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Collective Action and Web 2.0. An Exploratory Network Analysis of Twitter Use During Campaigns

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by Elena Pavan

1.   Introduction

The relationship between Internet and politics currently constitutes one of the most interesting and challenging objects of study for many disciplines both in social and computational sciences. Over the last two decades, scholarship "intrigued by (this) new medium's capacity for self-expression and its potential for disrupting social, political and economical relations" [Chadwick and Howard 2009, 3] has rapidly enlarged thus addressing the nexus between electronic communication and politics looking at different tools – websites [Bennett and Segerberg 2010], emails [Pavan 2012], forums [Gonzailes-Bailon, Kaltenbrunner and Banchs 2010], social media [e.g., Bennett and Segerberg 2012] – and at various domains, from political communications and electoral campaigning [Anstead and Chadwick 2009, Davis et al. 2009], to collective action and social movements [Ayres 1999; Segerberg and Bennett 2011] passing through the consolidation of new practices of dissent as cyberactivism [McCaughey and Ayres 2003].

Within this broad field of research, particular attention is being paid at the connections between *social media* and *collective action*, especially in conjunction with several contentious dynamics as the Arab spring, the Occupy initiatives or the rise of Indignados in Spain. Indeed, despite undeniable differences in terms of actors involved, size, goals, geographies, identities as well as in terms of the political dynamics played out, what these dynamics have in common is that political objectives have

been (or still are) pursued leaning on wide (trans)national networks of activists which were built and scaled up sustained and stimulated by a heavy use of Internet – and of social media such as Facebook, Twitter and Youtube in particular. Thus these social-media-enforced networks supplied offline action (e.g., street rallies, public debates or violent riots and takeovers) with a constant flow and exchange of information, multimedia contents, ideas, propositions, resources (both cognitive and materials, such as donations) that was not only circulating and animating the places of the protests but, more broadly, was building a bridge with the rest of the world [Kamis and Vaughn 2011; Khoury 2011].

These mobilizations, in all their diversity, provide good examples of the fact that, in a context that is characterized by the ubiquitous presence of ICTs [Hall 2011] and by the progressive merging of online and offline spaces in a sole, hybrid social space, collective action dynamics tend to be more and more defined by a "mix" of online and offline activities which jointly contribute to the sustainability and to the strengthening of these endeavors over time [Bennett and Segerberg 2012]. Yet, opinions on effects of social media communications on collective mobilizations still tend to diverge: while few would doubt that Internet communication reduces the costs for organizing collective efforts and allows the expansion of their reach [Earl and Kimport 2011], true *flames* light up when the potentials social media communications for effective political action are discussed.

The controversy opposing on the (web)pages of *Foreign Affairs*[1] Clay Shirky and Malcom Gladwell provides one good example in this sense. On the one hand, Shirky considers social media almost causative of collective action because, through the provision of easy modes for individual content production and sharing, they allow a wide circulation of information and enhance awareness on social issues thus leading to collective efforts which bypass the need for any organizational intermediations [Gladwell and Shirky 2011, see also Shirky 2008]. On the other hand, Gladwell claims that collective contention and mobilization existed well before social media and have always flourished and benefited from "*strong ties*" amongst participants. In this sense, the author suggests, that "just because innovations in communication technology happen does not mean that they matter" [Gladwell and Shirky 2011]. In the same vein, scholars like Morozov [2009] characterize in terms of "nano-activism" those forms of participation – as joining Facebook groups or Twitter discussions – which, because they are low-risk, low-cost and low-time-consuming, are more and

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[1] http://www.foreignaffairs.com/articles/67325/malcolm-gladwell-and-clay-shirky/from-innovation-to-revolution#

more diffused and replacing more traditional and, in his opinion, more effective forms of engagements [see also Morozov 2011].

As it happened before when the Internet of websites first came into the scene, neither cyber-optimists' nor cyber-skeptics' positions seem to fully respond to the complexity of the nexus between social media and collective forms of political participation. Portrayals of current mobilizations that over-emphasize the technological element and speak of "Twitter revolutions" tend to downplay the role of social actors (both individuals and organizations) while feeding the false idea that, without the Internet, these dynamics would have never occurred [Diani 2011]. Conversely, interpretations that read Internet activism in terms of substitution *tout court* of existing collective action dynamics with ineffective and extemporaneous commitments, tend to ignore that, while there is an actual growth of use of "quick" tools (e.g., online petitions), there is no evidence of the fact that online activity is replacing offline participation [Christensen 2011].[2]

In fact, as we live today in a highly mediated context, where changes in ICTs are to be considered as shaped by and, at the same time, shaping society in a fluid and dynamic way [Hall 2011], political effects of Web 2.0 tools cannot be thought as univocal but, rather, as depending on several conditions that are subjected to change passing from one situation to another [Diani 2000; Mosca and Vaccari 2011]. This entails, in the first place, that the sole provision of enhanced technical facilities will not translate automatically into political action, as the very context within which political action is pursued is, at the same time, *systemic* – i.e., based on the evaluation of political opportunities structures where actors operate [Koopmans 2004a, 2004b; Kriesi 2004; Meyer 2004] – and *technological* – as it is influenced by the level of sophistication of the media environment around political agency [Ward and Gibson 2009].[3] Moreover, when collective actions actually take place, the ways in which political and technological opportunities are exploited will vary depending on the type of collective action dynamics that we are witnessing [Diani 2008, Diani and Bison 2004], on the type of social media that is employed [Kaplan and Haenlein 2010] as well as on how they are used and their *affordances* exploited [Earl and Kimport 2011].

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[2] In his review of the empirical studies concerned with Internet potential for fostering political participation, Christensen [2011] points out that, although "the existence of a positive effect of Internet activity on political participation (has been questioned) […] none (of these studies) suggests a negative effect from using the Internet for political purposes on participation in real life. This suggests that fears of Internet activities supplanting real life activity are unsubstantiated."

[3] For example, with specific reference to the Arab spring case, it has been noticed that there is no correlation between the access rate to the Internet and actual uprisings as Internet penetration rates were higher in the Persian Gulf than in Egypt and Syria [Diani 2011].

To make sense of this complex intertwinement, then, we should abandon radical, extreme positions, and adopt a more complex and flexible approach that, while acknowledging the relevance of both social and technical aspects, triangulates the key intervening factors: social dynamics, communication technologies and their (more or less strategic and sophisticated) uses. It is precisely according to such a complex approach that recent scholarly contributions in this area have studied how some defining features of the Web 2.0 platform, (i.e, its collaborative and non-static nature, the lower level of competences required to publish contents, the marked accent on social connectivity and collective intelligence, see Chadwick and Howard [2009]; Mosca and Vaccari [2011]), meet the nowadays consolidated request for participation of non-traditional, non-governmental political actors to supply a widely recognized and multifaceted deficit of governmental and intergovernmental actors in terms of legitimacy, knowledge and access [Hockings 2006].

