (2011) defines it as the total information technology capacity that an organization must maintain in order to efficiently support its management activities and improve the performance of its business in an IT environment. IT capability brings together elements of hardware, software, services, management practices, technologies and management skills (Kettinger & Lee, 2005).

The modernization of public administration by strengthening the role of ITs is one of the cornerstones of the strategy for the smart, sustainable and inclusive growth of cities (Gaulé, Jurgita, & Jolanta, 2015). Due to the growing trend of cities to adopt visions of smart cities, a model for analyzing IT management capacity will enable cities to better understand how they are evolving from technology. This will allow supporting decision makers to visualize and develop actions and strategies aimed at consolidating smart cities based on IT.

A proposal for a referential conceptual model for public administrations focused on IT as an enabling element for the advancement of this new model of cities will be presented. It is designed from the revision of 23 reference models associated with smart cities and IT management. It proposes an architecture that includes strategic, innovative, technological and operational capabilities comprising 5 domains (D), 15 key domain areas (KDA) and 38 critical variables (CV). Finally, a model is applied in the Department of the Atlantic in Colombia, assessing the capacity levels of its domains and key areas through 48 indicators, taking as reference datasets, statistics and public national reports.

**RESEARCH METHODOLOGY**

In order to establish a methodology for designing and developing a model for smart city focused in information technology, the research proposes a five-step procedure as illustrated in Figure 1. They will be developed in detail in the following sections:

- **Scope:** The application context and the purpose of the model are defined;
- **Conceptualize:** The domains that will be the key elements of the model are selected and described from the literature review;
- **Design:** The architecture of the model is defined, taking into account the IT management capabilities that smart cities must have, describing the goal, interrogations and key areas associated with each domain;
- **Validate:** Conceptual validation is performed with academics and socialization in three Colombian cities;
- **Apply:** The model is applied by assessing IT management capacity in a Colombian territory.

![Figure 1. Research methodology](image-url)
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