CROWDSOURCING IN PARTICIPATORY PLANNING: ONLINE PLATFORMS AS PARTICIPATIVE ECOSYSTEMS

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Abstract. *Insufficient public presence within the traditional participatory activities in urban planning is largely caused by their incompatibility with the communication preferences of the public they are addressing. Accordingly, this research is aimed at identifying alternative approaches which enable the creation of new communication channels and improve the level and quality of participation. Starting from the hypothesis that technological development has changed the way we communicate, the goal of this research is to provide the deeper understanding of the current potentials and problems of internet participation in urban planning and also to point out on the future development strategies, which could address the problems we are facing today. By analyzing case studies in which Internet communication is used for this purpose, as well as publicly available data about user activities within the popular web platforms, we investigate the main advantages and disadvantages of the described practice, as well as the opportunities of the application of new communication approaches and technological trends, such as crowdsourcing activities and blockchain technology.*

Key words: *urban planning, participatory planning, crowdsourcing, blockchain, internet*

1. INTRODUCTION

When we talk about urban planning, we know that its subject is related to changes in which the whole society finds interest. British urban planner, Patsy Healey, emphasizes how easy it is to ignore the significance of these changes, even though they have a strong impact on our lives (Healey, 1997). Consequently, this also affects the response to the participatory activities in various urban planning projects. But the lack of interest is more consequence than a cause. The reason for insufficient participation can also be found in overlapping the time of traditional public meetings with the work hours of potential participants, their moving and transportation difficulties, and their determination to avoid

public confrontation. Even when there is participation, the results gained through traditional methods cannot be viewed as a real reflection of the community needs, because participants cannot be familiar with all the problems. Therefore it is very important to provide as many different participants as possible (Brabham, et. all, 2010), which is one of the reasons why this research is focused on investigation of the new possibilities for internet participation.

Since commercial use of internet had a revolutionary impact on information and communication technologies, reaching the new users become much faster than it was the case with other media - like radio receivers and personal computers before the emergence of a global network (Feldman, 2002). Its uniqueness is based on the ability to distribute information across the entire world of human activity, so it becomes the technological basis for creating the network as the organizational form of the information age (Castells, 2002). It becomes clear that internet can provide the planners with additional solutions for the creation of participative communication channels which would be free from the contextual boundaries characteristic for traditional methods. The situation in which it is possible to create, receive and broadcast information faster and easier than ever before, in combination with the general availability of technical devices, has also led to the emergence of a crowdsourcing phenomenon (Howe, 2006), which puts focus to the mass, or an undefined group of unknown individuals who approach the collective finding of the answer and its final design in the requested form. The potential of its application in different fields is described by an integral definition which states that crowdsourcing is a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task. The undertaking of the task, of variable complexity and modularity, and in which the crowd should participate bringing their work, money, knowledge and/or experience, always entails mutual benefit. The user will receive the satisfaction of a given type of need, be it economic, social recognition, self-esteem, or the development of individual skills, while the crowdsourcer will obtain and utilize to their advantage that what the user has brought to the venture, whose form will depend on the type of activity undertaken. (Estellés-Arolas, et. all, 2012). Since the Internet is an environment that does not know the limitations we encounter in the physical space, crowdsourcing can be implemented as the core principle within the online tools and platforms which can offer more flexible approach than traditional meetings. Starting from the assumption that groups have more knowledge than individuals, it is only necessary to create contexts in which they will be encouraged to participate (Howe, 2008).

The main goal of this research is to provide the deeper understanding of the current potentials and problems of crowdsourced participation in urban planning and also to point out on the future development strategies, which could address the problems we are facing today. This is achieved through the following methodology:

- Examining crowdsourcing and its common approaches in order to provide more information about possible actions within the planning procedures.
- Examining the user behavior models and their general activity within different internet platforms. Since we know that the existence of participatory platform is no guarantee for the participation itself, it is important to provide more information about the way people create content within it.
- Analysis of the case studies which included online participation as an integral activity during different urban planning projects in order to present different

approaches and get more insights about the possibilities of their implementation in various planning stages.
- Comparative analysis of user participation data gathered from two internet platforms - Wikipedia and Steemit. While the first one represents the largest online encyclopedia, the second platform is based on an innovative blockchain technology which enables us to consider its potential in the creation of decentralized online crowdsourcing platforms which could become the important tool in the future participatory planning. The published content on both platforms is not taken in consideration during this research, not only because they cannot be observed as scientific sources, but also because the information it contains is not relevant for the research goal. Instead of that, we analyzed open data related to the user activity level in order to discover potentials for increased engagement and participation in urban planning projects which base part of their activities on participation through online platforms and similar web-based concepts.