Despite initial fears for cyberbalcanization [Sunstein 2011] or for isolation [Putnam 2000], empirical evidence seems to suggest that the possibilities to transform private discourse into public discourse [Papacharissi 2011] and to remix information and cultural elements produced by others in personal ways [Lievrouw 2011, Valeriani 2011] foster the proliferation of contributions that self-coordinate through complex public opinion networks thus enriching in terms of pluralism the political agenda [Papacharissi 2009]. The added value of such a lively participation through content production and sharing practices can go beyond the simple amplification of existing dynamics [Earl and Kimport 2011]. When enhanced communication and information-sharing possibilities that are proper of social media are fully exploited, new organizational models of action tend to emerge: on the one hand, collective mobilizations seem to transcend more and more often from the presence of the organizational actor [Bennett and Segerberg 2012]; and, on the other hand, organizational actors that remain involved are hybridizing their action repertoires in order to enhance their flexibility and responsiveness to claims for enlarged participation thus mixing up elements of interest groups, coalitions, political parties and social movements [Bimber, Flangin and Stohl 2005; Chadwick 2007].

All these different "transformative effects," or *impacts* [Mosca and Vaccari 2011], of social media stem directly from the augmented networking potential that is proper of the Web 2.0 tools and that enhances the networked feature of our (contemporary) society [Castells 2010]. Still, networks that derive from the use of social media in collective action efforts tend to remain "virtual," on the background also of those critical analyses that adopt a complex approach of study. Few attempts have been made so far to trace and examine the very relational dynamics that are enabled by social media to see who mobilizes using social media, what types of contents are pro-

duced, what are their patterns of exchange, how user generated content contributes to the mobilization dynamic (for an exception, see Segerberg and Bennett [2011]).[4] And yet, as the social space for action becomes hybrid, the *multipolar* system of relations constituting collective action [Melucci 1996] inherits this peculiarity and becomes *multidimensional*. This dimensional enmeshment brings much more than the sole enrichment of action repertories [Costanza-Chock 2003; Rolfe 2005; Van Laer and Van Aelst 2010]: it is the very structure of relations supporting collective action that expands across the boundary between the online and the offline.

We contend that such relational enrichment of collective action systems constitutes the first and the most fundamental "transformative effect" exerted by social media, not only because it translates in the actual amplification of the size of collective endeavors but, more importantly, because the extended set of social relations established via social media provides a whole new relational milieu for exchanging informational and material resources as well as for creating shared symbolic systems and visions – two defining dimensions of collective action dynamics [Diani 2008, Diani and Bison 2004]. For this reason, if we are to understand if and how collective political participation changes in the Web 2.0 era, networked structures of participation created by social media use should "move from virtual to real," that is, they should be traced mapping the *actors* that enter the space of the mobilization through services like Facebook, Twitter or Youtube; the *connections* that they establish with other platforms' subscribers; the *contents* that are produced or remixed and their *patterns of circulation*.

In order to operate this shift, we propose to read contemporary collective action phenomena in terms of socio-technical systems, i.e., considering online and offline activism integrated within a unique multidimensional action environment resulting from the interoperation of two layers: one provided by the complex networks of social relations that shape our society (and collective actions within it); the other constituted by the global network of physical and infrastructures on top of which social relations are built (Internet, in the first place, but also airplanes routes and highways) [Vespignani 2009]. In this sense, we understand online and offline activism as *integrated* within a mixed relational structure that is sustained by different technological devices, some of which enable offline interaction and some others, like social media, enabling online interactions. With this overall conceptualization in mind, we focus here on social-media-enabled networks in order to deepen our knowledge on the actual relational milieu that is created by the Internet and to see how it is exploited to

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[4] More has been done to uncover patterns of hyperlinks amongst websites, see for example Bennett and Segerberg [2010], Padovani and Pavan [2009], Pavan [2012].

exchange resources and to create a shared symbolic universe under which supporters can (continue to) mobilize. In order to "move from virtual to real" the structures of participation that are enabled by social media and to elaborate on their contribution to the overall collective action dynamic, we propose to translate the socio-technical perspective into empirical analysis though the adoption of a relational approach and of network analysis techniques.

We apply the idea of collective action socio-technical systems to an illustrative case study, that of the annual campaign Take Back The Tech! (TBTT) – a global call for action promoted yearly by the Association for Progressive Communications Women's Network Support Programme (APC WNSP) to reclaim ICTs to end all forms of violence against women. TBTT provides a good example of how collective action efforts deploy thanks to a mix of online and offline actions in a hybrid way: since it started in 2006, it has heavily exploited electronic communications and tools thus enmeshing with offline initiatives – such as the Feminist Tech Exchange (FTX)[5] – to promote actual networked collaboration, both online and offline, between women from all continents to end violence and abuses perpetrated through ICTs.

In the 2011 edition of the campaign, social media became an integral part of TBTT activities through the *Tweetathon*, an intensive spread of messages through Twitter carrying the hashtags #takebackthetech and #16days. Starting from a snapshot of tweets exchanges between 100 campaign supporters on the first day of the 2011 Tweetathon, we aim at providing an example of how it is possible to trace and look into the "networked structures of participation" that are created by the use of social media in collective action. As stated above, this task entails mapping out *actors*, *connections* amongst them, *contents* they produce and the *patterns of content circulation*. In the analysis that we propose below, we will first look at actors and connections from two perspectives: a) the overall structure of the network so to examine at a macro level the overall characteristics of the participatory structure enabled by Twitter in this campaign; b) how connections established through Twitter bring some actors to prominence, i.e., to be good campaigners. Finally, we move to examine how tweets contents and flows can be used as starting point to inquiry on the collective construction of the overall campaign symbolic framework, i.e., its overall identity [Melucci 1996; Diani 2008; Diani and Bison 2004].

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[5] "The Feminist Tech Exchange, also known as the FTX, was developed in response to calls from feminist and women's rights movements for greater understanding of emerging technologies, their potential and impact on the rights and lives of women. Through skills sharing, information exchange and discussions, the FTX explores feminist practices and politics of technology, and raises awareness on the critical role of communication rights in the struggle to advance women's rights worldwide." Source: http://ftx.apcwomen.org.

Our analysis here is intended to be illustrative and exploratory of how online structures of participation can be conceptualized in relation to offline dynamics as well as of how they can be explored. TBTT is a 16-days effort that involves much more than the 100 Twitter users and tweets that we consider here and which makes uses also websites, Facebook and digital storytelling tools. In this sense, if we were to study the actual campaign, a more systematic mapping effort that follows over time the whole campaign across all electronic tools employed should be pursued thus implementing the study of online dynamics with that of offline experiments of mobilization as the FTX. However, while we admit that the selection of looking at the Tweetathon, considering just a limited number of users, tweets and a restricted time span constitute serious limits to the possibility of generalizing the results we obtain here, we invite our readers to consider the analysis presented here as an illustration of the heuristic potential that a study of networked structures of participation, understood as an integral part of contemporary collective action systems, can bring to the critical reflection on the nexus between social media and collective forms of political participation.

