Smart cities & crowdsourcing. A bottom-up approach

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Abstract

Objectives The main aim of our paper is to offer some creative & innovative ways of using crowdsourcing in order to improve the wellbeing of both individuals and local communities by providing alternative solutions to real-life problems inspired mostly from some local best practices examples.
Prior work As a trend, there are a lot of national and regional initiatives that are trying to push further the idea of creating and developing smart cities through the adoption of new technologies mostly within the governmental and local institutions. Many of the best practices examples are based on automatization, innovative sensors for measuring pollution and on the big data approach like in the case of traffic monitoring. Even though different regions design some well-integrated projects, the goal of becoming a smart city ultimately lies in the ability of local communities to self-organize and voluntarily use some innovative technologies that might facilitate to find efficient and effective solutions for solving some of the most pressing daily issues, such as traffic.
Approach We look to identify different solutions that might improve the social, economic and environment cohestion of some small and medium communitites. We explore also some of the the ways in wich social-media platforms might help the complex process of raising awareness regarding road hazards, accidents and related issues and problems. We also discuss the applicability of crowdfunding for local communities as a poosible mean that might be used in order to promote and improve the civic participation.
Results We design and suggest a model of an online platform based on the use of crowdsourcing whithin local smart communities such as smart cities. We expect this model to represent the basis for challenging local communities to move from the physical communities approach towards the virtual space by mobilizing crowds to create and support smart, sustainable and inclusive development strategies.
Implications Small communities started perceiving Internet as a means of solving day-to-day problems through spontaneous initiatives. Practitioners and public officials should look towards technology as a means of better understanding the needs of their constituency. Our research offers a series of coordinates that can be further adapted according to the needs of different groups and correspondengly adopted to different problems.
Value The potential of exploring Internet of Things (IoT) bottom-up solutions for less developed areas is increasing once people are becoming more and more aware of their ability to be actively involved without consuming a lot of their spare time on solving complex communities issues.

Keywords: Smart Communities; Internet of Things; Crowdfunding; Social-Media.

1. INTRODUCTION

Living in the era of a creative and knowledge and innovation based society based on an intensive use of knowledge, information and technology means that individuals can make their voices to be heard more and better. Thus as a consequence one's actions can affect changes in the world. The Web 1.0 wave of online participation has focused more

on the individual's presence in the virtual space, while Web 2.0 had focus on *the social web* by exploring the diverse possibilities of interactions, usability and interoperability (Haythornthwaite, 2012). Tech enthusiasts people had started to discuss the idea of evolving towards a Web 3.0 wave, that is mostly concerning the smart interactions and the personalized content (Techopedia, 2017). All of these new forms of online organizing have made it possible for local communities and crowds to form social identities and to generate value and mostly value added, mostly in the long-run. (Wieczerzycki, 2016).

Crowdsourcing is usually defined as a way of accessing crowds of talented people and channeling their creative efforts towards useful endeavours (Landsburg, 2013). Our paper builds on the existing research on the role of crowds in online innovations for IT companies (Bkelland, 2008), crowds' motivations associated with open-access and open-source platforms (Raymond, 1999), and correspondingly to the theory of participatory activism (Haythornthwaite, 2009). We examine the possibility of using crowdsourcing and crowfunding to improve local communities' wellbeing and to develop creative and innovative collaboration platforms based also on the open innovation approach.

We use the theory of *exstrinsic and intrinsic* motivation (Deci & Ryan, 1985) to determine how participatory culture can be incentivized through crowdsourcing (Leimeister, Huber, Bretschneider, & Krcmar, 2009). We look at different exemples of best practices involving local residents intro the decision-making processes leading to actions by targeting the improvement of their local communities. We will then try to create a model that might facilitate the application and implementation of some successful practices in the local Romanian communities.

2. MOBILIZING CROWDS

Crowdsourcing means transferring tasks usually performed by individuals or single entities to undefinied groups through an open call (Williams, 2013). The public can be invited to develop or get involved in creating projects, strategies, making suggestions, proposing solutions or helping others to do so. From this perpective crowdsourcing is *gamified activism*, as it becomes easy and entertaining for everybody to participate, regardless of how much time they are able to invest in it. Online crowdsourcing platforms are split on topics ranging from general to very specific fields, so that everyone can freely choose the one that is closer to her or his interests and passions.

