Opportunities, Risks and Challenges of using Social Media to foster Smart Governance for Smart Cities

Abstract—**Social media are increasingly used with different purposes, ranging from attempts to reach wider audiences, to attract different publics, to propose alternative means for interaction with citizens and/or other stakeholders. Apparently, there is an immense list of possibilities and there is potential to explore social media as one of the vehicles for providing smart governance for smart cities taking into account governance principles such as openness (i.e. transparency), accountability, collaboration (i.e. involvement of all stakeholders) and participatory processes (i.e. citizens' participation).**

This paper identifies the challenges, opportunities and risks of social media usage for smart cities to foster smart governance based on the scientific literature. Although we did not find many scientific papers about the role of social media for smart governance, interesting possibilities are addressed. In addition, there is a lack of empirical work. Our conclusions point out that we are in the infancy of this field, taking the first steps in leveraging the potential of social media on smart governance.

Keywords—social media; smart cities; smart governance; opportunities; risks

I. INTRODUCTION

This paper aims at presenting areas in which social media can contribute to smart governance for smart cities. The Information and Communication Technologies (ICTs) applications were studied in many different perspectives, namely from a technological point of view, from the perspective of the economic impact, among others. In this paper, our analysis departs from the social perspective and their impact on smart governance.

There is not a consensual definition in the scientific literature for social media [1]. However, in general, social media are perceived as a set of technologies used by individuals to communicate and interact with each other forming a social digital network. The way users participate in social media ranges from creating content, organizing, sharing, editing or combining content to commenting and rating, among others. Social media create a social environment where users can interact with each another on a regular basis and develop content. This new trend is having a tremendous impact in the way people communicate and socialize and has the ability to reduce distances, disconnection time, while simultaneously being more accessible and inclusive to society.
Himelboim et al. [2] define social networks as a group of individuals or organizations or communities that are connected by different types of social relations. They stress that social networks are created and primarily characterized by the relations among the participants. Therefore, social media can be seen as something created for user's inter-connection.

Kaplan and Haenlein in [3] refer to social media considering the power given to communities by technology and as applications allowing connectivity, networking, collaboration and co-production of content. In fact, it is a matter of considering the symbolic power of media, but also a question of viewing them as "material and symbolic spaces, where structures and contradictions of economic, political, coercive and symbolic power manifest themselves" [4].

From the definitions described above, one can conclude that social media rely on technologies and bring individuals and communities together through Internet platforms.

In general, social media presence is almost a mandatory prerequisite for all institutions. To have some sort of online platform, application or social media account seems to be a priority nowadays. Nevertheless, the real and concrete consequences of online activities are yet to be scientifically demonstrated. It seems that social media remain as unilateral tools mostly used to disseminate information. It is difficult to confirm if, for instance, citizens' participation in the cultural programme of a certain city is directly related to the investment in a certain platform or mobile application.

II. METHODOLY

This section describes how the paper is structured and the scientific methodology used to conduct this study. Figure 1 shows how the paper is structured.
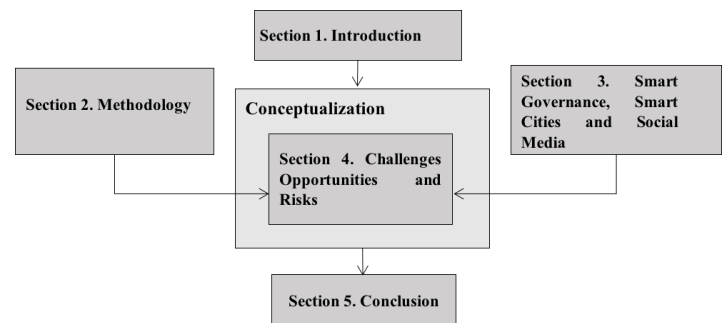

Figure 1: Paper Structure

The aim of Section I is to present the motivation for developing this work and to define its main concepts. In Section II the structure of paper and scientific methodology are described. Section III is dedicated to Smart Governance, Smart Cities and Social Media. Section IV is focused on the challenges, opportunities and risks that were identified in the research literature in what concerns the use of social media to foster smart governance for smart cities. Section V is for the Conclusion.