2.   Collective Action Socio-Technical Systems

At the core of the complex relationship that exists between social media and collective action stands the interplay between two types of networks which characterizes the global society in which we live: on the one hand, networks joining together social actors (individuals, organizations, platforms of action etc.); on the other, networked infrastructures of communication which provide a capillary structure along which relations and contacts can be built overcoming traditional boundaries and limitations. By now it is indeed acknowledged that globalization processes have been pushed tremendously by developments in the ICTs field, which have enabled the establishment of transcontinental flows and networks of activity and interaction [Held et al. 1999]. Conversely, the network society in which we live [Castells 2010] demands an adequate technological support and, in this sense, spurs relevant transformation as the transition from static websites (Web 1.0) to dynamic content publishing practices through social media (Web 2.0). In general, then, underpinning the global transformations we are witnessing in all the domains we operate within, from economics to migration passing through politics and culture [Held et al. 1999], there is a fluid relationship between technology and society for which changes at one level are shaped by and, at the same time, shape changes in the other [Hall 2011].

A fruitful perspective to depict and analyze this interplay and its consequences on social practices at large is that of socio-technical systems, which result from the inextricable intertwinement of two "infrastructures:" one given by the maze of social relations, the other by the maze of physical networks on top of which they are built [Vespignani 2009]. Within socio-technical systems, networks of social actors are seen as enforced and enabled by different forms of technologies: for example, the development of a global airplanes routes infrastructure allows global transportations of people and goods; and, in the same way, the development of a global infrastructure like that of the Internet allows global networks of information flows and communication between actors [Vespignani 2009; Latour 2011]. Conversely, global communication and information infrastructures spread in response to the social need for interconnectedness without which they would be simply pointless.

In this logic, the Internet infrastructure should be seen as both a technological innovation in the telecommunication field and a response to the inherent need for social communication. Since it has come to constitute one of the principal components of the physical layer that shape socio-technical system, its ubiquitous presence has progressively lead to a situation of seamless adaptation of social relations on its infrastructure [Giunchiglia and Robertson 2010]. And yet, this adaptation has brought a radical transformation of networks constructed by social actors, which can be built independently from physical presence and are grounded on patterns of information transmission and communication. On the one hand, then, the space for social action becomes hybrid, as cross-dimensional relations permeate it and social actors are joined together in networks that are nurtured by both mediated and unmediated interactions [Beer 2008]. On the other hand, as communications and the sharing of information become foundational of collectivities, there is a constant need for new and creative ways and tools for producing and circulating contents.

For our society that is organized through networks [Castells 2010] and Internet mediation is now everywhere [Hall 2011], this two-tiered relationship and the consequent hybridization of social structures can be traced in all domains of human action – collective action dynamics included. If we understand, with Melucci [1996, 40], collective action as a "multipolar system of action which combines different orientations, involves multiple actors, and encompasses a system of opportunities and constraints which shapes the actors' relationships," we can understand the relations that underpin it as mediated, to different extents, by different types of technology. When the technological infrastructure that enforces/enables collective action includes the Internet and its tools, as it is today, the collective action system is not only multipolar but it also becomes *multidimensional* as it is sustained by all those relations, independent from physical presence, that can be established through the use of Internet

communications. Hence, collective action is shaped by a multiplicity of technology-based relations between participants: depending on the technology at stake, some of these relations will be established offline (e.g., coordination meetings done in headquarters, occupying a public square etc.), some others online (e.g., the exchange of practical information through Facebook or the supply of donations through PayPal) and others – perhaps the majority – deploy across this boundary (e.g., when coordination meetings are involve different and spatially separated headquarters with the help of VoIP technology).

In this sense, online activism comes to integrate, thanks to the exploitation of technical possibilities, offline political participation within a unique socio-technical system of action. As different social relations shaping the collective effort are enabled by different types of technology, their (added) value and role should be evaluated starting from the platform which underpins them. In being electronic communication tools, social media allow the construction of quick, cheap and space-less relations. However, as they are tools enabling the production, the circulation and the remix of contents, they exaggerate the Internet potential for self-expression and the creation of information-based relations. As effectively pointed out by Castells [2011, 779], "social power throughout history, but even more so in the network society, operates primarily by the construction of meaning in the human mind through processes of communication. In the network society, this is enacted in global/local multimedia networks of mass communication, including mass self-communication, that is, the communication organized around the Internet and other horizontal digital communication networks."

In this sense, the interplay between the technological layer and the social layer, i.e., between social media and social networks of activism here translates in the provisions of new, vibrant *loci* where collective meanings for mobilization can be constructed in all the different ways that are supported by social media [Kaplan and Haenlein 2010; Hansen, Shneiderman and Smith 2011]. It becomes then important to explore social-media enabled networks looking at their main components and patterns to understand how the construction of collective meanings is translated into practices leveraging on the possibilities (and within the boundaries) of the platform that is employed.

3.   Campaigning and Tweeting. The Case of Take Back the Tech!

In 2005, the Association for Progressive Communications Women's Networking Support Program (APC WNSP) – a specific gender-oriented branch of the international non-governmental organization Association for Progressive Communications – realized a study that highlighted the urgency to foster understanding and awareness on the existing link between violence against women (VAW) and ICTs. In this report, the WNSP noted that, on the one hand, ICTs provide a platform through which VAW can be exerted in new ways as well as an amplification channel for spreading existing forms of abuse. On the other hand, though, the organization found that ICTs can also be the key factor for overcoming this situation and, in 2006, launched the Take Back The Tech! (TBTT) campaign to reclaim technology in a gender-sensitive perspective and to foster the strategic use of ICTs to end all forms of gender-based violence.[6]

Since then, TBTT runs yearly during the so-called "sixteen days" against VAW (between November 25th, the International Day for the Elimination of Violence Against Women, and December 10th, Human Rights Day). Over these sixteen days, the campaign foresees the realization of daily actions each of which addresses various forms of to gender-based violence and their link with different communication online and offline platforms.[7] Beside the participation to the sixteen activities, the 2011 edition of the campaign saw three important calls for action. The first, the *Map It!* action, was an effort to map, describe and share experiences of abuse to spread awareness of the multiplicity of violence cases and also to help women and girls to find the strength to denounce any abuse cases they have been involved in.[8] The second call for action was to participate in the *Tweetathon*, an intensive spread of messages through Twitter carrying the hashtags #takebackthetech and #16days. The third call was to spread the word on the campaign and its activities through all social media platforms where TBTT is present (from Facebook, to Twitter to G+) but also on the platforms to which supporters belong so to expand at the largest extent possible the campaign reach.

As mentioned above, TBTT is a good example of how collective action efforts to pursue social change, as those carried on by the WNSP, can be sustained, complemented and enriched by the patterns of relations established online through so-

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[6] Source: http://www.takebackthetech.net/page/about-campaign

[7] The list of daily actions for the 2011 edition of TBTT is available at http://www.takebackthetech.net/daily_actions/browse/2011. All past editions daily actions are available on the TBTT website at http://www.takebackthetech.net.

