Smart City and Smart Government: Synonymous or Complementary?

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ABSTRACT

Smart City is an emerging and multidisciplinary domain. It has been recently defined as innovation, not necessarily but mainly through information and communications technologies (ICT), which enhance urban life in terms of people, living, economy, mobility and governance. Smart government is also an emerging topic, which attracts increasing attention from scholars who work in public administration, political and information sciences. There is no widely accepted definition for smart government, but it appears to be the next step of e-government with the use of technology and innovation by governments for better performance. However, it is not clear whether these two terms co-exist or concern different domains. The aim of this paper is to investigate the term smart government and to clarify its meaning in relationship to the smart city. In this respect this paper performed a comprehensive literature review analysis and concluded that smart government is shown not to be synonymous with smart city. Our findings show that smart city has a dimension of smart government, and smart government uses smart city as an area of practice. The authors conclude that smart city is complimentary, part of larger smart government movement.

Keywords

Smart city; smart government; smart governance; e-government; open government.

1. INTRODUCTION

Defining the smart city term had been a complex process, which involved scientists and practitioners from various disciplines: social and political science; urban technology; information and communications technologies (ICT); education and training; health; transportation; energy, water and other city utility sectors; and tourism, are only some of the involved domains. It is normal for the development of a new area of study and practice to generate this much lively discussion and academic debate [1]. Rogers [2] has demonstrated the development process of a new industry to consist of the following steps:

1. Innovation development.

2. Imitation: firms develop their competitive approaches.

3. Technological competition: research and development (R&D) improves the innovation.

4. Standardization: an ideal product has been determined and R&D aims to improve the production process.

A similar process can be observed for the under development smart city industry [1; 3]. More specifically:

1. The smart city term initially appeared in 1997 and various smart city approaches have been developed since then as innovation in the city, in an attempt to deal with alternative urban challenges [4];

2. Many schools for thought were activated to define the smart city and multiple models have been composed [5];

3. Many vendors struggle to provide alternative products for almost all smart city dimensions: people, governance, economy, environment, mobility and living.

4. Many standardization bodies (i.e., International Telecommunications Union (ITU) Focus Group on Smart Sustainable Cities (FG SSC), International Standards Organization (ISO), US National Institute for Standards and Technology (NIST), European Committee for Standardization (CEN), British Institute for Standards (BSI) etc.) develop standards for smart city components or for the smart city as an entire system [1].

The new smart city industry has become dominant, with an estimated market size of $3 U.S. trillion by 2025 [1]. This large size is due to the involvement of almost all industrial domains, which struggle to develop products that deal with smart city challenges (i.e., climate change, energy consumption and emissions control, and livability improvement in the city) and to the customers' size, which involves all cities across the globe.

Governments play a crucial role in smart city development by funding these investments. Moreover, smart governance is among the six smart city dimensions and concerns the transformation of local government to transparent, efficient and open to its citizens with the use of the ICT [6] as well as the formulation of the appropriate smart city policies. However, the terms smart governance and smart government are emerging too, with the contribution of political and information sciences and in this regard it is questioned whether smart government refers only to smart city government, or it concerns a separate domain or

both. To this end, this paper aims to answer the following research question:

RQ1: What is the relation between smart city and smart government?

This question is very important to be answered since the smart city and smart government domains, both publish corresponding calls for scientific conferences, workshops and journal special issues. But we do not know whether smart city and smart government are synonymous with each other or complimentary. In this regard, it is necessary to be clarified whether the broader term smart government has smart city as part of it or not.

In an attempt to answer RQ1 the literature review research methodology is followed with regard to smart government and important findings are generated. The remainder of this article is structured as follows: section 2 concerns the background of this paper, while section 3 contains the outcomes from the literature review. Finally, section 4 contains conclusions and future thoughts.

2. BACKGROUND

Although the term smart has become fashionable, there is not a common consensus for it, while it is also broadly used as a synonym of almost anything considered to be modern and intelligent: A servant surrounded by servants, which may be a configuration of both humans and devices, from both public and private sectors [7]. While the word "servant" evokes images from aristocracy to slavery in the evolving smart ecosystems, a person or system will be surrounded by or embedded within "servant systems", which are the smart systems.

