Citizen participation in smart cities: a survey

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2 authors, including:

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3 PUBLICATIONS 1 CITATION

Some of the authors of this publication are also working on these related projects:

- Smart City View project
- Citizen Participation in Smart Cities View project
ABSTRACT

Smart cities have reached unprecedented growth because they deal with urban development problems using information and communication technologies (ICT). The main purpose of smart cities is to suggest innovative solutions in many fields like security, big data, mobility, transportation, environment…etc.

In order to succeed in the development of smart cities, citizens should be involved as an integral part because they are users, decision-makers, consumers and sources of data and information.

In this article, we will discuss the role of citizen participation in smart cities, we will also report the results of a survey administered to smart city experts from different cities in the world (n=20 respondents). The objective of this survey is to compare cities initiatives for citizen participation in smart cities projects and identify smart practices and new ways to increase civic participation.

Keywords
Smart City, Citizen Participation, Literature review, Survey

1. INTRODUCTION

Cities play an important role in the economic and social development of the world and have a great impact on the environment [1]. Urbanization is a factor of economic growth, 80% of the Gross National Product (GNP) worldwide is produced by cities [2]. According to the United Nations Population Fund, half of the world’s population lives in cities, this figure will reach about 5 billion by 2030 [2]. Moreover, the world would arbitrate 43 megacities of more than 10 million inhabitants by 2030, against 31 in 2017 [3]. As a result, cities consume about 75% of the global primary energy and generate between 50 and 60% of global greenhouse gas emissions [3].

In this difficult context, smart cities gained the support of scientists, urban planners, and governments all over the world, because they suggest innovative solutions for all urban development problems using Information and communication technologies (ICT).

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In order to succeed in the development of smart cities, citizens should be involved as an integral part because they are users, decision-makers, consumers and sources of data and information.

No recent studies about practices, barriers and new ways to increase civic participation in smart cities could be found, there is a lack of efficient information and data about cities initiatives for the citizen participation in smart cities projects. In order to contribute to reducing this research gap, we will try to answer the following research question: “How to enhance citizen participation in a smart city project?”

To this end, we will represent in this article the citizen participation theory and a literature review of smart city concept and then discuss the role of citizen participation in smart cities, we will also report the results of a survey administered to smart city experts from different cities in the world (n=20 respondents).

2. CITIZEN PARTICIPATION THEORY:

Top-down decision-making approach has shown its ineffectiveness in most democracies, citizens become more demanding and aware of their rights [4, 5]. Actually, there is a big gap between citizens’ aspirations and government politics, which has led to social movements and declining trust in public institutions [6]. In this democratic deficit context as labeled by Hindess (1997) [7], citizen participation has appeared as an alternative to break through this deadlock and give an active role to citizens. Those citizens, who are often excluded from government’s decision-making process and are only considered as elections voters, can act also as experts and information providers for their communities [8].

First scientific researches on citizen participation in public decision making was started in the late 1960s in a period marked by urban struggles and students protest movement, from which came the first demands for “participatory democracy” [9]. Thus, the famous article « A Ladder of Citizen Participation » of Sherry Arnstein come out in 1960. Arnstein 1960 suggested a ladder for participation levels starting from manipulation to citizen control with each rung corresponding with the extent to which citizens can determine the product. As it is argued, citizen participation is a power redistribution that allows the disadvantaged citizen to be deliberately involved and consulted in urban planning, information diffusion, political programs and resources allocation. However, it can take a “tokenism” form being just a consultation directed by public administrations to allow citizens to hear and to have a voice [10].

Scientists and experts have also studied the objectives, functions, advantages, and inconveniences of participation, and developed
many models and frameworks to categorize and understand citizen participation.

Bishop and Davis (2002) define participation as “the expectation that citizens have a voice in policy choices” and categorize it according to policy objectives (Table 1). In concrete terms, the authors provide a map of policy participation [6].

### Table 1. Adapted from Bishop and Davis, 2002

<table>
<thead>
<tr>
<th>Type</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Giving the control of an issue to the electorate</td>
</tr>
<tr>
<td>Consumer choice</td>
<td>Customer preferences shaping a product through the choice of products</td>
</tr>
<tr>
<td>Standing</td>
<td>Involving third parties in the review process</td>
</tr>
<tr>
<td>Partnership</td>
<td>Involving citizens in some aspects of decision making</td>
</tr>
<tr>
<td>Consultation</td>
<td>Evaluate community reactions and feedbacks</td>
</tr>
<tr>
<td>Information</td>
<td>Giving some information by the decision makers</td>
</tr>
</tbody>
</table>

According to Irvin and Stansbury (2004), citizen participation in the decision-making process has many advantages like educational benefits for citizens and a better understanding of community expectations by administrators, political suasion, citizen empowerment and avoiding litigation costs. However, involving citizens is not easy and might be costly and time-consuming. Thereby, technology can be the best solution to reduce cost and help along with the process implementation. In this case, the smart city concept can be a suitable ground for citizen participation [11].