[8] www.takebackthetech.net/mapit.

cial media use. TBTT pursues its goal of empowering women through ICTs realizing and/or participating to several initiatives (seminars, learning camps as the Feminist Tech Exchange etc.) but, above all, its endeavor is carried on through a heavy and strategic exploitation of electronic communications. In this case, the networked structure of participation that is built thanks to the Internet not only is important but it becomes truly fundamental for the mobilization dynamic. In the following sections, we move to an illustrative (and admittedly limited) exploration of a snapshot of such relational structure – that developed within the Tweetathon on Twitter – with the aim of showing the heuristic potential of a network approach for analyzing collective action socio-technical systems with particular emphasis on the patterns of relation established online through social media.

3.1. *Data Collection and Network Overview*

For the purpose of tracing and exploring microblogging networks developing during the 2011 edition of the TBTT campaign, we have employed the NodeXL software both for data retrieval and analysis.[9] Through this software, we traced a network of relationship established on Twitter starting from the hashtag #takebackthetech. As known, the volume of information travelling on Twitter is enormous and very dispersive. Hashtags respond to the need of "aggregating" posts that pertain to a specific topic: every message (can) contain one or more hasthags – strings of text anticipated by the symbol # – which characterize its content in relation to themes, events or people. In our case, if a user was inserting the hashtag #takebackthetech within her tweets, that was considered as an explicit support to the TBTT campaign as the message was actually "speaking" of the campaign. Given the illustrative and exploratory aim of this exercise, we considered only 100 users that tweeted #takebackthetech on November 25th (in different moments in the day) and traced existing relationships between them whether these were *follow*, *mention* or *reply to* relations. As Barash and Golder [2011, 146-147] point out, different Twitter relations have different meanings: in the mare magnum of global communication flows, *following* someone implies having an interest on information he/she posts online; *mentioning* someone is the easier way to maintain conversations with other users; while *replies* are "markers of addressivity," as they denote a specific interest in notifying a response to a communicative stimulus sent by someone. In this sense, mentions and replies

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[9] NodeXL is a free, open-spurce template for Microsoft Excel created by the Social Media Research Foundation that is mainly aimed at visualizing and performing basic network analysis of social media networks. http://nodexl.codeplex.com/.

are most "intense" social relations as they communicate specific attention for a communicator while the decision of following someone does not necessarily imply the attribution of systematic attention for contents posted [*ibidem*]. Figure 1 shows the result of the data collection process.
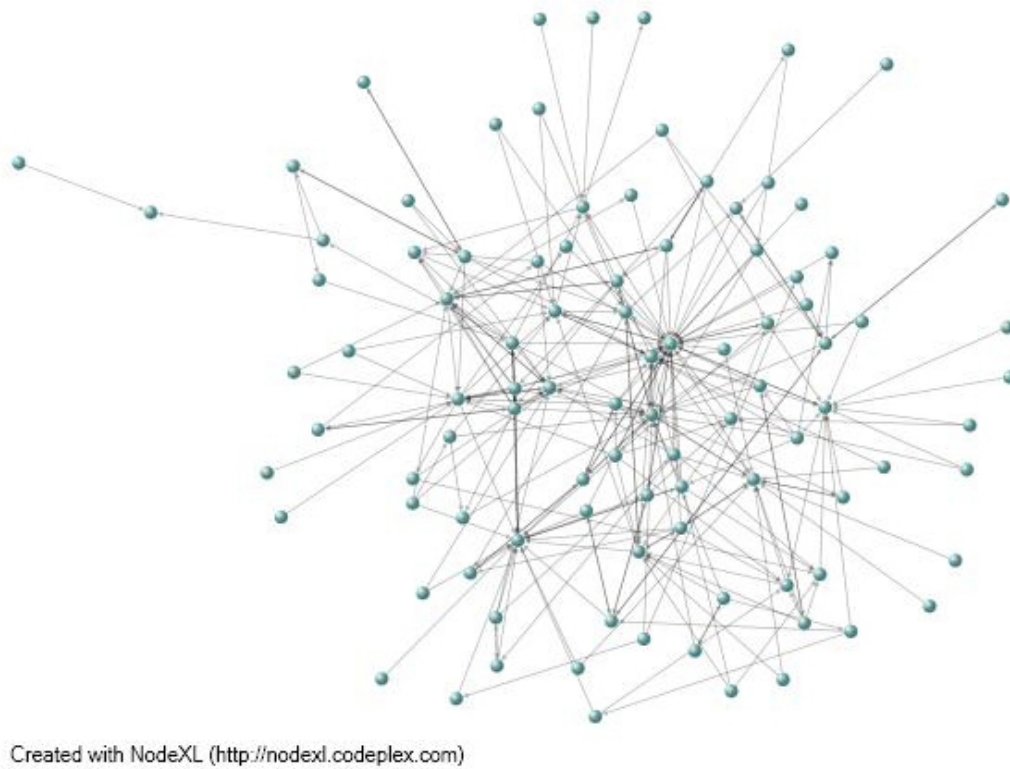

Created with NodeXL (http://nodexl.codeplex.com)

FIG. 1. Twitter network of 100 Take Back the Tech! campaigners on November 25, 2011

Table 1 shows some basic network features. Amongst the 100 nodes identified, only 3 are isolated (i.e., twitted with the hashtag #takebackthetech but are not tied to any of the other supporters identified) and this seems to suggest a certain level of cohesiveness of the online campaigning environment. Looking at the main component in this graph, overall, 287 edges were mapped: the majority are unimodal relations, while 11% of edges have a weight higher than 1, i.e., two nodes entertain more than one type of relation at the same time (e.g., follow *and* mention).

TAB. 1. *Network overall metrics*

N of Nodes	100
n of Isolated	3
Edges (unique)	287
Edges with weight >1	31
Density	0,03