2. CROWDSOURCING AND ITS POTENTIAL IN URBAN PLANNING

The main reason for creating the participative online platforms dedicated to specific urban planning problems is their ability to harness the wisdom of the crowds in the way which was not possible before because the collective intelligence of communities was largely untapped by traditional public participation methods (Brabham, et. all, 2010).

However, an important question relates to the way in which the crowdsourcing principles are implemented in the mechanisms we are addressing to the masses. Howe further explains this, by stating that crowdsourcing is not a single strategy but the umbrella term for a group of approaches that depend on some contribution from the crowd (Howe 2008):
- Crowd wisdom (Collective intelligence) – Every crowd member possesses specific knowledge about a general issue, and synergy of their minds may come with the results that largely surpass the results of individuals or teams, regardless of their qualifications and expertise.
- Crowd creation – These are usually activities which include delegating different tasks to the crowd, in order to harness their creativity.
- Crowd voting – Organizing the information based on the voting preferences of the crowd. This does not necessarily relate to conscious voting – it could be based on mass preferences and other patterns.
- Crowdfunding - Getting financial support for projects and ideas from people who support it and are usually willing to donate money in exchange for symbolic gifts or benefits.

Depending on the problems they are addressing, participatory platforms can take on different forms, with their relevance depending on whether and to what extent they stimulate the interest of the crowd, both through the contexts they create and some of the above-described approaches.

3. WHAT MOVES THE CROWD?

Speaking of urban planning, we can consider the act of participation as a process in which individuals or groups are creating the value in form of information and transfer it to planners and other participants. In the context of internet participation, regardless of

the form and functionality of the platform that is used as a communication channel, we can say that the act of participation is actually the act of creating the value in the form of user-generated content (UGC).

Enabling participative functions is not the guarantee that participation will actually happen, so it is absolutely needed to analyze the user activity on existing ones. Just like in traditional methods, we may face the low-interest problems, especially when we know that participatory platforms are not attractive by themselves in the era of social networks and another web 2.0. concepts.

It is very important to take a look at participatory tendencies on popular internet platforms. Online encyclopedia Wikipedia is created and expanded exclusively thanks to community contributions, so many were surprised when the "Gang of 500" theory was introduced in 2006. According to it, 50% of all edits were carried out by 0.7% users (524 people), while 2% of users (1,400 people) wrote over 73.4% of all edits (Gajewski, 2016). This data is almost in correlation with the Internet "1% Rule ", which different variations speak almost identical thing - the dominant number of users still falls into the category of content consumers. Bradley Horowitz, former director of Yahoo and vice president at Google, talked about this phenomenon through *Yahoo! Groups* user behavior analysis and point out that 1% of users will create a group or launch a new topic within an existing group, 10% of users will actively participate in discussions, while the 100% of the users will benefit from the activities of the previous groups (Horowitz, 2006).

So even in the case of the platforms which are proven in high traffic and interest generation, we do not speak about the high percentage of content producing users. If we talk about the hypothetical platform dedicated to urban planning problem, this could mean that not all users will take the action and participate through their UGC. We could presume that high community awareness about the specific urban topic could lead to increased participatory interest, but that is applicable to the traditional methods too. Speaking of the participatory activities which usually do not generate much public and media attention (which could, for example, be included within the urban pocket or urban acupuncture projects), we can almost be sure that the standalone internet platform could not become participation catalyst by itself. But before we explore the additional horizons in the search for the answer, it is needed to explain what internet platform should provide during the participatory process.