Understanding what motivates people to participate in open online projects is key in order to create successful crowdfunding campaigns, especially when the target is the development of physical communities. To do that, one should look at the most popular examples of crowdsourcing, such as Wikipedia, Quora.

We may also look at some of the famous environmental initiatives, such as *Let's Do It. The World Cleanup*, a movement born in Estonia in 2008 when 50.000 residents cleaned up the country's rubbish in a few hours (Let's Do It, 2017).

Deci and Ryan (1985) formulated a theory based on splitting motivations into two most important typologies, *intrinsic* and correspondingly *extrinsic*. The first type refers to the motivation incentivized by seeking fulfilment that is generated by the activity *per se* (e.g. playing for fun) while the latter means the action is a means towards an outcome (e.g. for money). Kaufmann et al. (2011) differentiate between these two types and *internal* and *external* motivations and argue that sometimes the practical differences between the two tend to be blurred. Their combined model identifies the main categories of motivaton factors based on the specificities of crowdsourcing (Fig. 1.). We suggest the use of an adapted version of their model in order to better understand the main motivators behind civic action through crowdsourcing projects.

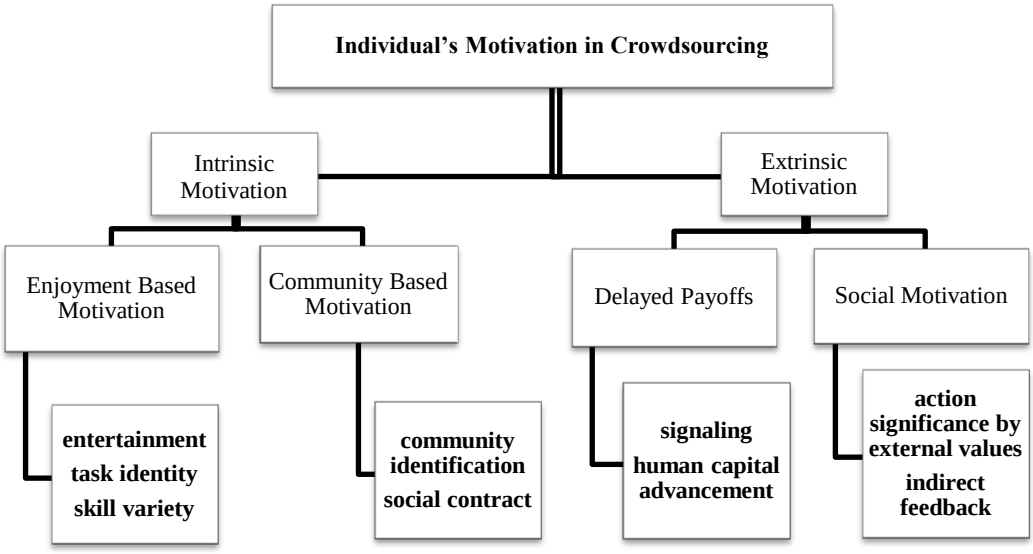

Fig. 1. Authors adaptation of *Worker's Motivation in Crowdsourcing*
Source: Kaufmann et al. (2011)

Quora is maybe one of the most fascinating best practices examples showing how people can help others by sharing something that's different from information, namely knowledge and wisdom, without expecting anything in return, at least apparently. In fact, the previous model can help us to better identify some of the motivation patterns, especially whithin the category of *community based motivation* and *social motivation.* We consider feedback, community identification and human capital advancement to be the primary stimuli for civic implication through online platforms.

Creating civic projects through crowdsourcing is not very different from making people answer questions from strangers, when they believe they have something valuable to share.

In the following sub-section, we will explain how by creating smart communities through crowdsourcing works by applying the theory of motivation factors to different examples of residents' involvement in developing their physical smart local communities.