This element, together with the fact that 70% of unimodal relations are of the basic "following" type, seems to suggest a rather "flat" information exchange (no complex relationship building, information flow guaranteed by the very functioning mechanisms of the platforms). However, the fact that 30% of unimodal relations are constituted anyhow by mentions points out that our network is actually exploited to interact, although this is not its predominant use. Also, the network is quite sparse, as only 3% of possible ties are activated but, as it is very unlikely that a user is connected to all other users in the same platform, this sparseness seems to suggests that there are some key nodes around which the bulk of exchanges seem to develop.
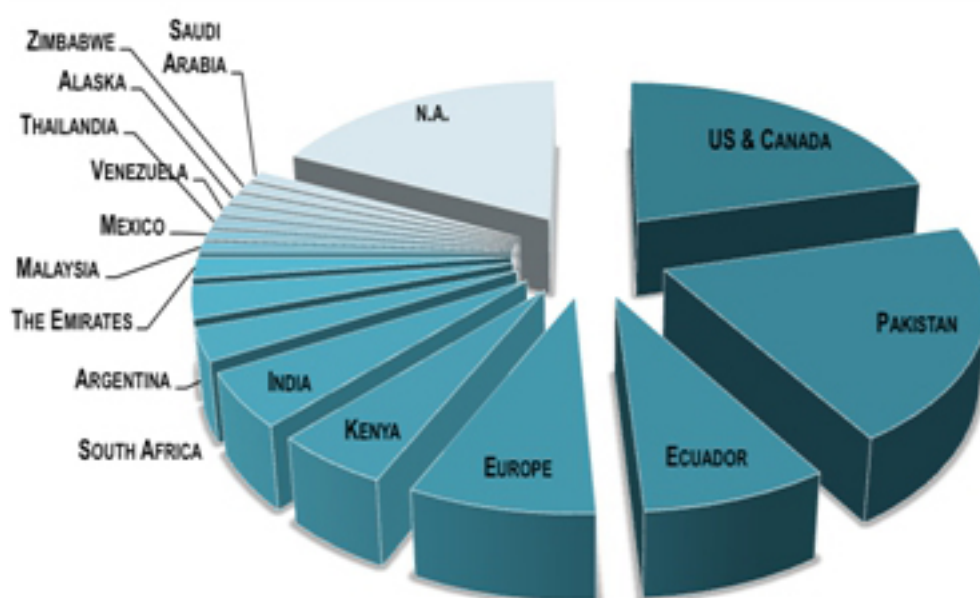

FIG. 2. Time zone of 100 tweets sent with the #takebackthetech hashtag

Note: N.A. = data not available

One further aspect that can be analyzed is how global is the reach of the network looking at how extended is the geography of the tweets. As we argued elsewhere [see Pavan 2012], although it might appear useless to explore the spatial dimension in the online context, looking for a "geography of the tweets" can be nonetheless interesting to evaluate how much local/specific claims can be brought into a potentially unlimited space as the online one. Starting from the information on tweets time zone that is retrieved during data collection, we find out that the flow of tweets shows a cross-regional breadth spanning from the US and Canada to Pakistan, passing through Latin America and Europe an reaching to Africa and India.[10] Hence, the space of the

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[10] We aggregated different US&Canada time zones in one category.

campaign seems to be truly global, thus compensated by the presence of hotspots of interests (such as Pakistan and North America), which correspond to long term established TBTT local campaigns (figure 2).[11]

3.2. *Prominent Campaigners*

As it has been mentioned in the introductory overview, contemporary collective action dynamics are often participated by individuals alongside organizational actors. If we move our analysis from the macro level to the micro one and focus on the positions and the attributes of nodes, it is possible to analyze how and how much political agency is mixing up in this sense. Thus evaluation of nodes prominence (the level at which an actor is involved in relationships with others, see Wasserman and Faust [1994]) can help us detect who are the actors that are more central than others in the online relational milieu: are prominent campaigners single individuals or are they organizations that opened a Twitter account? Do prominent campaigners have an organizational membership or do they speak on their personal capacity?

An evaluation of nodes' centrality and, more precisely, of their indegree [Freeman 2002] can help us identify who is more involved than others within online relational structures thus having more prestige [Knoke and Burt 1983]. Indeed, as edges in our network are a mix of following, mentions and replies, actors who receive more ties will be also those who attract other nodes' attention to a larger extent [Barash and Golder 2011, 149], hence, a higher communicative potential [Pavan 2012].

As shown in figure 3, the distribution of indegree follows a decreasing trend for which the majority of nodes have low values while just few stand up (the highest value, 35, is reached just by just 1 actor).
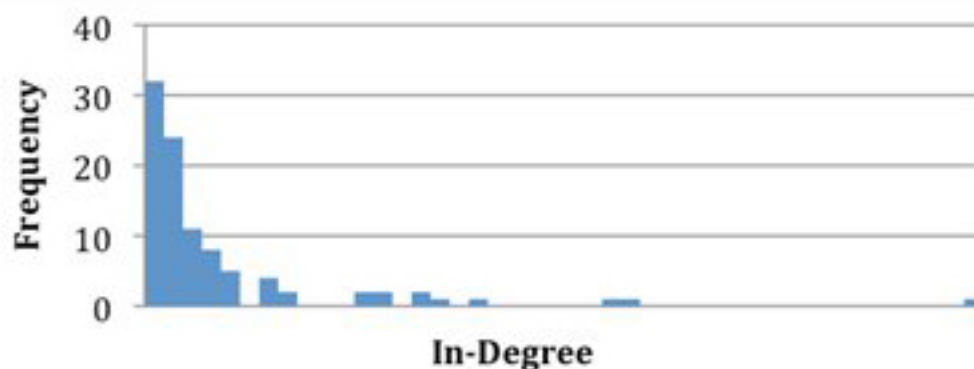

FIG. 3. Indegree distribution

[11] http://www.takebackthetech.net/connect/tbtt-campaigns.

To overcome difficulties connected with such a variability, we use a cutoff value C_V, defined as $C_V=(I_M+SD)$ where I_M is the mean indegree value and SD is the standard deviation, to identify the actors showing indegree values that are higher than this treshold and who can be therefore considered to have a high communicative potential. Who are these highly and systematically recognized nodes? As it shows in table 2, prominent campaigners are both individuals and organizations. The node that receives more links from the rest of the network, i.e., @nighatdad, is an activist and a TBTT campaigner also working for *Bytes for All*, one of the organizanizations explicitly involved in the the sensitization activity of TBTT and in the *Map It!* effort, and which is also the second most often linked node (@bytesforall). These first two nodes are both based in Pakistan. The node with the third indegree value is @jehan_ara, President of the Pakistan Software House (P@sha). @jehan_ara twitts from the US&Canada time zone although P@sha is based in Karachi, Pakistan. @thegenderwire is a branch of the Inter Press Service (IPS) news agency, a well known media organization with a clear focus on the South of the World. Within IPS, The Gender Wire covers stories of women and monitors representations of gender in the news thus fostering a more balanced representation. Other two single individuals follow in the list, one with a clear interest for Pakistan politics (@meeraghani) and the other linked to an indian organization (@shahikhrafia). @takebackthetech node, the Twitter official presence of the campiagn, comes up in the list in the sixth place, followed by the APC news service @apc_news. @end_harassment is another twitting profile connected at @nightadad but specifically focused on violence against women. The last two nodes represent a journalist and a movement to end street harassment (i.e., Hollaback!] which is currently issued in 45 cities in 16 countries (mainly US, Latin America, Europe and India).

What are the characteristic of prominent campaigners? As it shows from the self-descriptions available (see table 2), all central actors share interests for human rights as well as for ICTs which, often, is also their main field of work/activity. In this sense, nodes that receive many inlinks are not simply *concerned* with the issues at stake but can be conceived as true "issue-professionals."[12] Also, high-indegree nodes are geographically characterized: they are often located in the South of the world, from Pakistan to Latin America.

