TeMA

Journal of
Land Use, Mobility and Environment

This special issue collects a selection of peer-review papers presented at the 8th International Conference INPUT 2014 titled "Smart City: planning for energy, transportation and sustainability of urban systems", held on 4-6 June in Naples, Italy. The issue includes recent developments on the theme of relationship between innovation and city management and planning.

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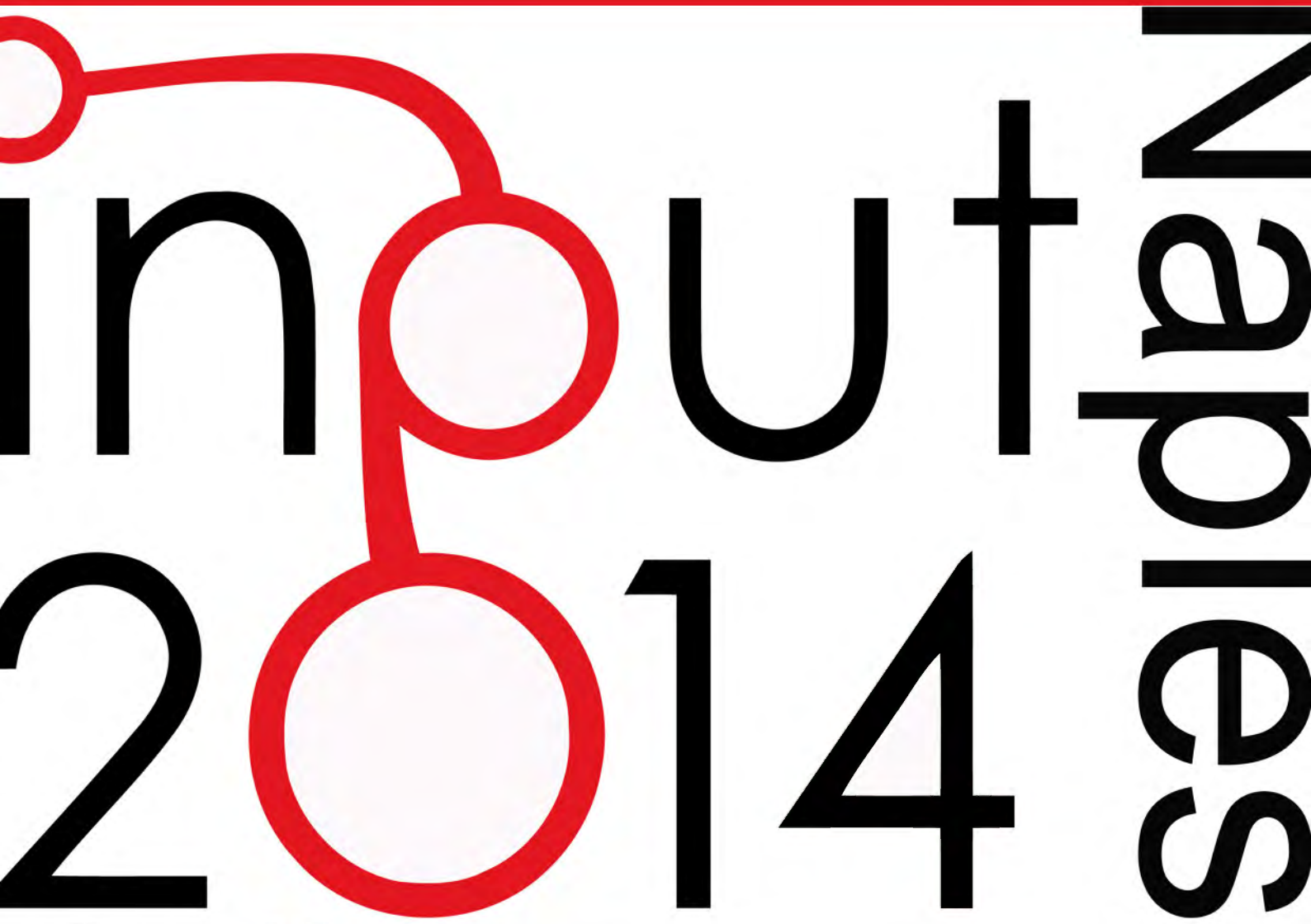

Smart City

planning for energy, transportation and sustainability of the urban system

Special issue, June 2014

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SMART CITY

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Laboratory of Land Use Mobility and Environment
DICEA - Department of Civil, Architectural and Environmental Engineering
University of Naples "Federico II"
Piazzale Tecchio, 80
80125 Naples
web: www.tema.unina.it
e-mail: redazione.tema@unina.it

TeMA Journal of Land Use, Mobility and Environment

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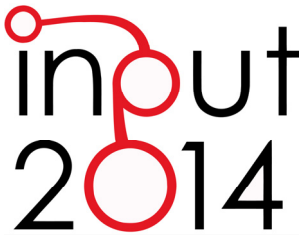
TeMA Journal of Land Use, Mobility and Environment

This special issue of TeMA collects the papers presented at the 8th International Conference INPUT 2014 which will take place in Naples from 4th to 6th June. The Conference focuses on one of the central topics within the urban studies debate and combines, in a new perspective, researches concerning the relationship between innovation and management of city changing.



TeMA Journal of Land Use, Mobility and Environment

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EIGHTH INTERNATIONAL CONFERENCE INPUT 2014

SMART CITY. PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM

This special issue of TeMA collects the papers presented at the Eighth International Conference INPUT, 2014, titled "Smart City. Planning for energy, transportation and sustainability of the urban system" that takes place in Naples from 4 to 6 of June 2014.

INPUT (Innovation in Urban Planning and Territorial) consists of an informal group/network of academic researchers Italians and foreigners working in several areas related to urban and territorial planning. Starting from the first conference, held in Venice in 1999, INPUT has represented an opportunity to reflect on the use of Information and Communication Technologies (ICTs) as key planning support tools. The theme of the eighth conference focuses on one of the most topical debate of urban studies that combines , in a new perspective, researches concerning the relationship between innovation (technological, methodological, of process etc..) and the management of the changes of the city. The Smart City is also currently the most investigated subject by TeMA that with this number is intended to provide a broad overview of the research activities currently in place in Italy and a number of European countries. Naples, with its tradition of studies in this particular research field, represents the best place to review progress on what is being done and try to identify some structural elements of a planning approach.