Regarding the scientific methodology used, it follows a six-step approach, including:

1) Defining the searching keywords
2) Selecting the scientific database
3) Screening the relevant literature
4) Analysing the selected literature
5) Conceptualizing oportunities, risks and challenges
6) Summarizing the findings

As the purpose of the work was to capture the use of social media in smart governance for smart cities, the keywords used were - "Social media" and "Smart governance" and "Smart cities" and "hashtag" (Step 1). The scientific database used was Google Scholar due to its broader coverage (Step 2). In total, 38 papers were found in Google Scholar with those keywords. From the 38 papers screened 13 papers were selected as relevant papers for this work (Step 3). After the selection, the papers were analyzed using the software NVivo to extract information about the opportunities, risks and challenges (Step 4). In the following step, the information extracted from the papers was organized in conceptual maps (Step 5). Finally, the findings of this literature review were summarized (Step 6).

III. SMART GOVERNANCE, SMART CITIES AND SOCIAL MEDIA

Smart Governance is one of the dimensions of smart cities. It is the smart city dimension responsible by all the aspects related to political participation, citizens' engagement, public services delivery, as well as how local administration works.

In an extensive literature review developed by Bernardo [5], eight common factors have been identified in smart cities initiatives: 1) e-participation; 2) e-services; 3) e-consultation; 4) Information and Communication Technologies (ICTs); 5) open data, 6) e-decision-making; 7) good governance; and 8) smart governance. In [6] Chourabi identified the most relevant principles of smart governance, which are collaboration, leadership, participation and partnership, communication, data-exchange, service and application integration, accountability and transparency.

Although there is not a consensual definition of smart city, the primary concern relies on the improvement of citizens' quality of life [7].

Previous studies stress the role of social media for government innovation [8], mostly in relation with interaction with citizens and more transparent and efficient administrative processes. Social media have been challenging traditional modes of production, diffusion and sharing of information. Different purposes are behind users' choices, but there are some frequent characteristics of social media in a globalized world. This area has been under the researchers' attention in the past years, mainly due to an alleged potential for e-democracy, for more transparent and accountable governments and institutions, as well as for more participatory, engaged and active societies. Nevertheless, as M. Allen [9] points out, the newness of social media is arguable, as blogs, social networking sites and Google existed before 2005.

What is intrinsic to social media is that they are "spreadable media" [10]. This is probably the first characteristic of social media that prompts its use. It has the potential to reach wider audiences, target groups, and boost the impact of online activities. According to [4], social media are "forms of online

sociality" because they gather multiple possibilities of sharing, cooperating, acting and mobilizing. In short, through social media is possible to connect different communities and to turn individual reactions into collective actions.

In fact, there are two clear trends in the literature that critique the democratizing role of digital technologies. The main argument relies on its potential to introduce change, meaning that the online is more an extension of the offline world rather than a "factor of transformation" per se [11]. There are several examples in the scientific literature that illustrate this. A study from 2003 shows that parliamentarian parties' use of the Internet enhances top-down communications efficacy but it does not augment civic participation via party politics. Others stress that it is largely an extension of the offline political life (engagement in online campaigning, lobbying, etc.), but it is not beyond the formal political system and the role played by the media in that same system.

Another view assumes that we are currently in a new era characterized by some question marks about how democracy works. It is seen as a new historical juncture where the Internet plays a very important role. There is emphasis on the possibilities of horizontal communication of civic interaction given by the Internet and other ICTs, to engage and increase the networks of participants, including activists. There are different organizational formats which change the traditional structure of politics – "usually very loose and horizontal in character, with a good deal of transitory membership" [11]. The year of 2011 became noticeable for the high number of protests and collective actions for political change as several Occupy movements emerged with the replicating potential of outlets like Facebook and Twitter to reach wider publics, gather audiences and foster mobilization. Social media have the potential to create new forms of dialogue and informal interaction that enable greater involvement and participation of citizens in matters that affect them directly [12].

Using the immense possibilities given by social media, there are ways of combining the advantages of these tools for smart cities considering smart governance guiding principles.

IV. CHALLENGES, OPPORTUNITIES AND RISKS

This section presents the challenges, opportunities and risks found in the reviewed literature. In the next paragraphs are described each of these aspects.

A. Challenges

We are facing times that require a smart governance, times where the resources are limited but the challenges are more complex. Thus, it is important to think about how ICTs can help city' governments make their cities more efficient and sustainable.