2.1 SUCCESSFUL PRACTICES

Smart communities use information and communication technology to improve residents' wellbeing, and facilitate both their individual and collective development. Some authors differentiate between communities and crowds (Haythornthwaite, 2012), the first being defined as social groups that know each-other and share some common interests, while the latter suggests big groups of people gathered together (Merriam-Webster). We argue that today, these difference are not visible anymore. When talking about physical communities although geographical proximity remains a determining factor that charachterizes the community, face-to-face interactions between peers do not represent a reality anymore. Take the following example: the residents within a neighbourhood represent a community; however, not a lot of people today know their neighbours well enough to be able to share personal interests. From this perspective, physical communities are comprised of *people* living close to eachother. Involving residents in decision-making processes is a useful tool for anybody who is involved in that community, meaning residents, local authorities responsible to their constituency and also the private sector activating in the area.

One interesting community revitalization project implemented based on crowdsourcing technology took place a few years ago in Bristol, Conneticut, where a private development initiative on developing a 17-acre piece of land turned to the community, by creating an open call that empowered residents to submit and vote for ideas on what should be built on that vacant site (Sherman, 2011). The winning project was then presented to the City Council for approval. The technology behind *Bristol Rising* was based on Ning, a SaaS platform for creating social networks, and Bubbly, an online voting tool. This project involved almost a thousand residents who decided on what should be built in their neighbourhood. Moving on to motivations, we assess that people got involved for different reasons. Firstly, *community identification* and *feedback* – being the one with the winning project might bring you recognition within the community; Secondly: fun – designing a project, coming up with an idea or simply voting what others' suggested might be an entertaining activity that makes one feel good. Thirdly: *action significance by external values* – some individuals are more inclined towards thinking about the long-term impact of current actions, so the involvement in a civic project might translate as an investment into the future. The incentives can be multiple and most of the times they are mixed, but this example shows how a smart campaign can revitalize the participatory culture within a community, using online crowdsourcing tools.

Another example of using crowdsourcing to involve people in city projects, implemented this time by local authorities, is Boston's 2014 *#CityHallPlaza*. The Mayor has requested proposals from academics, entrepreneurs and creative individuals, for the redesign of the main city square using the hashtag #CityHallPlaza (Sturgis, 2015). Boston's officials have also organized other numerous crowdsourcing initiatives such as a hackathon or a contest for designing public spaces.

These are not unique experiences, but they underline the idea that people would get involved in the public affairs if they would have the opportunity to do so. However, these

are spread projects that could represent a basis for creating a more integrated platform for promoting and implementing smart ideas coming from individuals wishing to get involved in the community development (Nasulea & Medintu, 2015). In the following section we will propose a model that might be usedin the case of crowdsourcing in order to revitalize Romanian local communities.

2.2. A NEW MODEL FOR CREATING SMART COMMUNITIES IN ROMANIA

Moving physical communities in the online space is not an innovative idea. Individuals have had the initiative of bringing their interactions to social-media platforms because it was simply more convenient and time-effective. At the moment, there are thousands of Facebook groups dedicated to residents of Romanian villages, towns, cities and neighbourhoods. Some of these groups are promoting tourism in the area, others are using some platforms for discussing different problems of the community. These groups gather both residents and local authorities and have established working procedures such as posting photos and other materials regarding things that need to be repaired or improved (roads, street lighting etc.), while also sharing thoughts on possible development projects, events and so on. While this is a very good starting point for involving crowds and communities into decision-making processes, there is still room for improvement.

Our model of using crowdsourcing to create a participatory culture builds on local national and foreign examples and aims to become a starting point for a more comprehensive development strategy. The idea is to create an online platform dedicated to residents, local authorities and private companies from certain areas. The community can be defined as the people living in a village, town, neighbourhood or other types of residential areas. The main features of this platform would be accessibility and the ease of use.