Furthermore the conference has represented the ideal space of mind comparison and ideas exchanging about a number of topics like: planning support systems, models to geo-design, qualitative cognitive models and formal ontologies, smart mobility and urban transport, Visualization and spatial perception in urban planning innovative processes for urban regeneration, smart city and smart citizen, the Smart Energy Master project, urban entropy and evaluation in urban planning, etc..

The conference INPUT Naples 2014 were sent 84 papers, through a computerized procedure using the website www.input2014.it . The papers were subjected to a series of monitoring and control operations. The first fundamental phase saw the submission of the papers to reviewers. To enable a blind procedure the papers have been checked in advance, in order to eliminate any reference to the authors. The review was carried out on a form set up by the local scientific committee. The review forms received were sent to the authors who have adapted the papers, in a more or less extensive way, on the base of the received comments. At this point (third stage), the new version of the paper was subjected to control for to standardize the content to the layout required for the publication within TeMA. In parallel, the Local Scientific Committee, along with the Editorial Board of the magazine, has provided to the technical operation on the site TeMA (insertion of data for the indexing and insertion of pdf version of the papers). In the light of the time's shortness and of the high number of contributions the Local Scientific Committee decided to publish the papers by applying some simplifies compared with the normal procedures used by TeMA. Specifically:

- Each paper was equipped with cover, TeMA Editorial Advisory Board, INPUT Scientific Committee, introductory page of INPUT 2014 and summary;
- Summary and sorting of the papers are in alphabetical order, based on the surname of the first author;
- Each paper is indexed with own DOI codex which can be found in the electronic version on TeMA website (www.tema.unina.it). The codex is not present on the pdf version of the papers.

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DIGITAL SOCIAL NETWORKS AND URBAN SPACES

PABLO V. FLORENTINO[a], MARIA CELIA F. ROCHA[b],
GILBERTO CORSO PEREIRA[a]

[a] Federal Institute of Bahia, Salvador, Brazil
e-mail: pablovf@ifba.edu.br
URL: http://lattes.cnpq.br/7522094241285957

[b] Federal University of Bahia; CAPES (proc. n. 11527/13-7), PRODEB, Salvador, Brazil
e-mail: rochamcelia@gmail.com
URL: http://lattes.cnpq.br/9355339989087222

[c] Department of Urban and Regional Planning, Federal University of Bahia, Salvador, Brazil
e-mail: corso@ufba.br
URL: http://gilbertocorso.tumblr.com/

ABSTRACT
The goal of this paper is to explore how available data from digital social networks can be used to understand ongoing collective actions on urban micro spaces. For this we analyze two cases, one in Brazil and the other in Italy. We propose to conduct an exploratory exercise about group discussions in digital social networks interactions on issues that affect the use of residual public spaces as a way to understand how collective actions are trying to modify urban environment. Aiming to verify the possibilities of analysis of this kind of interaction we made a study of digital urban movements in two cities: Salvador (Brazil) and Potenza (Italy). Such study aims to perform social networks analysis from groups and interactions on digital communities. This permits to test specific research methods to understand how groups and individuals are articulated for qualify cities micro environments, by using digital social networks platforms as a way to improve public participation in a broad sense.

KEYWORDS
Social Networks Analysis; Public Participation; Urban Movements

1 INTRODUCTION

Social interactions of everyday life are permeated by technology. Social sharing and a dynamic information integration may enable the convergence of different points of view, by exchanging individual or group experiences. It also reveals various alternative ways to behave and act over urban space.

Gordon (2008) suggests the network technologies and corresponding practices significantly changes the nature of local situations, not only socially, because of the way we share information geographically located, as phenomenologically, the way we experience what's near. Ongoing research at laboratory LCAD at Federal University of Bahia – UFBa goes in that direction: the use of mobile digital technologies and its influence at the urban environment. This paper presents questions that have been discussed in two current research projects at UFBa: the project "Networked Citizen: from consumer to producer of information about the territory," developed in partnership with the PRODEB – Cia of Data Processing of Bahia – and the project "Digital Social Networks and their Impacts on Urban Space in Brazil". The objective of the paper it is to explore how data from digital social networks can be used to understand communication and re-composition of structures of social groups involved in actions to improve residual areas in urban space, using complex network theory. We observe the way people are using digital social networks to communicate and diffuse theirs interests, as well as the interactions are shaped around their more active members.

To verify the possibilities of analysis of this type of interaction, we made a study of digital urban movements in two cities: Salvador (Brazil) and Potenza (Italy). Our goal was to test alternatives as a way to expand a repertoire of research methods used to understand how groups and individuals are organized to deal with urban spaces, by using digital platforms social networking as a way to improve public participation in the broad sense.

2. PARTICIPATION, URBAN MOVEMENTS AND DIGITAL SOCIAL NETWORKS

Nowadays a widespread use of ubiquitous communication technologies are based in convergence and mobile networks. These technologies made possible new forms of sociability and allowed new social practices and actions. Social medias have given rise to new participation forms in issues related to urban life. On the path of this process we can notice that the mobilization around the theme of common goods in urban life could contribute to civic engagement, clearly embodying the cultural dimension to the concept of citizenship.

Several initiatives by citizens' groups, often associated with NGOs, seeking to occupy and redefine the use of urban spaces, are inserted in social movements that aspire to repopulate virtual and physical public space with elements of a public sphere. Public sphere is understood in this text as a mean of communication between people who want to govern their lives.

The term "participation" became popular as part of the political vocabulary of the social movements of the 60s of last century. Protests against the anti-democratic nature of urban interventions of the post-war cause, in those years, greater involvement of users and affected communities in the definition of projects, particularly in developed countries (Pereira 2009). Advocacy planning movements arise from then mostly aimed at improving the quality of urban life at the local level. They represent a first attempt to involve citizens in urban planning processes (Murgante 2013).