### 3. THE SMART CITY CONCEPT:

Ecological, demographical, economical or spatial problems need smarter approaches to be solved. With the increase in population and rapid urbanization, we need smarter solutions that help us to create sustainable cities.

The term “smart city” has not been defined recently. The term has been generated from “smart growth” movement in the nineties, which supports community-driven solutions to solve urban problems [12]. There is no consensus among researchers about a smart city definition, key elements, and boundaries. As the concept is used all over the world with different names and different contexts, there are numerous terms similar to “smart cities” such as intelligent city, knowledge city, wired city, digital city, and so on [13, 14, 15, 12, 31]

In his literature review, A.Cocchia distinguished smart from digital city and tried to define the “smart city” according to two different approaches:

- **Their contents**: the digital city regards the use of ICT in urban areas; the smart city regards the attention to be paid to the environmental quality in cities;

- **Their nature and relationship with the government**: digital city is a free trend emerging from the daily use of smart and digital devices by citizens. It incites the local governments to supply e-services, that is, to transform gradually the city into a digital city; smart city is a political trend, driven by international institutions, to implement adequate initiatives to improve the environmental quality in cities [13].

Giffinger et al. 2007 identified economy, mobility, people, governance, environment and living as the main factors of the smart city [16]. The Smart City Council highlighted the smart city in the use of technology across all city functions [17].

Some definitions argue the use of technologies, the private firm IBM was the first to introduce the term “Smart city” and defined three main characteristics for it: instrumented, intelligent and interconnected. Other definitions stressed different aspects like natural resources management [18, 19]

Other scientists claimed that Smart cities must undertake open access and inclusive strategies to diminish the digital dividend [20] and consider that a successful smart city should be inclusive and must concern all citizens including people with disabilities. Therefore, the new term “Inclusive Smart City” is defined as “A city that uses digital assistive technology in the urban spaces in order to enhance the experience that people with disabilities have in these spaces, extending to a considerable number of citizens the gain envisaged by SC initiatives” [21]

Nam & Pardo organized the definitions according to three dimensions depending on some recurrent characteristics:

- **Technology dimension**: The use of urban information and communication technology (ICT) infrastructure to improve quality of life is the main driver for the smart city. The concept included in this dimension are Virtual City; Digital City; Wired City. Information City, Intelligent City, and Ubiquitous City;

- **Human dimension**: it includes human capital and it relies smart city to education, citizens, learning and knowledge. This dimension includes the concepts about Learning City and Knowledge City;

- **Institutional dimension**: The combination of technological and human dimensions are very important but without cooperation between stakeholders and institutional governments, it will be difficult to develop a smart city project. This dimension concerns the concepts about Green City, Smart Community and Sustainable City [12].

### 4. CITIZEN PARTICIPATION IN SMART CITIES:

Citizen participation is the key challenge to develop a smart city project since the main objective of smart city is to improve the quality of life of citizens. Thus, all actions should be done in cooperation with citizens and stakeholders. Otherwise, the smart city will not achieve its objectives.

In fact, ICT technologies are certainly the main driver of any smart city project, but without considering people, technologies and strategic visions will not create public value for citizens [22].

Hollands 2008 criticized the smart city approach based on the use of ICT only, and argued that Smart cities should start with people and human capital of the city: “Progressive smart cities must seriously start with people and the human capital side of the equation, rather than blindly believing that IT itself can automatically transform and improve cities.” ICT should be adapted to citizen needs and used to empower and educate them in order to create a smart community in place of a smart city. Cities with more educated populations experience more rapid growth [23].

Actually, the most used and accepted definitions of smart city take into account this critique plus the other dimensions: “A city to be
smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance” [27]

Many scientists acknowledge citizen participation as the main component for smart city project; decision-makers should innovate in interactions with citizens [24]. According to Berntzen & Johannessen (2015), Citizens can be involved as:

- **Democratic participants in the decision making process** and build sustainable local communities where every inhabitant cares for the other.
- **Main source of experience and competencies** in order to develop better solutions and plans. Thanks to competent citizens, problems can be avoided early and the risk of failure decreases.
- **Data collectors**: The citizens can help to collect data after the implementation of the smart city as data collectors by using mobile devices or other technologies, in this way, they will feel as an active and integral part of the smart city [25]

Other researches argue that the Quadruple Helix Model for innovation should be followed to create an alliance between the four pillars of innovation: university, government, industry, and civil society and involve them in the early innovation of the smart city process in order to develop new ideas that can meet social needs. The civil society is introduced as an important stakeholder, which has updated the classical triple helix model [26, 27, and 28].