As explained in the figure below (Fig. 2), the platform would be based on four main features:

- *Forums:* social interaction between the members of a community can be enhanced by having forums on topics ranging from general to specific; this would help individuals navigate directly to the topic they are interested in, making it an efficient and pleasant experience for the user. These forums should address the problems of the community, its rules, and everything that is related to civic identity. This feature builds on *enjoyment based motivation* and especially *direct feedback*, but also *social contact* as individuals can share their knowledge and receive acknowledgments from other members
- *Ongoing Projects:* this is where issues or ideas discussed in the forums become projects where individuals can first make proposals and suggestions, and then vote on those proposals. This would assure residents' that their opinions matter, while also helping local authorities to understand the preferences of their constituency. Furthermore, private companies can launch competitions for open proposals on business ideas, like in the previous case of Bristol.

- This feature would be interesting to members due to *community identification*, *signaling* (individuals can be noticed by possible employers because of their ideas) and *action significance by external values.*

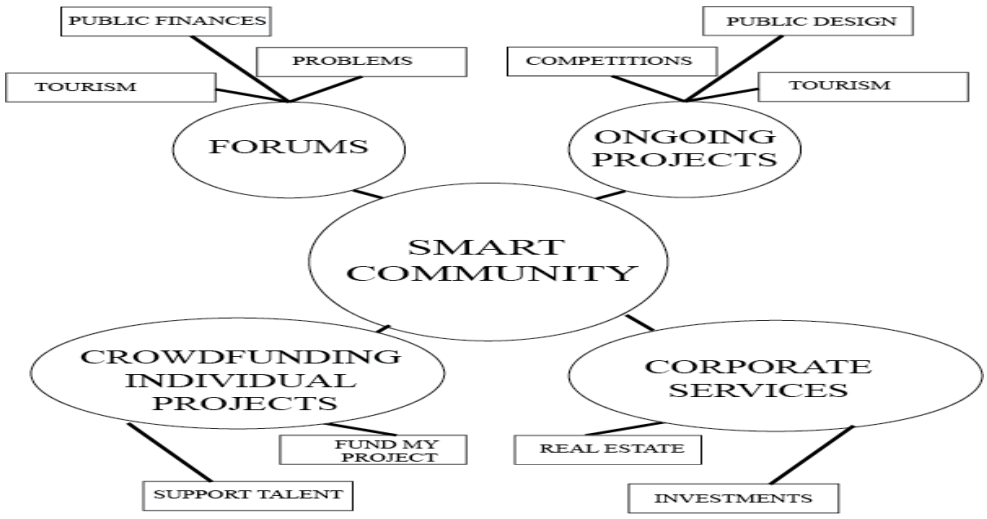

Fig. 2. A Model for Creating a Smart Community Online Platform
Source: Authors' own research

- *Corporate Services*: investors, developers and companies can access the possibilities of investment in that area, by sharing information and get feedback from residents and local authorities. This would be helpful for all parties involved as it would limit the possible risks for the companies and it would help authorities to establish a long-run relationship with the business sector that is activating in the local community.
- *Crowdfunding Individual Projects*: residents could promote their own projects in order to either fund them or conduct awareness campaigns. Individuals could help with small donations to interesting projects or find out about talented people living in the area. This feature is especially incentivized by people's need of *feedback* and *human capital advancement.*

3. CONCLUSION

Using a model based on the motivations involved in the crowdsourcing process is a prerequisite for further research aimed at achieving a deeper understanding of the main factors mobilizing individuals and, by extension, crowds to get involved. Our suggested platform is merely a basis for developing a smart strategy for enhancing civic spirit in local communities. We believe that getting people involved in the decision making process in a fast, easy and convenient manner would help create smart local communities.

One of the most important challenges of the knowledge and innovation based society and correspondingly for a smart, sustainable and inclsive development is to create smart, creative and innovative communities such as smart cities. Our paper had highlighted the importance of understanding how local communities would have to use some of the innovative technologies in order to create and next develop some appealing projects based on an active involvement of individuals within the complex decision-making process with expected win-win solutions for all the citizens who live and interact within a smart city. We consider that we have to support a holistic cross disciplinary approach concerning the smart city integrated in the broader concept of creative, and innovative communitues as consistent parts of a creative economy who joins in a synergetic vision both creative class people, creative & innovative clusters and industries that are acting within creative & innovative local communities.

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