In the 70s of the twentieth century, authors denounce the excessive autonomy of the political sphere rather than the source of legitimation of power. "From there emerged new movements and theories about democratic mechanisms that sought to increase citizen participation in public affairs" (Silva 2009, 29).

The debate on public participation is renewed with the popularization of the Internet in the 90s and especially with web 2.0 in the mid first decade of the XXI century. According to Gomes (2005), the most

enthusiastic phase with the possibilities of the Internet prevailed until the second half of the 90s. There was hope that the Internet should induce a renewal of the public sphere and participatory democracy. But, on the other hand, continues the author, studies have pointed to deficits of the Internet in terms of their contribution to modern democracies.

In the 80s, movements for social advocacy and nongovernmental organizations have already used the Internet in discussion groups and BBS (Bulletin Board System). In the 90s, diverse movements are integrated via web into collective actions, whether to engage in a common struggle, or to build a common activity (Antoun 2008).

Access and interaction are important for participatory processes – are in fact its conditions of possibility – but they are also very distinct from participation because of its less explicit emphasis on the dynamics of power and decision-making. Carpentier (2012) emphasizes that the defining element of participation is power. Poplin, Pereira and Rocha (2013) tested a Participatory Cube to analyze some Brazilian and European online participatory platforms as a framework for the analysis of participatory applications available online. It is composed by three axes that represent the most relevant dimensions: decision power, interactivity of communication, and the access to space of communication. They have found the more usual is wide access, but centralized communication (one to many) and narrow power of influence.

Van Dijk (2012) defines eParticipation as the use of digital media to mediate and transform the relations of citizens to governments and to public administrations in the direction of more participation by citizens. The author founds eParticipation is more used in the first phases of the policy process: agenda setting and policy preparation. Initiative of citizens frequently is related to policy evaluation and governments and public administrations rarely allow entries to the core decision making and policy executing phases, the author says.

Rustad and Sæbø (2013) focused on how, why and with whom local politicians engage on Facebook. They conducted a qualitative case study focusing on politicians in a local municipality in southern Norway by using their proposed framework. Their empirical results indicate that politicians *"still have some work to do to strategically harness their use, or non-use, of social media in political discourse"* (78).

Parviainen, Poutanen, Salla-Maaria and Rekola (2012) examined nearly 100.000 Facebook users and over their 27.000 interactions in the two Finnish presidential candidates' Facebook pages during a period of 14 days. They combined statistical and social network analysis to distinguish structural differences in the underlying friendship networks, such as in the interconnectedness of the page users.

From the network structure's point of view, they could see that underlying friendship networks of both pages differed in many aspects. The activity over time analysis revealed the evolution of both groups in terms of new page "likes" and the amount of posts. They also explored associations between the amount of friendship connections within the post and different "activity ratios". The authors conclude that activating the most connected users of a page will yield the page more activity.

It thus appears that the present studies have been devoted to understanding behaviors, seeking to associate them with interactions in digital social networks. They use Social Network Analysis (SNA) relying increasingly on large volume of data being produced and shared: the *Bigdata*. Applications based on social networks provide an operational context for interaction between the contact networks of each participant, expanding the social sphere. Within this type of application, social capital of each network node becomes available for privileged methods searching for ideas, content and people (Maistrello 2007). In the contemporary context, one of the goals of the study of social networks is analyzing relationships between social entities and the implications of these patterns and relationships to the social life (Wasserman and Faust 1994).

Such studies promote deeper analyses about social structures in these networks and a quantitative dimensioning of interactions. Thus, quali-quantitative evaluation of such social networks initiatives can happen following organized procedures and based on specific methodologies with concepts and applications of Social Network Analyses and Complex Networks Theory (Barabási and Bonabeau 2003), such as centrality, betweenness, density, clustering coefficient, degree distribution and so on (Wasserman and Faust 1994). This permits classifying complex networks for comprehending their internal structures using mathematical and statistical techniques.

Some studies on participation with the use of digital platforms mentioned here confirm the interest in adopting an expanded view of political participation to contemplate new social arrangements present in cultures that use communication networks as a medium to share views. Such social arrangements are considered here as a starting point to analyze two movements that try to change the use and meaning of certain urban spaces, they also propose to take care of these spaces collectively. This paper used data from online social networks and communities *fanpages* with an active presence on Facebook seeking to reclassify waste and degraded urban spaces in two cities, one in Brazil and one in Italy. Through quantifying more meaningful interactions conducted in 2012 and 2013 and structural analysis of relationships maintained in these groups, it is expected to characterize them and establish bases for comparison.

3. CASES DESCRIPTION

3.1 GARDEN IN MOTION (*IL GIARDINO IN MOVIMENTO*, ITALY)

The project Garden In Motion (*Il Giardino in Movimento* or GMO) rises from a prior facebook group named Parco del Basento devoted to discuss an idea to recover an degraded area near the Basento river, along the lower part of the city of Potenza (Southern Italy). This area became degraded since the process of *deindustrialization* starts from the mid 70s of last century, closing piggeries settled into and around.

A design of a great park – Parco del Basento – was conducted in 2010, by Studio WOP, and grew up with new supporters joining civil society associations and collecting signatures on a petition, calling for the construction of the park in 2012. Local newspapers reported the initiative, whereas professionals and professors were asked to give their opinion in public hearings with mayor and politicians. Social networking improved debate, reaching its peak between February and May 2012. The project was enriched by discussions with stakeholders and mobilized many citizens of Potenza that see the initiative as an opportunity to think about the city, to participate in the planning of urban space, to experience new forms of public participation.

As a result of this process, a group of dwellers continues to discuss the use of urban space through Facebook and meetings. These people are sharing visions on the present and the future of the city through fanpage and group forum called “Il Giardino in Movimento”, since the end of 2012. This way, they experienced, on their own, collaborative process trying to attend collective interests from local community - in short, the common good for citizens of Potenza nowadays.