5. **SURVEY ABOUT CITIZEN PARTICIPATION IN SMART CITIES:**

5.1 **Methodology**

In order to compare cities initiatives for the citizen participation in smart cities projects and identify smart practices and new ways to increase civic participation, we have administered a survey to smart city experts from different cities in the world (n=37 interviewed): Amsterdam, Chicago, Boston, Washington, Barcelona, Toronto, Mulhouse, London, Lethbridge, Coimbatore, Casablanca and Palo Alto. We got responses from 20 experts.

We administered the survey during the Smart City Expo in April 2018 in Casablanca, which helped us to meet respondents that are participating in a smart city projects development in their countries and serving in important positions like Mayor, strategy advisor – international smart city ambassador; Future Cities Council President, Ph.D. students, Professors; Intelligent Community Program Manager; CIO and Consultants.

5.2 **Survey highlights**

This survey gives insights about smart city projects and citizen participation in different cities. Key topics explored include city priorities for smart city and citizen participation, city inclusiveness, budget allowed to citizen participation, Practices used to enhance citizen participation, citizen participation barriers.

5.2.1 **Smart city priorities:**

How important are each of the following objectives for smart city project in your country? (Check one box for each row.)

![Smart City Priorities](image)

Figure 1. Smart City Priorities

Respondents most frequently identified smart city technologies as a priority in civic engagement and transportation, with 71% of respondents identifying these initiatives as a top priority in this area. Health, education and human services (65%), telecommunications (59%), public safety (59%), built environment (53%) were also among the top five sectors in which smart-city technologies were identified as a top priority by respondents. Other respondents chose to add other priorities and qualify them as very important like cybersecurity, big data for urban informatics, embedded computing, and networks for smart cities, regulation, public facilities and an open-air ground for people, interoperable data rather than open data.

5.2.2 **Citizen participation priorities:**

How important are each of the following benefits in motivating your local government to implement or expand the citizen participation in a smart city project? (Check one box for each row.)

![Citizen participation in Smart cities benefits](image)

Figure 2. Citizen participation in Smart cities benefits

Enhanced services for residents and open /sharing data was identified as the most important benefits from citizen participation
in a smart city project by the respondents, Economic development and administrative efficiencies were also among the top five benefits.

5.2.3  **Budget allocation to citizen participation:**
Does your local government typically allocate a certain amount of funding for civic engagement in a smart city project?

![Figure 3. Budget Allocation](image)

If yes, on average what percentage of the project budget is typically allocated for civic engagement?

![Figure 4. Percentage of budget allocation](image)

Only half of the respondents think that their cities are allocating a certain amount of funding for civic engagement in a smart city project and 72% of them ranged the budget from zero to 5%, which means that even if decision-makers are aware of the importance of citizen participation, they do not give enough budget for it.

5.2.4  **Practices used to enhance citizen participation:**
Which of these practices do you use in your city to enhance citizen’s participation in your city? Please rate it

![Figure 5. Practices used to enhance citizen participation](image)

Among seventeen practices suggested to respondents, allowing access to city services via smartphones; reporting service problems via mobile app; being involved in the planning of the new public services; participation in political decisions concerning issues of citizenship's interest; creation or expansion of public wireless networks, were the top five practices. Which proves that smart city experts insist on the important role of citizens in the early stage of planning public services as co-creators, also as experiences providers by reporting problems.

Free courses in computer literacy for youth and adults were also identified as important practice by 47% of respondents, which highlight the smart city experts’ awareness about City inclusiveness.

5.2.5  **Citizen participation barriers:**
To what extent do each of the following issues represent barriers for your community to implement or expand the citizen engagement in a smart city project? (Check one box for each row.)
services as experiences providers by reporting problems. We notice also an interest in the role of citizens as data collectors, indeed citizens can provide decision makers with important data. Thanks to this data, they can get valuable insights to provide services to many sectors in the smart city, as well as improve citizens’ experiences and create new business opportunities [29].

City inclusiveness was also among the most concerns of respondents, since they agreed that smart city illiteracy is preventing them from involving citizens in their smart city projects, they are also willing to give free courses in computer literacy for youth and adults in order to reduce the digital divide. Actually, decision-makers should create a good environment for developing a smart city for all and promoting city inclusiveness.

Our study noted also a lack of long-term vision and specific budget allocation for citizen participation in smart city, which provides a significant barrier. Local government should not only act as the initiator of new policies but also the main organizer of citizen participation, knowing that citizen participation level increases when it comes to implementing a policy already agreed on by local government [30].

We acknowledge that our survey has a relatively reduced sample, however respondents are participating in smart city projects development in their countries and serving in important positions like Mayor, strategy advisor…etc., which can offer a first impression of what citizen participation in smart cities currently looks like. We also believe that our findings can help both researchers and local governments further. Academically, researchers can try to address the research gap about citizen participation in smart cities and come up with smart practices to enhance citizen participation. Governments can take lessons from our survey highlights, namely, the citizen participation barriers in order to update their policies and support financially citizen participation.

7. ACKNOWLEDGMENTS
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REFERENCES