4. EXAMPLES OF ONLINE PARTICIPATORY APPROACHES IN URBAN PLANNING

Ensuring all the conditions for online participation is a far more complex task than creating the platform itself. It is necessary to plan and provide a user environment and information that will enable participants to understand the context in which the project is being developed and the real needs that initiated the planning process. Brabham is speaking about the platform model in the hypothetical planning case where new neighborhood development is proposed to the city planning commission, and the public involvement program is launched in order to identify the potential impact on the community and find solutions to problems (Brabham, 2009). According to him, it is necessary to form an adequate open call and give as much information as possible to the potential participants – about the site where the construction is planned, timetable, expected number of new residents, etc. These questions and answers should form the basic elements of the

crowdsourcing call. Also, it is desirable that as much information as possible be included in this call - maps, list of business entities in the area. The call should also include specific professional information and data because there is no need to underestimate the ability of the mass to interpret and use them. All of these should be available on the dedicated website, along with the information about bounties, prizes and other perks which could bring the satisfaction to the participants. This could be the money, but also the prizes sponsored by local companies, communal service discounts, rights for naming some of the public buildings, etc. An understandable guide or template for the right formatting and proposal submissions should also be posted, and all user-generated entries should be publicly available for the crowd voting and other types of feedback. This does not necessarily mean that the crowd is deciding what should be included in the plan. There are many approaches to implementing their preferences into the planning procedure. For example, planners could combine different solutions, or launch the new call based on the specific entry, etc.

A concept similar to this generic model has been tested during the case of the planning the design of the bus station in the Salt Lake City, Utah. After they were introduced with the problem and available information, people around the world were asked to send their ideas. User registration was enabled from June 5 to July 24, 2009, while 338 users, mostly from the United States, United Kingdom, Germany, Austria, India, Australia, Ireland, and Canada, were registered. A total of 258 solutions was proposed, while more complex 3D concepts were submitted in the later phase of the contest. Participants not only enjoyed submitting their own designs but also in voting, commenting and following the popularity of other ideas (Brabham, et. all, 2010). Website oriented participation brings more benefits owing to the fact that it is accessible to a wide range of users. Its maintenance after the project does not cost much so it can be reused or used as an educational or another tool.
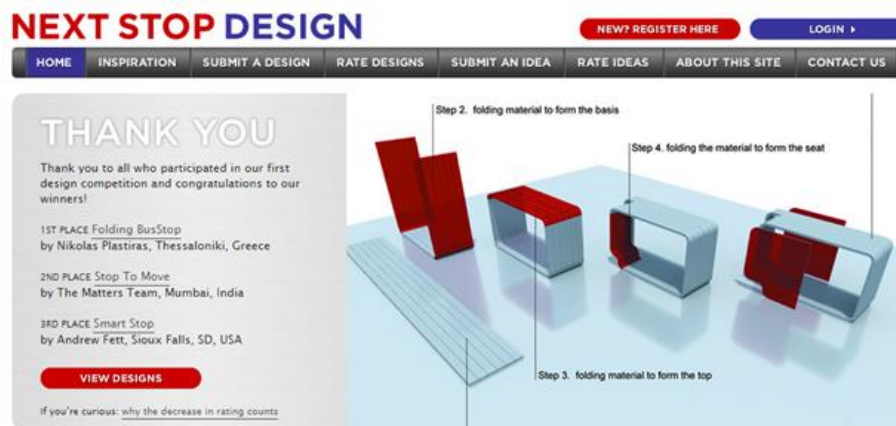

Fig. 1 Screenshot from the Next Stop Design site (accessed on 30th December 2018).
Source: http://first.nextstopdesign.com