3.2 COLLECTIVE YARDS (CANTEIROS COLETIVOS, BRAZIL)

Collective Yards (*Canteiros Coletivos* or CCS) is a group of dwellers that rises from discussions developed in digital social networks about urban problems in the city of Salvador (Northeast, Brazil), between January and February, 2012. Diverse manifestations, organized by unknown citizens or already constituted movements,

happened in this period requesting deep changes in the municipality to restore the popular use of city public urban spaces. The creator of the movement explains how it was born in a TV interview, in September, 2012:

> *I have launched the idea of recovering an urban site near my house and wish that such actions would multiply by several city neighborhoods, rescuing our role of active citizen, who not only think, not only questions, but it does, search solutions, alternative search and get things done. From there we formed a group and began to define practical actions.*[1]

The first intervention was performed on a common and degraded area in a large avenue in Salvador. This experiment was replicated in other different and distant areas, afterward. The actions of *"planting, maintenance, painting and cultural occupation of spaces"* have succeeded in other parts of the city based on the invitation of organized social actors whose actions are directed to certain neighborhoods and areas of the city.

The interventions take place with anyone interested in collaborative efforts and/or voluntary participation. Online and offline actions aim to promote "an increasing number of residents with the possibility to transform the city". Collective Yards performs also a project in partnership with an NGO (Permaculture Institute of Bahia) which aims to make this type of intervention an educational practice, strengthening the educational aspect through direct practices. They develop and promote training workshops in the communities where interventions are performed.

4. DATA AND ANALYSES

Both projects host a discussion group and a *fanpage* in Facebook where actions are organized, debated and disseminated. In the group area of each project, the respective participants have autonomy to publish and interact with each other through posts, likes and comments, or even sharing the content for beyond the group. Public actions are organized and people are invited to participate in initiatives in a hyper-connected way using Facebook as main platform. For extraction of data we used the NetVizz application (Rieder 2013), which permits access to different kinds of data about the projects analyzed. In the first set of data extracted for analyzes, (I) we retrieved all the textual content of posts in each group and respective comments, just as statistics and aggregated values of the different measures, as comments and *likes*. On Facebook, the sum of these two measures is defined as Engagement and will be considered in this work.

The second set of data (II) retrieved from both projects two kind of networks: a) the friendship network of members belonging to each group; b) the network based on interactions between group members through the posts (likes or comments from user X on a post from user Y create an edge between X and Y). The last one set (III) retrieved a 2-mode network[2] of *fanpages* of each project between two kinds of nodes: posts and users. Two-mode networks are a particular case of social networks where two different kinds of elements (nodes) have relations (edges) exclusively between nodes of different types (Latapy, Magnien and Del Vecchio 2008). In the current cases, every time a user comments or likes a post in the *fanpage*, a link between the post and the user is created. For all networks analyzed we considered undirected edges between nodes[3].

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1 https://www.facebook.com/groups/coletivodecanteiro/.

2 It is possible creating 1-mode network (projection) of 2-mode networks formed by only one type of the nodes. If nodes A and B belong to type X and each one keeps a relation with node P1 (which belongs to type Y, in a 2-mode network), then, the 1-mode network projection for type X will create a relation between A and B.

3 Undirected edges represent a kind of relation which allows the existence of a link between a pair of nodes A and B, independent of direction. So, the relation does happen in ***A=>B*** as also in ***B=>A.***

4.1 STATISTICAL ANALYSIS

4.1.1 THE GARDEN IN MOTION PAGES

- The GMO group page

The GMO Facebook group page[4] was created in 2012 on the initiative of Studio WOP architect. It is an open group with 562 members (December 19, 2013).

This study made a first group recognition through its posts between October 1st, 2012 until September 2nd, 2013. During 337 days, there were 80 posts, sometimes only informative and/or calling for mobilization or participation in the events, sometimes sharing opinions and knowledge. We decided to analyze the content of 20% of the posts with the greatest commitment, computed here as the amount of comments and "likes" (Engagement) addressed directly to the post (not the comments on the post).

The post with highest number of comments (18) and *likes* (8) refer to photos of an event under the Musmeci Bridge. The comments are however a conversation between three friends whom combine a meeting on another date. The second one is a photographic record of an event held in the "garden" area, with 9 comments – many people are saying sorry for not having attended – and 10 *likes*. Third-placed one brings images of designs for redevelopment of the area under the bridge resulting from a workshop, whose election was through number of likes and comments.

- The GMO fanpage

The GMO Facebook *fanpage*[5] was created only on June 26, 2013. The page is defined geographically as *hyperlocal* in its description: *"In Potenza, between the Musmeci Bridge and the city, there is a garden that changes in a natural way. We think (and we live) in this space in a shared way"*. The area has a symbolic meaning for the group. The Musmeci Bridge is the main entrance to the city. It was built in 1976 and should be reverted into a riverside park, which was never built (Murgante 2013). With the desired realization of Parco di Basento project, the bridge and the whole area adjacent would become valued.

Until December, 2013 the *fanpage* reached 826 followers. Between July 15 and September 3, 2013 (50 days), there were 52 posts, on average 1.04 post/day. Engagement reflects the set of interactions observed for each kind of interaction mentioned. Unlike the data obtained for the group, here we also consider the amount of shares and liked obtained by the comments.

The top post in all aspects (22 likes, 7 reviews, 27 shares and 5 comments like) concerns to the disclosure schedule of the second phase of the workshop *"Il Giardino sotto il Ponte"*, held on 17th and July 18, 2013, under the Musmeci Bridge, when the chosen intervention among the designs made in the first workshop and put to a vote on the page has been performed. Except for the post with the schedule of the workshop, that has got a lot of likes (22) but also got record number of shares (27), the number of likes were responsible for posts get better positions in relation to engagement (28 *likes* on the photo of the intervention and 23 likes in group photo), in any other case there was more than one share.