Smart city has been quite a "fuzzy" topic until recently, when various scholars managed to define it more precisely. More specifically, among various works, Gil-Garcia et al. [8] performed a study on smart city and they identify several works and six practical tools from international smart city cases. They concluded that all smart city definitions describe same or very similar phenomena regarding the utilization of the ICT-based infrastructure and services to enhance urban living. Moreover, they identified the smart city core components with their sub-elements to be:

- Technology and Data (ICT, data and information).

- Physical environment (natural environment and city infrastructure).

- Society (knowledge economy, human capital and governance).

- Government (institutional arrangements, city administration and public services).

Moreover, Anthopoulos and Reddick [3] explored 129 articles from 27 interdisciplinary journals between 1997 and 2015 that publish smart city works and examined articles with regard to e-government. They concluded that smart city concerns innovation -not necessarily but mainly based on ICT- that enhances urban living in terms of.00A8(-(ps)10rnanc,e)7(econoy,( )]TJ0.008 Tc 0.359 Tw -13.18 -1.153 Td[mobtilty,(hen)8virn)8nment and livin

or governments as the means to increase their efficiency and effectiveness.

On the other hand, Harsh and Ichalkaranje [13] present a claim that smart governments utilize the power of "data" in their attempt to improve public services; to enable an integrated, seamless service experience; to engage with citizens; to co-develop policies; and to implement solutions for well-being of the community. They adopt Rubel [14] definition for smart government according which, government smart transformation engages citizen participation, information transparency and service improvement. This definition seems to be followed by Scholl and Al Awadhi [15] and by Gil-Garcia [16], who sees a "whole-of-government" result behind this information integration, while Maheshwari and Janssen [17] recognize the need for public organizations' interconnection too and discuss corresponding interoperability issues.

Other definitions of smart government are given by Gil Garcia et al. [18], who perform an analysis of past approaches to smart government, clarify the term and conclude that smart government is a creative mix of emerging technologies and innovation in the public sector. More specifically, they claim that smart government is a continuous effort and not a specific goal, which is supported by a set of emerging technologies (i.e., big data, open government data, social networking, blogs, Really Simple Syndication (RSS) feeds, web design and programs (i.e., html5, xhtml, SQl, and more), mobile government, smartphone applications, cloud computing, and sensors).

Moreover, Gil Garcia et al. [18] locate a shift of government innovation from a value-based concept into a concrete goal with specific targets, which is used to measure smartness. In this respect, governments utilize innovation as a means to gain a good understanding of the communities (being percipient); to accurately assess situations or people (being astute); to judge sharply (being shrewd), and to decide and respond quickly or effectively (being quick). According to their approach, smart city is only a subset of smart government, where local governments understand the term "being smart" as their attempts to enhance their efficiency, effectiveness, transparency and collaboration with emerging technologies and innovation.

Smart government is also defined as the next step for e-government, with the use of innovation [19]. Innovation can lead to the production of new public value, that is 'value created by government through services, law regulations and other actions' and in this respect a triangle controls the migration from e-government to smart government, which consists of politics, values and evidence.

Jimenez et al. [20] introduce an intelligent model for public organizations, entitled "Smart Government Ecosystem Matrix". This model is a 2-dimensional matrix that combines open government features (transparency, collaboration, participation and interoperability) and smart city context (organizational and management, technology and infrastructure, governance and policy, social, economy and natural environment) and defines smart government as the next step of open government.