Because of its simple, yet a well-rounded concept, this project had its second iteration which dealt with the planning of an intersection in one of the Salt Lake City neighborhoods. Both of the projects are still accessible via the website, but the central

web destination does not have to be an explicit requirement in order to maintain successful online participation. For Example, UN Habitat is using the Minecraft game within their "Block By Block" initiative, to gather the idea about urban space designs from the specific crowds. In April 2014, Block By Block was applied during the Aldea Digital Festival in Mexico City. The goal was to find a proposal to redesign Plaza Tlaxcoaque in the city center. Through the plugin named PlotMe, thousands of identical models of the scene were created on the public server, and each of them was assigned to individual users who applied for participation. They were introduced with the details of the task, and after that, they had three hours to propose a solution. At any moment, the public could follow the creative process through the link. The results were surprising, as more than 7,000 young people responded while delivering over 1400 ideas and 431 complete projects. All the collected ideas were presented to the city representatives as an inspiration for the future improvement of public spaces. Many proposals demonstrated the depth of thinking and ability to identify the most specific community needs. The winning entry came from a person who is only 12 years old and was based on the zoo, urban gardens, medical center, fountains and space for outdoor games (Westerberg, Von Heland, 2015).

A good example that crowdsourcing does not have to exclusively involve the use of new technologies and the development of independent web tools, but can represent an innovative use of existing ones, is the planning case of the new parking location in Canmore, Canada (Meng, Malczewski, 2010). More parking place was equally needed by residents and tourists who often came to the city for wellness and recreational activities.

The Planning Department proposed four potential locations for the project, but it remained open for citizens' proposals, stressing that certain criteria (distance from the main road, tourist facilities, housing, etc.) must be respected. The method for public participation was fully based on the Web PPGIS approach, by using the existing service ArgooMap. ArgooMap is a software solution in the form of an internet forum based on maps, intended for discussions while allowing participants to make their own contributions in the form of references to specific geographic locations.

Although the mechanics were very clear, users were introduced with a simple interface which contained all the necessary guidelines and instructions for the proper use of the web tool. In order to raise the needed public awareness, the project was advertised in local newspapers and on different websites, and the citizens had the opportunity to submit their proposals and suggestions within three months. During that time 58 persons participated with their contributions. Considering the fact that because of the previously described reasons, traditional methods usually do not achieve such a response, we can see that relocating these kinds of activities into the Internet environment could be a good way to improve the current situation.

In addition to the information we get by direct input into the custom web tools, it is also very important to analyze data related to user preferences within different web platforms and applications which are not closely related to urbanism topics. A good example is research on user behavior on Twitter and Foursquare, which was aimed at examining the use of public space in Boston and Chicago (Xiaolu, Zhang, 2016).

The basic idea was to collect data that users are sharing with each other and then classify and display them within a geographic information system. The chosen platforms were compatible and in accordance with the urban objectives because of their key characteristics. At the time of research, Foursquare was a social network where users shared their location, which later could be classified through different categories. Also, location information could be also shared via Twitter.

So basically, by using the well-known platforms with the existing user base, researchers could focus on the development of algorithms which would collect the tweets with foursquare references. After the data was collected, results were applied in the space maps, which indicated the points of public interest within different categories: travel, and transport, outdoor and recreation, food and restaurant, shop and service, nightlife, etc.

5. THE NEED FOR NEW HORIZONS

Due to the speed of technology changes and the need for a reaction that is more often appearing as an instinctive reflex and not a planned approach, we come to situations in which the Internet is used as a participatory environment, but without a longer-term strategic plan. However, the presented case studies are illustrating two types of successful online approaches. In the case of Next Stop Design, we had an open website with a clear participation procedure. In the second case, the existing technology was used in a non-typical context to trigger the crowd creativity. Both approaches reflect two general tendencies in online participation today – development of the web platforms which would gather entries in an open or specific form, or using different network connected tools to communicate with the crowd during the participatory workshops.

Users are changing their habits, and trends are disappearing even faster than their appearance. If the Minecraft is attractive at this moment, it does not mean that will be the case in the near future. This was not the first time of using the popular game for participation activities - Second Life game was also used in the participatory planning as a tool for analyzing avatar behavior in the simulated virtual environment (Foth, et. all, 2010). The Minecraft example, just as the parking planning in Canmore, illustrates how software solutions could be used in order to create contexts which could trigger the collective wisdom of the crowd. However, the crowdsourcing approach in urban planning processes does not have to always relate to them. Extracting the needed information from Foursquare and Twitter showed some valuable insights, while it maintains significant resource efficiency - thanks to the fact it used well known, populated platforms.