Confronting group and *fanpage*, there is a tendency to use the second one to spread the idea of participatory design, conveying a large amount of media (videos, images) and information, especially those related to the first workshop. This channel was used for involving others dwellers in the movement, always reinforcing the idea of participatory design. It provides details related to intervention projects over the area of intervention, discloses the name of participants, as well as traditional media news about the movement.

4 https://www.facebook.com/groups/389327887802076/.
5 https://www.facebook.com/IlGiardinoInMovimento.

The *fanpage* has the role of an outside diffusion into the public set of followers, while the group page shares information deemed of group interest: calendars, events of other groups, links to publications, photos taken by its participants and photos of internal events performed by the group. On project´s *fanpage*, there are posts from several followers and participants, although with a predominance of some of them. The peaks of interaction (20% of posts evaluated for the periods of observation) occur primarily linked to events promotion. In case of *fanpage*, this occurs during the workshop held in July 2013. These peaks were more distributed on time in group forum.

4.1.2 THE COLECTIVE YARDS PAGES

- The CCS group page

The CCS forum on Facebook[6] is presented as an open group, which brings together people who believe in participatory management of public residual urban areas. Through actions of cleaning, planting and artwork, the group intended to lead the local people *"the idea that the strength of a collective can transform and reframe degraded and forgotten spaces of a city"*.

The group defines itself as a "collective" and states they seek to create a spirit of autonomy so that residents and retailers keep themselves locations recovered, promoting a new use of the area "for the community", rescuing *"the intense life on neighborhood streets"*. The group was born on December 19, 2013, and had 1,502 members in February, 2012.

The collected data from the group refer to the period between June 4 and July 29, 2013. In 56 days there were 107 messages posted in the group, most often calling to participate in events, sharing knowledge and opining on interest issues of the group, or reporting initiatives that reinforce its objective. 22 top posts considering engagement (*likes* and comments) represent 20% of posts in the group considering the period and received 246 *likes* and 61 comments.

The most liked (28 *likes*) was the post sharing news related to the collective from a traditional newspaper from Salvador: comments (4) congratulate the creator of movement. The second post with most *likes* (22 likes) was a post calling *to celebrate each day as the Environment Day*. The third post with highest engagement (18 *likes* and 5 comments) mention the Collective Yards project in a university class.

Considering the 22 posts analyzed, the one with more comments (11) ranks sixth place in terms of engagement. It is a message where the group sets up a meeting to discuss a new event. 3 posts that had higher engagement circulate pictures: newspaper timeline photos and posters pictures.

- The CCS fanpage

This Facebook *fanpage*[7] and the group forum were created in the same month, February 2012. *Fanpage* is presented with the same goal in group space. However, on page they reinforce the idea of education action group in the sense of *"proposing a new relationship, exchange, learning the day-to-day, collective work for the common good"*. The page had 2,704 followers until September 12, 2013 .

The data collected for this study refer to interactions between May 17, 2012 and September 26, 2013. In 497 days were posted on the status line 680 messages. On average 1.37 posts per day. 20% of the posts with top engagement (number of *likes*, comments, *likes* on comments, and sharing) totaled 136 entries in the status area.

The top post on engagement (161 mentions) got 58 *likes* and was shared 90 times: it concerns the release of a free workshop (gardening, ecology, art). Next is the post that got 149 entries and was shared 94 times,

6 https://www.facebook.com/groups/coletivodecanteiro/.
7 https://www.facebook.com/CanteirosColetivos?fref=ts.

referring to the mobilization for action intervention group in a square. Thirdly, the post with 128 entries in total and the largest number of shares (99), is requesting diffusion of a *flyer*.

The comparison of interactions amount (group and page), considering the 20 higher engagement, indicates that their dynamics do not coincide at all. There it is great focus on more engaged group interactions between June and July, 2013, period of protests in Brazil against indifference of public administration with relevant social issues as education, health and transport. Curiously, despite this, these posts do not refer to these manifestations.

4.2 SOCIAL NETWORK ANALYSIS

4.2.1 GROUPS: INTERACTION NETWORK AND FRIENDSHIP NETWORKS

The interaction and friendship networks of each group were firstly adjusted considering the biggest component of connected nodes for performing analyzes. In both cases these sub-networks represented, at least, more than 90% of original networks. This step is fundamental for computing metrics in social networks analyzes, respecting all the premises stated in Watts and Strogatz (1998), which ensure the possibility of studies and comparisons of considered projects. Random network (using the software Pajek[8] and allowing comparisons between relevant metrics such as clustering coefficient and length) and degree distribution were also generated for each network.

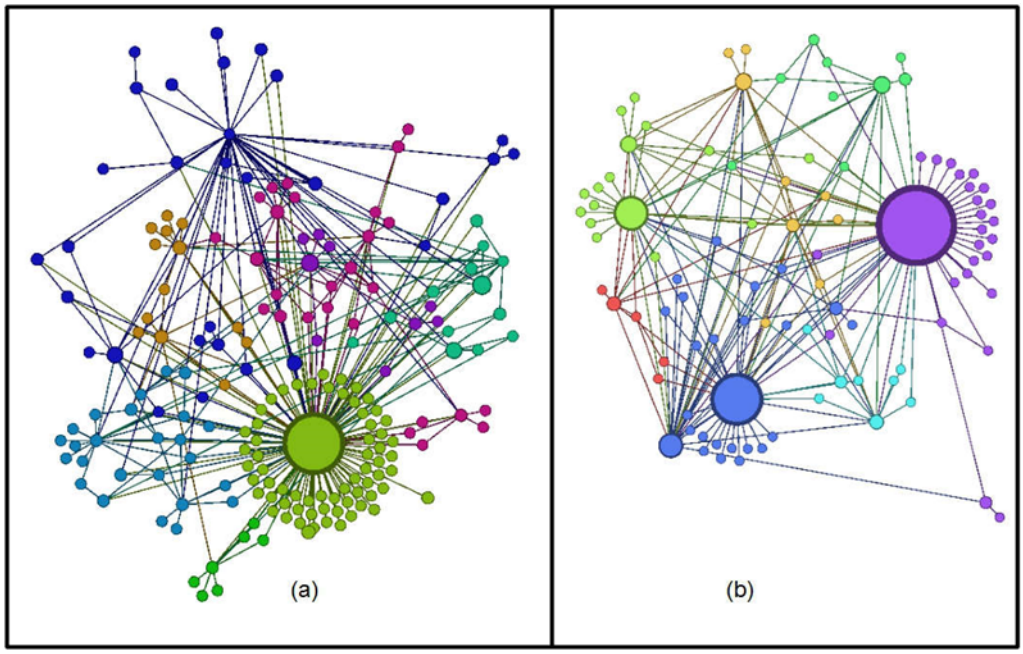

Fig. 1. Interactions networks for CCS (a) and GMO (b)