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[12] An overview of self-descrptions of actors with an indegree of 0 (attracting no attention from others in this network) reveals that often there is an interest for gender issues, human rights or ICTs, these are not systematically link nor they point to a proficiency as that reached by prominent campainers who not only *have an interest* but they have developed certain expertise in the field.

TAB. 2. *Higher indegree nodes in day#1 TBTT Twitter network*

Node	Indegree	Status	Self-Description*
nighatdad	35	individual	Internet Rights Activist, TakeBacktheTech Campaigner, FoE and Privacy Activist, Researcher, Lawyer, Women Rights Defender, Works 4 Bytes for All.
bytesforall	21	organization	Internet Rights Activist, Take-Back-The-Tech Campaigner and Human Rights Worker... Shattered, clueless but forward looking... Hope remains forever!!!
jehan_ara	20	individual	President of the Pakistan Software Houses Association for IT & ITES (P@SHA). Activist for Internet freedom, Communication, Human rights & VAW. Privacy advocate
thegenderwire	14	organization	Giving voice to gender equality for @ipsnews http://www.facebook.com/thegenderwire http://www.ipsnews.net/genderwire http://www.ips.org/mdg3
meeraghani	13	individual	I'm pretty sane for an eccentric. I tweet about everything and anything but mostly Pakistani politics and am outraged quite often. So stand back!
shaikhrafia	12	individual	Moving from rhapsodized Foodaholic to ruthless Workaholic to inconsistent Drifter - In quest to find my own genesis - Narcissist at zenith, about to fall apart!
takeback-thetech	12	organization	Reclaiming ICTs to End Violence Against Women
apc_news	10	organization	Internet for social justice and sustainable development. Karen Higgs and Grady Johnson tweet with occasional guest tweetple.
end_harassment	10	individual	Raising voice against sexual, street and all forms of harassment and violence against Women in Pakistan! Tweets by @nighatdad
beenasarwar	9	individual	Journalist, artist, documentary filmmaker from Pakistan; focus: human rights, media, gender, peace. Facebook Page http://bit.ly/cLn281
ihollaback	9	organization	You have the power to end street harassment, one hollaback! at a time. Tweets by @emilymaynot + @ecuadoriangirl.

Source: Twitter profiles of the node

How much is prestige linked to a node overall popularity or to her more or less intense use of the social media platform? In other words, are prominent campaigners simply highly followed Tweeters or heavy Twitter users? As it shows in figures 4 and 5, attributes of nodes that can be associated with their "popularity" (i.e., number of followers) or with a more intense activity (i.e., number of tweets sent) on Twitter do not seem to be strictly related to the levels of recognition within our network. Indeed, as illustrated in figure 4, nodes with a bigger size (i.e., with a higher indegree) tend also colored with darker shades (i.e., fewer followers). Thus, as shown in figure 5, bigger nodes do not show particularly high tweeting volumes. Quite interestingly, the most active node (in terms of number of tweets sent) is a very low indegree vertex positioned on the bottom-right corner of the network.

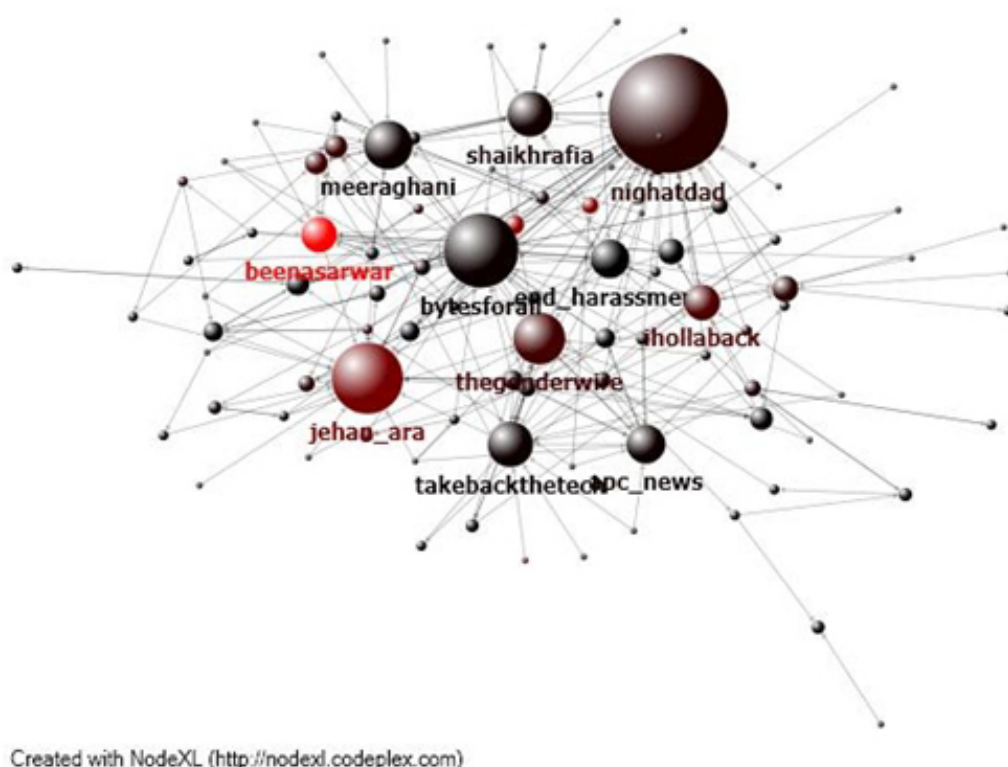Created with NodeXL (http://nodexl.codeplex.com)

Fig. 4. TBTT Day#1 – nodes representation proportional to indegree and number of followers

Note: nodes size is proportional to indegree; nodes color reflects the number of followers in a scale from black (fewer followers) to red (more followers)

If it seems that levels of recognition within our network do not follow as a direct consequence of the "quantitative" use of the Twitter platform itself, we might wonder if centrality in the campaigning network links to the "quality" of contents posted by users. To this aim, looking at retweets, i.e., messages authored by someone