On the other hand, if we are planning development of long-term participatory online spaces, which could serve equally for participatory activities and raising the general awareness about participation importance, we should take a look forward and analyze potential forthcoming trends in the context of planning needs. The main reason for this is reflected in the 1% Rule – so if we want to maintain continuous interactions in our online communities and trigger the crowd wisdom in the best possible way, we have to think about additional methods which could increase their motivation and interest.

6. BLOCKCHAIN TECHNOLOGY AS A PARTICIPATION CATALYST

After the blockchain came into our reality, taking a central position in the mainstream through reports about the success of Bitcoin, many organizations recognized the potential of this technology. This was a completely new way of organizing data. In blockchain systems, all user data and transactions are stored in encrypted data chains, which are stored at different points within the network. Any change in the chain requires the consensus of all participants who own a copy of the database, making the system almost absolutely secure

and resistant to the risks inherent in classic databases. This has been recognized as a potential in almost all areas of human activity, both for the sake of security and for the fact that these are decentralized systems in which decisions are not passed by a central authority but are achieved by consensus. When different industries talk about the blockchain, they often use a definition which states it is a distributed ledger representing a network consensus of every transaction that has ever occurred (Tapscott, 2016).

Soon, blockchain becomes the basis for different projects and startups. Creating a blockchain ecosystem such as Ethereum has initiated the launch of new businesses with their own cryptocurrencies while creating a significant impact on the market. Blockchain changed the rules by eliminating the middleman and central authorities and providing the users with tokens that have unstable, but real market value. This was the case with social platforms. Finally, it becomes possible to enable the users to monetize their content, so the profit was not anymore in the hands of centralized companies but the community which was distributing the rewards among its members through the simple act of crowd voting. Today, one of the most popular ecosystems of this type is Steem blockchain.

Given that the platforms on Steem blockchain support activities based on four basic types of crowdsourcing, it has been examined how the STEEM as its native cryptocurrency can affect the overall user activity with its market value, or can there be a deviation of the "Rule 1 % ", which relate to the activity of users who create, evaluate and consume the content? The basic intention was to check if the direct possibility of financial reward for participatory entries in the form of UGC, can increase the number of active users or impact their behavior within the specific platform. In order to achieve this, this research used the data publicly available on Steemit platform as a part of regularly, user performed analytics and reporting.

In an earlier analysis of internet participation, the activity of Wikipedia platform users was divided into three groups: contributors - contributed at least 10 times, active contributors - at least 5 times in the previous month and Very active contributors - contributed at least 100 times in the previous month (McConnell, Huba, 2006). This categorization is taken as a marker for later comparison with activity of Steem platforms users. But before that, the data from the period of July – August 2017 was taken from the public available source at Wikimedia Stats website (https://stats.wikimedia.org). This range was picked because the Steem cryptocurrency had a low and stable value, so it could not impact the activity within the blockchain (as was the case during the famous bull market in December 2017). This data is shown in the table below (Table 1).

Table 1 Statistics from Wikipedia (English) platform in the period of July - August 2017

Wikipedia (English)				
Number of registered users	Active users	Number of submitted edits/content	Active percentage of users	Average number of entries per user
25872501	411522	4499205	1.59%	11

The average value of submitted UGC per active account in the analyzed period is 11, which would place the average active user at the very border between the participant and the active participant, according to the aforementioned categorization from 2006. By analyzing steem blockchain activity in the same range (Table 2), we can see that its users created enough content to place them extremely high in relation to the activity of Wikipedia users. Everything becomes more indicative because the total number of active user accounts never broke the 1% rule. Based on that, we can say that in the context like

this, users are participating within the same percentage range as on traditional platforms, but with more entries which is probably caused by the possibility to be evaluated and rewarded by the community.