Networks generated from interactions among social actors can be named emerging networks and represent social interchanges performed by social interactions and conversations mediated by computing. Such complex networks generally show *Small World* characteristics (Recuero 2009). Figure 1 presents the networks of interactions on posts among participants of projects CCS and GMO, respectively.

[8] Pajek is a very traditional software for SNA and generates randomic networks using Poisson distribution of degrees.

The colors in Figure 1 represent clusters of interaction. The figure shows a trend toward greater centralization in the case of CCS, where one of the actors has a very prominent role. In the case of the Italian group can also identify the most active actors but the leadership of the interactions is somewhat more distributed.

Figure 2 presents the friendship network of participants of each project, CCS and GMO respectively. Colors represent sex of users - blue nodes are Facebook users whom did not inform sex. For both interaction networks analyzed, comparing to the random correspondent networks, the clustering coefficients are high and average shortest path metrics are low. The degree distributions show no patterns in both cases. This allows us to classify the interaction networks as *Small World* networks, confirming Recuero. In fact, these networks function in a clustered way – very small subgroups or a place for inter-mediating meetings of already known users – another characteristic of emerging networks (Recuero 2009). Participants may not achieve the totality of users in the group as interactions remain inside little subgroups (of dialogues, of known people, of close talks), without a large socialization among the remaining users.

These examples of networks are efficient for interchange of information inside the clusters, but as they happen in a context of community, create digital trails for non-participants of such clusters, whom can also reach the posts and dialogues shared in the group, participating in debates and promoting information. This result confirms a characteristic of little complex social networks (Appel and Hruschka 2010), where subgroups have a tendency for high connectivity among their elements than with the hole group, tending to hierarchical organizations with communities inside communities. The friendship networks (Figure 2) metrics present the same behavior of the interaction networks, but the degree distributions present a tendency to Scale Free (Barabási and Bonabeau 2003) network. Figure 3 shows the degree distibution of connections and as the amount of elements in the CCS network is higher, its graphic presents different scale in frequency axes from the GMO network.

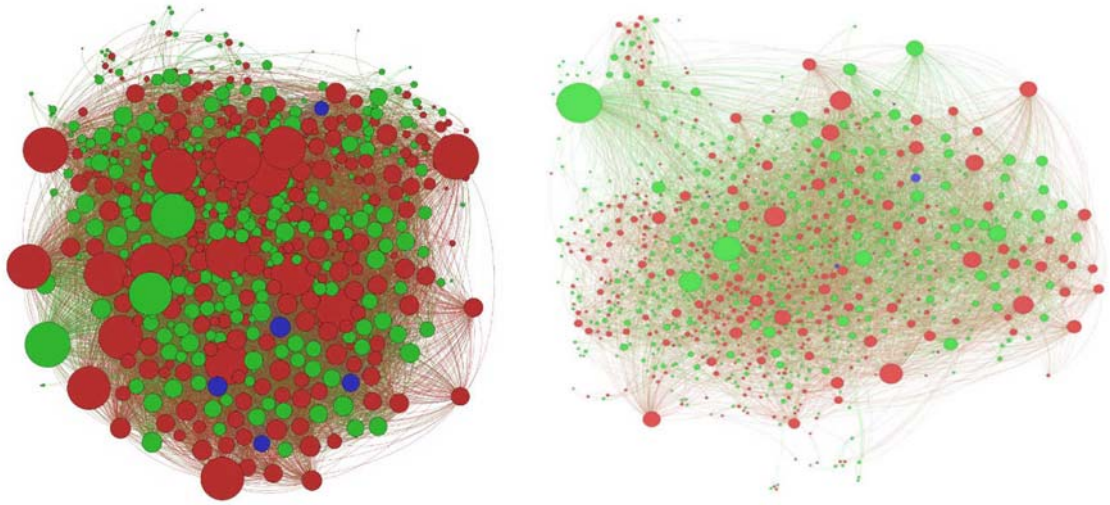

Fig. 2. Connections networks for GMO (left) and CCS (right)

In these cases, few people are linked to many others, while these are connected to very few people. So, most part of the connections belong to very few people in the observed groups. It was possible to realize that in these structures, some people have a higher attractiveness for new elements joining the groups, becoming fundamental for keeping dynamics in the projects, although, inside the group, the interactions show a clustered behavior.

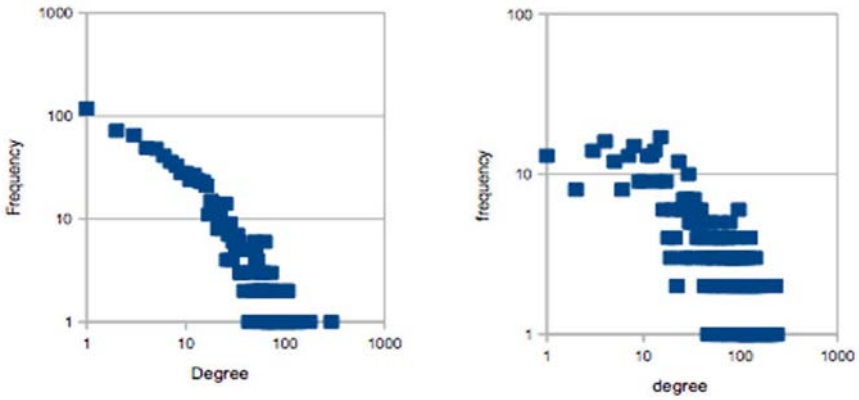

Fig. 3. Degree distributions of connection networks for each project: CCS (left), GMO (right)

We can conclude that these networks have their formation process highly influenced by elements with high attractiveness. In case of eliminating such nodes from their respective networks, these systems can crash originating incommunicable islands (the clusters). It is proper to make a parallel between goals of the groups and the scale free networks: both groups try to develop some kind of organization over specific urban environments that were in a neglected-chaos state. This kind of behavior is similar to those revealed in transition phases of unorganized systems for organized ones.