else and that are forwarded, can provide useful insights. Indeed, although retweets can be done "to show off the cool people you know" [Barash and Golder 2011, 148], they nonetheless denote an interest for contents published online. In this sense, the number of retweet can be thought as a proxy for the quality of the contents produced. If we look at how many times central nodes are retweeted, a clearer (although not linear) relation with indegree seem to emerge.[13] Central nodes are more often retweeted than others and, in this sense, their prestige seem to be connected with the quality of the information the post which, in turn, stimulates other users to follow, mention and reply to them (see figure 6).
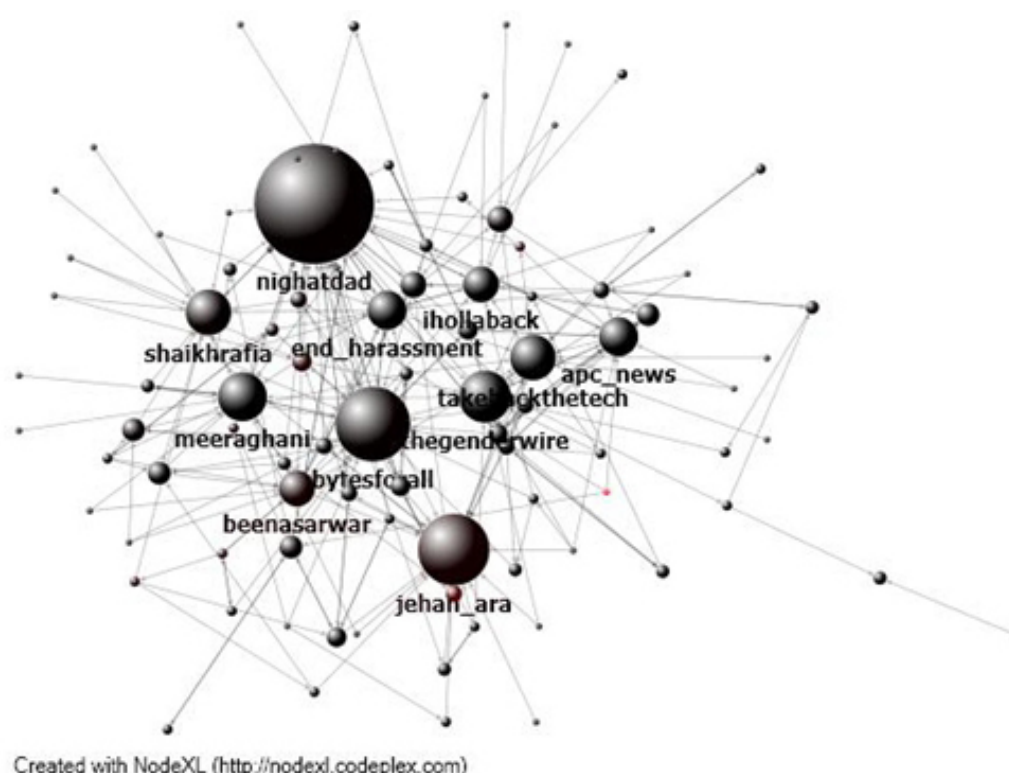

Created with NodeXL (http://nodexl.codeplex.com)

FIG. 5. TBTT Day#1 – nodes representation proportional to indegree and number of tweets sent

Note: nodes size is proportional to indegree; nodes color reflects the number of tweets in a scale from black (fewer tweets) to red (more tweets)

[13] Retweets are particular cases of mentions and, for this reason, highly central nodes in our network are also those who tend to have more retweets. However, as the figure 6 shows, this relationship is not linear: as not all mentions are retweets and the majority of relations in the network are of following, it can happen that high indegree nodes - such as @bitesforall – are less often retweeted than other, less central nodes. In this sense, we think that the number of retweets can be thought as a proxy for the quality of the contents posted, which, in turn can be thought as a variable influencing centrality of nodes in the campaigning network.
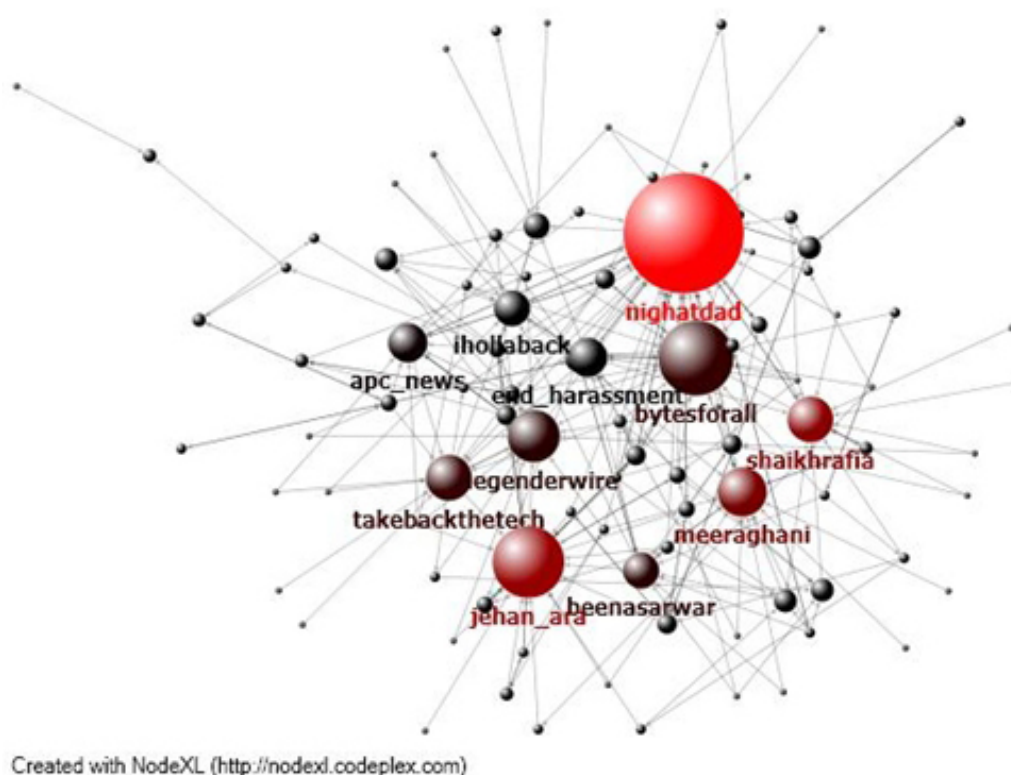
Created with NodeXL (http://nodexl.codeplex.com)

F*ig*. 6. TBTT Day#1 – nodes representation proportional to indegree and number of retweets

Note: nodes size is proportional to indegree; nodes color reflects the number of re-tweets in a scale from black (fewer retweets) to red (more retweets).[14]

3.3. *Campaign Contents*

As we mentioned above, contents and their circulation are two crucial elements of the online campaigning networks. Amongst the many tweets that are sent everyday, a majority of messages are ignored, know a limited diffusion or, more likely, constitute informational noise [Lotan et al. 2011]. However, some contents, because they are reputed more valuable than others, are retweeted and get more or less widely circulated amongst followers of authors' followers and beyond. Looking at the contents of retweeted messages can help us understanding what is the discursive contribution that online-networked structure of participation can bring to the overall mobilization.

In our case, an ex-post classification of retweeted contents reveals the presence of two discursive blocks. The first one, which could be labeled "calls for action," gathers calls for participation into the TBTT campaign and its activities. Quite illus-

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[14] The retweet feature is represented in this picture just only for the 11 nodes with higher indegree values.

trative of this call is a tweet originally sent by @shaikhrafia: "*For all those girls who've bn emotionally tortured on Twitter, here is YOUR chance > http://t.co/wwdbTGio #takebackthetech #NameNShame #VAW*" which is a message sending users directly to the *Map It!* page and points directly to the link between ICTs use and gender-based violence (see the "girls tortured on Twitter"). However, there are many more calls for participation which, on the one hand, can be directed towards TBTT specific initiatives (e.g., invites to report in the *Map It!* platform stories of violence and abuse or calls to watch on the campaign website the videos realized with women who have experimented abuses and violations); and, on the other, link TBTT to the broader mobilization effort of the sixteen days against gender-based violence (in two cases with an explicit mention of the Tweetathon). Also, it is worth to notice the presence in this category of "strategic" tweets, spreading the hashtags to participate into the discussion ("*RT @maureenagena: Some Hash tags 2 use during 16 days of activism for those interested #16daysofactivism #takebackthetech #GBV #VAW #endmilitarism #IsisExpo*") and links to key websites against VAW (as the "Say NO" platform for action lauched in 2009 by UN Women, the UN agency for gender issues).