Table 2 Statistics from Steem blockchain platform in the period of July - August 2017

Steem Blockchain				
Number of registered users	Number of active users	Number of submitted posts/comments	Active percentage of users(average)	Average number of entries per user
1096067	56999	4300310	5.2%	75

As it was stated in the research methodology description, Steemit, Wikipedia and other online platforms cannot be treated as relevant scientific sources in the content domain, but it is still possible to approach them as models that can provide valuable insights into user behavior. Data generated through human activity and not directly by their creative and intellectual work (statistics, average values, time spent on web pages etc.) becomes the basis in which we can spot patterns that are hard to detect in isolated environments which are not massively visited. These platforms, while respecting transparency and openness rules, make their databases open to the public, which is a unique opportunity to use them as a resource for additional analysis and research.

7. CONCLUSION

The application of crowdsourcing in different fields is important because it represents the new communication layer which correlates to the communication habits of those we address. These habits are an actual consequence of the fact that the internet has become a resource without which it is almost impossible to function and perform daily tasks.

By examining the ways in which crowdsourcing activities can be performed, this research has pointed to the basic forms of crowdsourcing activities that can be combined depending on the needs of a specific project. As a particularly important factor, the level of user activity was treated, as well as the fact that creating participatory environments does not guarantee that participation will occur. This is very important because in this way we avoid the risk of transferring problems from traditional methods to online environments. It is necessary to prevent investing in the development of participatory platforms that will be innovative but not visited.

Fast technological advancement is also one of the reasons why we should consider the upcoming trends and anticipate the future behavioral patterns of the public with whom we communicate. Comparing blockchain as an innovative concept that decentralizes communication with classic online platforms showed that users who receive direct financial rewards usually create more content then in the cases where participation is rewarded by other means. This indicates the possibility of creating decentralized environments where users create their own rules and independently participate and evaluate suggestions among themselves. Eventually, these could become social platforms, aimed at connecting planners with their publics. In this way, it is not only possible to realize multiple participatory activities within a single platform but to create a valuable database of projects, in which both experts and the general public will find their interest.

According to this, we can formulate following results:
- Crowdsourcing in participatory planning offers a more versatile approach than traditional methods, which can result in increased engagement of the targeted public. However, while it is able to overcome common limitations of traditional methods, such as time requirements, meetings in physical space and confrontation with other participants, it is needed to develop integrated solutions which would be applicable in different urban planning projects in order to create online spaces which would be widely recognized and have significant impact on current practice.
- Internet users who are participating on different internet platforms are more engaged and productive when the activism is evaluated by the community and valorized through direct rewards. Since blockchain technology can be used for the creation of decentralized, transparent and community-driven systems based on crowdsourcing and user rewarding, it should be further researched in order to timely recognize and create long-term online participatory spaces which could be used for different planning objectives that require public involvement.

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CROWDSOURCING U PARTICIPATIVNOM PLANIRANJU: INTERNET PLATFORME KAO PARTICIPATIVNI EKOSISTEMI

Nedovoljno prisustvo javnosti u okviru tradicionalnih participativnih aktivnosti u urbanom planiranju uglavnom je uzrokovano njihovom neusklađenošću sa komunikacionim preferencijama javnosti kojima se obraćaju. U skladu sa tim, ovo istraživanje je realizovano sa ciljem prepoznavanja alternativnih pristupa koji omogućuju stvaranje novih kanala komunikacije i mogu uticati na unapređenje nivoa i kvaliteta participacije. Polazeći od premise da je tehnološki razvoj promenio način na koji komuniciramo, cilj istraživanja je da omogući potpunije razumevanje trenutnih potencijala i problema internet participacije u urbanom planiranju, kao i da ukaže na buduće razvojne strategije koje mogu pružiti odgovore na probleme sa kojima se suočavamo danas. Analizirajući studije slučaja u kojima je internet komunikacija primenjena u ove svrhe, kao i javno dostupne podatke o korisničkim aktivnostima u okviru popularnih web platformi, ukazuje se na osnovne prednosti i nedostatke opisane prakse, kao i šanse koje u ovoj oblasti donose novi komunikacioni pristupi i tehnološki trendovi, poput crowdsourcing aktivnosti i blokčejn tehnologije.

Ključne reči: *urbano planiranje, participativno planiranje, crowdsourcing, blokčejn, internet*