4.2.2 FACEBOOK *FANPAGES*

In relation to Facebook *fanpages* of both projects, we have extracted 2-mode networks (Latapy, Magnien and Del Vecchio 2008) formed by two types of elements: a) posts made by the *fanpage* administration and b) users that performed some kind of interaction, as *likes* or comments, on such posts. From both networks, we have generated four projections networks (Latapy, Magnien and Del Vecchio 2008) for each mode (two exclusive for users and two exclusive for posts) which gave us four 1-mode networks.

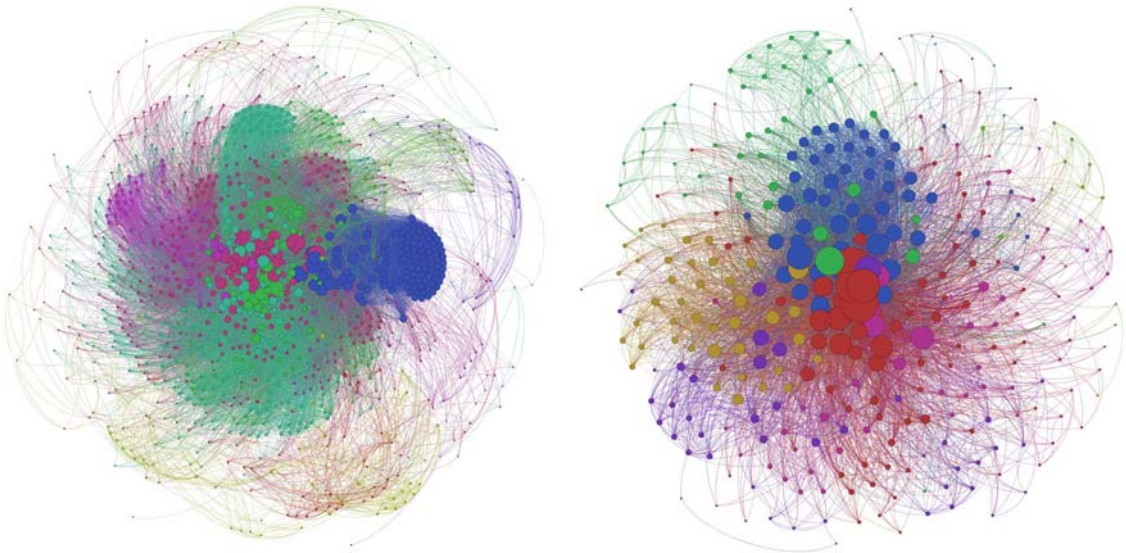

Fig. 4. Projection of users extracted from 2-mode fanpage network: CCS (left), GMO (right)

The projections exclusively for users (separated from the posts) for both projects can show how the followers “meet” in virtual spaces (the *fanpage* and its posts) trough interactions and content exchange,

establishing possibilities of contacts among strangers. Thus, we have analyzed such projections as well as their respective original 2-mode networks, generating and observing their metrics and structures.

Measures as average degree, density, average shortest path and diameter, evidence very similar results for 2-mode networks, even with very distinct values for amount of nodes and edges, which are the basic for most of metrics. Networks projections for users show similar behavior for clustering coefficient. A visual inspection on both 1-mode networks evidence clusters (represented by nodes colors) linked for few nodes, repeating a *Small World* tendency. This is confirmed by metrics in comparison with their respective random networks metrics in both projections: high clustering coefficient and low average shortest path. Such results permit us conclude that both projects have similar behavior and network structures, even in different countries and cities with very distinct population size and cultures.

5. CONCLUSIONS

According to Carpentier (2012), as the actual use of social media and correspondent practices often extend the theoretical reflections on politics, one can speculate how democratic values subsidize current visions of the common good, understood here as the right to the city.

Both cases work through the occupation of public space. In Brazil, the goal is on urban residual spaces. In Italian case, the focus is on a space whose quality has been degraded by previous usage given to it. We can say that these movements change the public space in a sense they try to improve its quality to become usable by citizens.

Similarities and differences in terms of goals, forms of speech and action can be observed. Il Giardino in Movimento comes to assure the area management for the city. This requires changes in urban legislation, they want to enhance the city, valuing Musmeci bridge, the entrance from the town, which it is an architectural heritage. The group also aims to develop different urban participatory projects by involving voluntary associations, university professors, designers and others professionals. Collective Yards wishes changes social behaviors and local communities with a more educational approach. Implicitly, it also wants to promote environmental awareness. There is involvement of distinct neighborhood associations and a university project.

The main stage for debate and develop such actions were digital platforms, specifically digital social networks, as Facebook. This permits people from distinct neighborhoods can discuss and organize meetings, interventions, debates in physical places, creating new social interaction and exchange of ideas, motivating others to keep acting on urban spaces or joining the group actions. The way Facebook is used to communicate and spread interests and collective actions shows similar dynamics in usage of posts published by both groups. GMO uses fanpage to spread actions for a broader audience, while the group forum diffuses information for group interest. In CCS case, posts with more response from participants are related to recognition from the press or students groups, while most liked posts in fanpage are related to publicizing of movement activities (workshop, gardening), as in GMO. We may conclude that, in both cases, forums reinforce relations among elements of the groups, while fan pages work for publicizing and engaging people in groups actions. Fanpages are used to get visibility outside, while the group pages are used to a kind of inside conversation.