The new digital social media enable citizens to interact with governments in news ways which can promote citizens' engagement and co-production on the policy making. However, before social media became a really effective tool for smart governance some challenges must be overcome.

Figure 2 shows the conceptual map of the social media challenges found in the research literature. Seven challenges

have been identified: 1) meaningful information; 2) stratification; 3) principles; 4) engagement; 5) participation and 6) privacy.
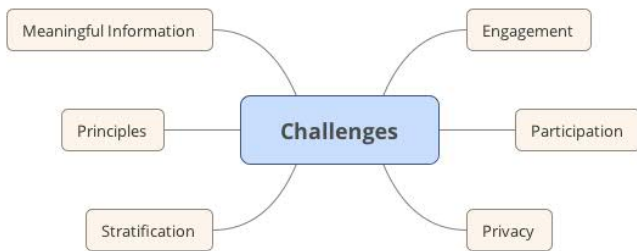

Figure 2: Challenges Conceptual Map for Social Media

The hyper-connectivity, data mobility and availability per se do not lead to more citizen participation in city modus operandi [13], the data must be provided in meaningful and usable ways.

For instance, Barcelona offers interactive bus shelters to travelers that provide tourism information and bus arrival times. Further, they have bicycles spread around the city and travelers can check their availability and location with a smartphone application, thereby fostering a friendly environment. Amsterdam is testing sensors for crowd management, Seoul and South Korea provide content delivery for smartphones to citizen and tourists [14]. Social media can lead to social stratifications and disconnect the digital illiterate citizens and construct dominant socio-technical networks of people. To avoid stratification new social formations must be constructed or they remain incapacitated to participate in the digital social networks [13]. A strategical investment to foster innovation in the more traditional communities and to enrich physical infrastructure and coverage can also mitigate the social stratification. How the principles of self-expression, bottom-up decision making, democracy, inclusion and pluralism can be assured in these distributed networks of knowledge and power is still unknown. How smart governments use social media to engage local communities in public service co-production and how the multi-actors involved such as, governments agencies, non-governmental and private organizations and individuals, collaboratively participate in co-producing public services, are still open questions. The privacy is an obvious and one of the biggest challenges in the social media, the users are quite afraid of providing personal information to social media application/services without knowing and the data collected being used for other omitted purposes. Today, social networks such as Twitter, Facebook and others allows to download the content shared by the users but they do not allow to access any user information beyond that is visible on their public pages [15]. The ultimate challenge is to increase the citizen participation and engagement in the daily life of the smart city to increase their well-being and quality of life [16].

B. Opportunities

Technologies have been used in different ways and by multiple stakeholders to bring the citizens closer to the governments, the cities and the public institutions. Social media platforms are considered part of the infrastructure of governments and public institutions [17] because they allow citizens to actively contribute to build a collective voice and frame a "spatial imaginary" [15].

Figure 3 depicts the conceptual map of opportunities for the use of social media for smart cities that were found in the research literature, namely: 1) collaboration, co-creation; 2) prediction, anticipation; 3) raising awareness; 4) engagement; 5) participation and 6) assessment, monitoring and evaluation.
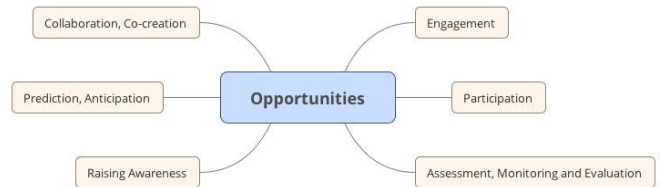

Figure 3: Opportunities Conceptual Map for Social Media

Social media features allow citizens to communicate and interact easily and widely, but, more importantly, they open up the range of possibilities of participation in collaboration, co-creation, decision-making, policy-making with the aim of fostering better public service delivery, open government, transparency and accountability [13], [18].

Thus, the interaction between governments and citizens finds new avenues with the use of social media. Government officials can take advantage of this use for the assessment of satisfaction with opinion mining and sentiment analysis [19], [20], crisis management and prediction, real time reporting and monitoring (e.g. of traffic conditions, air pollution ecological issues, noise problems). Li et al. [21] focus on a web application that gathers data from Twitter and Instagram and conclude for the added value that the identification of users' reactions and attitudes brings to policy making.

