A Participative Method for Prioritizing Smart City Interventions in Medium-Sized Municipalities

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ABSTRACT

One of the most critical issues relating to smart cities is the selection of the most suited interventions, among numerous available options. Especially when medium-sized municipalities are concerned that typically have less capabilities and available expertise, the need for a methodological framework for supporting the selection of possible interventions is profound. The aim of this article is to propose such a participative method for investigating the sectors in which a municipality could take actions, and for deciding on possible interventions. The approach includes citizens' opinion, municipality policy, and the organizational, technological and economic status of the municipality, as well as best practices from other smart cities. This way, a multi-criteria decision support model was developed, in order to select the best application scenarios for a medium-sized municipality. The model was applied in Samos Island in Greece, revealing that citizens show great interest in the development of smart applications. The whole approach can be easily applied, with the proper modifications, in a large variety of cities, offering a useful tool to decision makers and societies.

KEYWORDS

Decision Support Model, Digital Public Services, Multicriteria Decision Making, Samos, Smart Cities

INTRODUCTION

Every vision for a project has to go through many constraints, difficulties and challenges to achieve the successful outcome. "Smart city's projects" could not be an exception to this. The success of a smart city depends on the desires of its residents, the local community, the willingness, active participation and initiative of local authorities in the implementation of new "smart city" interventions. But beyond the desires and initiatives of the residents and the municipality, the decision on the primacy of the initiatives to be implemented is also important and varies from city to city.

With a multiplicity of available options, the need for a methodological framework for supporting the selection of possible interventions for municipalities is profound. The aim of this paper is to to develop a methodological framework able to reach evidence-based decisions for the sectors where

actions should be taken and for the prioritization of possible projects, allowing medium-sized, developing municipalities to join the Smart Cities movement.

For this purpose, by analyzing the citizen demands and the city capacity, the authors propose a multi-criteria decision support model, able to assist in the construction of application scenarios for a medium sized municipality. The model was applied in Samos island in Greece, in 2016.

The present paper is structured as follows: Section 2 provides the background for smart cities and the challenges facing medium sized municipalities. After analyzing the urgent need of organizational changes in order to prioritize smart interventions in medium-sized municipalities and present the case of Samos, the authors describe the proposed model in Section 3. The research findings are presented and discussed in Section 4. The following section 5 indicates the appropriate modifications to be made in order for the model to be adaptable to other medium sized municipalities. Finally, the paper ends with conclusions and further research.

ON SMART CITY INTERVENTIONS

A Smart City uses information and communication technologies in order to achieve high quality of life in multiple key areas: economy, mobility-transportation, environment, health care, tourism and culture, waste and water management, safety, democracy and governance. For the first time in 1994, the term "Digital City" was born with the creation of the digital city of Amsterdam, the Netherlands, using the city as a metaphor combined features of a community of people, a site, and a platform for virtual communication and collaboration. In the years that followed, especially after 2000, a large number of studies for this new concept of smart city have been identified (Albino et al, 2015). At the same time, there are a variety of definitions and terms of similar importance, such as: "Virtual City", "Cybercity", "Wired City", "Virtual Community", etc. Many researchers use more than one of the above terms to describe the same concept, and others use the same term with a totally different meaning. In nowadays, the common place of all these definitions is the use of "smart city" as an allegory for describing a network of people and information moving digitally. A new dimension of a city is presented in the context of the technological revolution in the field of telecommunications and electronics and their integration in the city, the diffusion of information, and the increasing dominance of the digital on the physical space.

The evolutionary journey from "Digital" to "Smart Cities" has shifted interest from cities' technologies and digital infrastructure (communication networks, sensors, intelligent agents) to the human and institutional dimensions of the city. For example, the use of human creative skills, the cooperation in the field of innovation as well as artificial intelligence applications have gained new interest as key contributors to the design of a smart city. The perception of the "smart city" is not something static, but a process or a number of steps, the development of which is transforming cities into more sustainable, adaptable to the needs of citizens, and therefore more able to respond immediately to the new challenges.

Current research (Chourabi et al., 2012) distinguishes eight areas which affect the implementation and use of smart actions and projects, the first being the organization and management of the project. This field includes the original design, strategy and methods to address the daily difficulties of the action. Furthermore, a project is based on technology: the use of new technologies and IT infrastructure and networks are important features of smart city interventions. The third factor is the institutional framework and various political components. The fourth factor is the model of governance and the fifth factor is the human factor, followed by the economy, infrastructure and the natural environment.

The areas where "smart city" initiatives affect the economic, social, physical, environmental and institutional development of cities are perceived through a wide range of examples of case studies from Europe, Japan, India and North America. Smarter cities all over the world (Copenhagen, Vienna, Barcelona, Stockholm, Tokyo, Boston, New York, Toronto, etc.) have better public communication, greater commitment to cycling and hiking, a greater focus on sustainability and low carbon emission

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