Social data analysis reveals great similarity in the interactions and network structures, considering examples from different countries, with different cities not only in culture but also in size and dimensions. The use of these tools and data proved to be useful. The classification of networks from each case reveals a short path between nodes in almost all networks structures. Although structure of interactions had shown great

polarization in CCS case and wider distribution around some poles in GMO case, it could be expected that interactions and connections emerged from such digital trails pass could perform interferences on urban experience through contemporary and diffuse processes.

Castells (2000) says that the trend for networks formation is central in our society and institutions. Above all both, social networks and social movements became on-line. As data about social networks can be found today in digital format, computational approach seems adequate for data acquisition. Once gathered, data must be analyzed and this can be done in a quantitative way or by a qualitative approach. As we are dealing with a great amount of data, manual treatment could be highly time consuming. DNA is a way of extract information about agents, opinions, interactions by use of computational tools, however we find that to go further in the knowledge there is a need of mixed methodologies – not only statistical and computational but socio spatial analysis – different professional backgrounds are essential to a better data interpretation. DNA it is useful tool that can highlight the points that must be analyzed in a qualitative and, in some cases, manual approach. Following insights brought by social data analysis, as a future work we believe that content analysis of discourses and meanings contained in the posts will bring new findings. We will explore Semantics Networking Analysis as a first approximation to discover meaning shared by those groups about participatory actions on urban public spaces.

REFERENCES

Antoun, H. (2008), "De uma teia à outra: a explosão do comum e o surgimento da vigilância paticipativa". In: Antoun, H. (org.) *Web 2.0: participação e vigilância na era da comunicação distribuída*. Rio de Janeiro: Mauad, X. 11-28.

Appel, A.P., Hruschka Jr., E. (2010), "Minerando a Web por meio de Grafos – da teoria às aplicações". In: Pereira, A., Pappa, G., Winckler, M., Gomes, R. (Orgs.), *Tópicos em Sistemas Colaborativos, interativos, multimídia, web e banco de dados*. Sociedade Brasileira de Computação, 1. 101-130.

Barabási, A., Bonabeau, E. (2003), "Scale-Free Networks". *Scientific American*, 288, 50-59.

Carpentier, N. (2012), "The concept of participation. If they have access and interact, do they really participate?", *Revista Fronteiras – estudos midiáticos*, 14, 2: 164-177.

Castells, M. (2000), *The rise of the network society*. Oxford: Blackwell Publishing.

Gomes, W. (2005), "Internet e participação política em sociedades democráticas". *Revista FAMECOS*, 27: 58-78.

Gordon, E. (2008), "Towards a theory of network locality". *First Monday*, 13, 10.

Latapy, M., Magnien, C., Del Vecchio, N. (2008), "Basic notions for the analysis of large two-mode networks". *Soc. Networks*, 30: 31-48.

Maistrello, S. (2007), *La parte abitata della Rete*. Milano, Tecniche Nuove.

Murgante, B. (2013), "Wiki-Planning: The Experience of Basento Park In Potenza (Italy)". In: Boruso, G., Bertazzon, S., Favretto, A., Murgante, B. and Torre C. M. (eds.), *Geographic Information Analysis for Sustainable Development and Economic Planning: New Technologies*. IGI Global. 345-359.

Pereira, G.C. (2009), "Informação Geográfica, Interatividade e Participação Pública". In: PRODEB. *Internet, participação e interatividade*. Relatório Técnico Preliminar. Salvador, 45-59.

Parviainen, O., Poutanen, P., Salla-Maaria, L., Rekola, M. (2012), *Measuring the effect of social connections on political activity on Facebook*, (mimeo).

Poplin, A., Pereira, G.C., Rocha, M.C.F. (2013), "The Participatory Cube: A Framework for Analysis of Online Participation Platforms". *Lecture Notes in Geoinformation and Cartography*. Berlin: Springer Berlin Heidelberg. 395-414.

Rustad, E., Sæbø, Ø. (2013), "How, Why and with Whom Do Local Politicians Engage on Facebook?", in Wimmer, M.A., Tambouris, E., Machintosh, A. (eds.), *Eletronic Participation 2013. 5th IFIP WG 8.5 International Conference, ePart 2013*. Koblenz, Germany. Proceedings. Lecture Notes in Computer Science, 8075. 69-79.

Silva, S.P. da (2009), *Estado, democracia e internet: requisitos democráticos e dimensões analíticas para a interface digital do Estado*. Tese de Doutoramento em Comunicação e Cultura Contemporâneas, Universidade Federal da Bahia, Salvador.

van Dijk, J.A.G.M. (2012), "Digital Democracy: Vision and Reality". In: Snellen, I., Thaens, M., van De Donk, W. (eds.). *Public Administration in the Information Age: Revisited*. Amsterdam: IOS Press. 49-61.

Wasserman, S., Faust, K. (1994), *Social Network Analysis: Methods and Applications*. Cambridge, Massachusetts: Cambridge University Press.

Recuero, R. (2009), *Redes sociais na internet.* Porto Alegre: Sulina (Coleção Cibercultura).

Rieder, B. (2013), *Studying Facebook via Data Extraction: The Netvizz Application*. ACM WebSci. Paris, France: May. 346-355.

Watts, D., Strogatz, S. (1998), "Collective dynamics of 'small-world' networks". *Nature*, 393. 440–442.

IMAGES SOURCES

Fig. 1, 2, 3, 4 created by authors.

AUTHORS' PROFILE

Pablo Vieira Florentino

Phd student at UFBa. He has a Bsc in Computer Science at UFBa (2000) and a Msc in Systems and Computing Engineering at COPPE/UFRJ (2003). His current research interests include social network analysis, digital social networks and urban spaces.

Maria Célia Furtado Rocha

Phd student a UFBa. She has a Bsc in Economics and a Msc in Administration at UFBa. Her current work is funded by CAPES (proc. n. 11527/13-7). Her current research interests includes digital social network, semantic networks, internet and public participation.

Gilberto Corso Pereira

Professor at Department of Urban and Regional Planning at UFBa. He is an Architect and PhD in Geography. His current research interests includes Geographical Information, public participation, digital culture.