As this entails possibilities for a closer engagement of citizens with the city, their quality of life can be improved with the use of social media. Smart tourism is capturing this idea by introducing ways of citizens to have customized experiences with places, to actively participate in co-creation, context-specific consumption activities and monitoring [14]. The literature is prolific in providing concrete examples, as interactive hotspots with touristic information, exchange of locations using apps with real time updating, context-awareness tools to avoid undesirable or dangerous places in certain cities, attractive routes and walking tours with augmented reality, pictures shared on Instagram or geo-tagging on Flickr, and so forth.

To Indaco & Manovich [15], cities' self-representation is directly related with social media content, as imagens, text and hashtags used in outlets as Facebook, Twitter or Instagram contribute for its identity and attractiveness, both for residents

and visitors. In addition, it is an important tool for policy-makers in the definition of the cities' self-promotion and marketing strategies [16].

C. Risks

Globalization and technological innovations are challenging established practices and the way we understand each other's roles, including of public and private institutions, policy-makers, governments, and citizens as well as societies in general. Along with opportunities, there are inherent topics requiring careful attention, which we present in this sub-section as risks.

In the conceptual map of Figure 4, we show the following risks identified in the research literature regarding the use of social media for smart cities: 1) context risks; 2) strategy risks; and 3) leadership competences' risks.
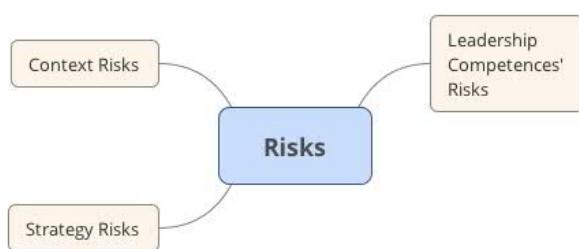
Figure 4: Risks Conceptual Map for Social Media

Using social media to foster smart governance envisages a coordinated and coherent plan for the city's strategy. It is uncertain to invest in such without taking into consideration characteristics of the population (such as socio-demographic information, consumption habits, etc.) and of the city itself (as, for instance, more attractive, touristic or unexplored places). Public officials need to focus on the investment strategies in accordance with the characteristics of the city and with the plan envisaged for the future. In addition, distinctive strategies shall be designed for specific purposes, as using social media within a municipality having inhabitants as targets differs from a strategy directed to promote tourism [14].

An additional risk is the lack of ability of governors to cope with the logics lagging behind new platforms (such as the type of language used, or the dimension of posts).

V. CONCLUSION

Based on contradictory trends found in scientific literature about the democratizing role of social media and the governance principles, our objective was to identify areas in which they can contribute to smart governance for smart cities, such as monitoring, evaluation of public services, problem prediction and/or anticipation of possible solutions, raising awareness about issues of public interest, literacy promotion, and so forth.

We presented conceptual maps for each of the areas: opportunities, risks and challenges. We found in the research

literature seven challenges: 1) meaningful information; 2) stratification; 3) principles; 4) engagement; 5) participation and 6) privacy. In terms of opportunities, six were identified: 1) collaboration, co-creation; 2) prediction, anticipation; 3) raising awareness; 4) engagement; 5) participation and 6) assessment, monitoring and evaluation. Regarding risks, there are three types: 1) context risks; 2) strategy risks; and 3) leadership competences' risks.

Our preliminary analysis indicates that, although there is emphasis on the potentialities of social media for smart governance, there is a lack of scientific research, as well as empirical work, in this field. We did not find many scientific references related with the objectives of this paper. From our point of view, it is worth considering more investment in the role and potentialities of the use social media in smart cities to foster smart governance. Moreover, this should be envisaged with field assessments and considering mixed methods (both quantitative and qualitative) for the analysis of the impact and effects of such use.

Having this in mind, we would suggest that social media are currently used in a first level of maturity, i.e., in a level that does not allow nor bidirectional communication, nor more advanced initiatives (using the opportunity for prediction of problems or sentiment analysis, for instance).

For further research, we would highlight that our next step entails a review of the international agreements and a survey of case studies to analyze the impact of social media in these areas and, lying on that, the design of a framework for social media usage and development in governments at all levels. The social media framework must be a tool capable of fostering the smart governance principles and goals.

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