Finally, various scholars see smart government within the smart city nexus and a corresponding research-practice consortium has been structured to investigate this relationship: Nam and Pardo [21] see smart city as an area of practice for government innovation, which enhances government effectiveness and efficiency, service delivery, process transparency and

collaboration; quite similarly, Anthopoulos and Reddick [3] see smart city as a means for smart government deployment, as well as utilities for recent government challenges' management and new policy development (i.e., climate change management); Gil Garcia et al. [8] identify smart government as the source of smart public service delivery within a smart city, of city administration and of public engagement; Scholl and Scholl [22] view smart government as smart city government, where the local government implements policies for smart local development and stakeholders' engagement; Gil-Garcia and Aldama-Nalda [23] document smart governance as the facilitator for local economy via the efforts of local governments to adjust local regulatory frameworks for new business attraction and creation; Alawadhi et al. [24] compare alternative definitions to justify the need for better governance to manage smart city initiatives. All these definitions are depicted and compared on (Table 3).

Since both smart government and smart governance terms are used in literature, a distinction must be given: "Government occurs when those with legally and formally derived authority and policing power execute and implement activities" and "Governance refers to the creation, execution, and implementation of activities backed by the shared goals of citizens and organizations, who may or may not have formal authority or policing power [25]. Therefore, it is concluded that smart governments implement smart governance initiatives [18]. Finally, the definitions presented in (Table 3) show that smart government is not synonymous with smart city, but smart city is considered an area with the broader term smart government practice. The authors will return to this important finding in the conclusion section.

Table 3. Definitions relative to Smart Government

Term	Definition	Citation
Smart Government	The extensive use of smart technology to perform governmental tasks	[7; 10]
	The implementation of a set of ICT-based business processes that enable cross-government information flow and high quality service provision.	[15]
	Government's strategic role in society and the development of managerial capacities that enhances effectiveness	[26]
	Smart ICT government operations (i.e., cross-agency working groups for every ICT field; infrastructure for educational training; and instituting procurement strategies)	[27]
	The evolution of the term 'smart government' to the term 'smart governance' in an attempt of governments to cope with complex and uncertain environments and to achieve resilience.	[22]
	A creative mix of emerging technologies and innovation in the public sector.	[18]

	Smart government is the next step for e-government	[19]
	Smart government is the next step for open government	[20]
Smart Governance	Principles, factors, and capacities that constitute a form of governance able to cope with the conditions and exigencies of the knowledge society	[27]
	A dimension of smart city, which measures local smart government performance.	[6]
	The facilitator for local economy via policy making for new business creation	[23]
	Better governance to manage smart city initiatives.	[24]
Smart Government and Smart City	Smart city is an area of practice for smart government.	[21]
	Smart government is the source of smart public service delivery, of city administration and of public engagement.	[8]
	Smart city is an area for smart government development.	[3]
	Smart government deals with smart City government, which manages and implements policies by leveraging ICTs and institutions and by actively involving and collaborating with stakeholders	[22]

4. CONCLUSIONS

This paper investigated the relationship between the terms smart city and smart government. The necessity for studying this relationship comes from the fact that smart government and smart governance are both evolving very rapidly and alone with contributions from different disciplines.

After documenting the above observation and problem's importance, the authors grounded the research question RQ1 and performed a literature review with the keywords "smart government" in a comprehensive literature review analysis using two commonly used academic databases. The outcomes show that smart government is a recent topic with the first articles published in 2012, while the smaller number of publications showing a promising space for further evolution. Moreover, scholars of the retrieved works provided alternative definitions of smart government, while many combine it with but do not limit it in smart city. However, smart government is proved not to be synonymous to smart city but a broader term that describes the next step for government transformation, while the smart city is considered to be an area within the overarching term smart government. Therefore, the authors believe that smart city is complimentary, part of the broader smart government movement.

Future research could examine case studies that demonstrate the relationship between smart city and smart government. Examining specific cases of governments that have been able to

bridge both smart city and overall smart government would be interesting illustrations of this research. A limitation of this research is only examining two databases for the intersection these two terms that focus mostly on journal articles, and conference would be more underrepresented in this research.

In conclusion, this study showed that smart government does not "ignore" smart city. Instead, smart government leads smart city development, while it uses smart city as an area for its practice (collaboration and service co-production testing etc.). In this respect, there have to be complementary forces that interrelate these terms and have to be identified.

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