The second cluster of retweeted contents gathers instead "thematic tweets," i.e., short messages about facts, data and information on the topic of VAW. In this group, a tweet about an aggression against two women in Faisalabad and originally posted by @jehan_ara has been extensively retweeted giving rise to a chain of retweets: "*RT @thegenderwire: & thx for doing! RT @apc_news: THIS is why we do what we do. RT @jehan_ara: Acid thrown on 2 women in Faisalabad: (#takebackthetech #16Days*"). Other messages that fall in this category report data on the proportion and the consequences of VAW (e.g., "*RT @nighatdad: A total of 486 cases reported in 2010 in respect of Domestic violence which is a major category of VAW in #Pakistan #takebackthetech #16days*") or face the issue in a provocative way (e.g., "*RT @bytesforall: Why the hell we can not allow women on motor bikes - will help reduce sexual harassment in public trnspt #Pakistan #16Days #TakeBackTheTech*").

The analysis of retweet contents reveals also the existence of some "Twitter-tactics" to enrich the campaign discourse. On the one hand, "retweeting retweets" (like in the case of the message about the aggression with acid) allows supporters expand the audience passing on true chains of contents. On the other hand, it is the thematic reach of the message that can be expanded adding further hashtags to already widely circulated contents ("*RT @bytesforall: Acid Throwing in #India too: (RT @sunil_abraham: @bytesforall my friend - also happens in #India #Pakistan #16Days #TakeBackTheTech*").

Paralleling the study of the relational structures established amongst campaign supporters with that of association between themes in retweeted messages can be of

help to uncover how campaign discourses are articulated exploiting the potentialities of the platform (in this case, the possibility to enlarge the thematic reach adding hashtags). Figure 7 shows the network derived from the joint use of tags within tweets.

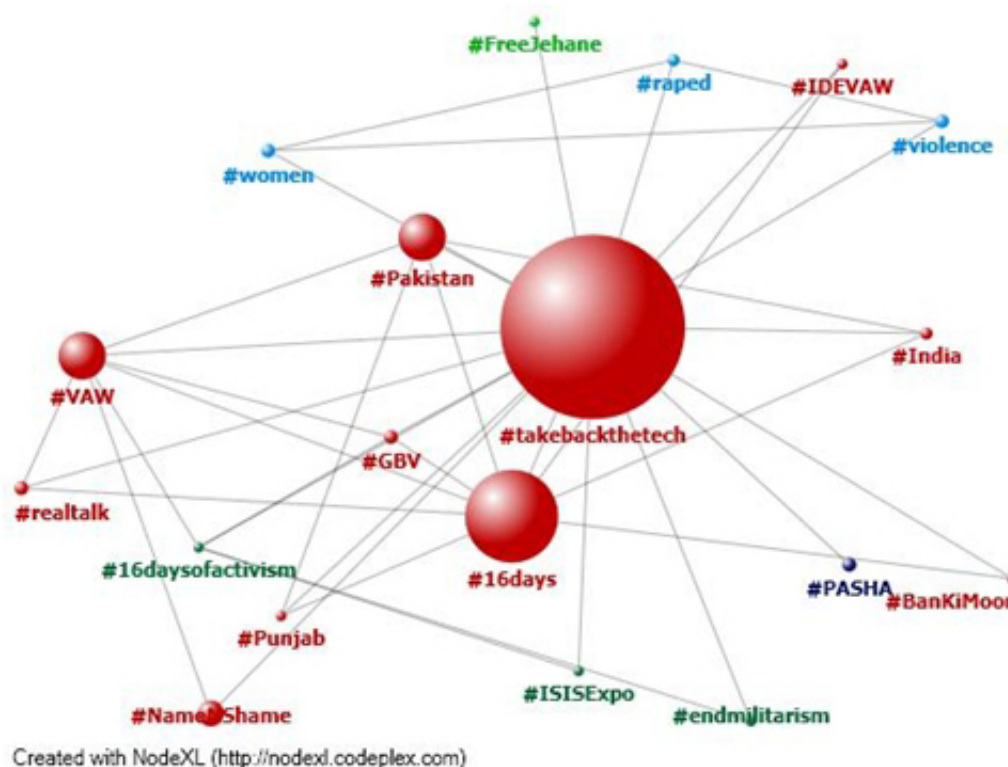Created with NodeXL (http://nodexl.codeplex.com)

FIG. 7. Hashtag network from retweeted messages

The size of the nodes here is proportional to the number of times an hashtag has been used. Beside the campaing hashtag #takebakthetech, there are other well-employed tags: the #16days tag (as to comply to Tweetathon rules), #Pakistan (confirming a certain sensibility for events occurring in this territory) and #VAW (as to confirm the overall target of the campaign). A cluster analysis of this network identifies a set of tags that are often used together and that, in the end, constitute the thematic core of the online discussion around which other conceptual associations tend to emerge yet without consolidating. As it shows in the figure, this core (colored in red) connects the campaign to the issue of violence against women (#VAW), in different context (especially #India, #Pakistan and the #Punjab province), and considering all forms of gender based violence (#GBV) as well as to a broader (intergovernmental and supranational) institutional environment within which the TBTT sensitization effort takes place (#IDEVAW – International Day for the Elimination of Violence Against Women; #BanKiMoon; #16days).

4.   Conclusions

In this article we have addressed the nexus between social media and collective action arguing that the first and most fundamental transformational effect exerted by these tools consists in the enrichment of the relational structure that underpins collective political participation dynamics. We contended that such an enrichment translates in the provision of a new relational milieu for exchanging resources that are useful for the mobilization as well as a new territory for creating shared symbolic systems and visions. In acknowledging that many of the analyses on the impacts of social media on political participation tend to stress the element of networks, we pointed out how the relational structures that are enabled by these tools tend to remain "invisible," as they are always called upon but never actually traced and analyzed. We proposed instead to bring networked structures of participation "from virtual to real" through a twofold operation. On the one hand, we proposed to conceptualize online activism as integrated with offline practices in a sole, unique multidimensional socio-technical system of collective action. This conceptualization allows to render the interplay between social and technical elements in a critical way and to evaluate the (added) value of relations established starting from the type of technology used. In this sense, we argued that the relational milieu created by social media can prove particularly strategic for the creation of collective meanings under which the mobilization can be carried on. On the other, we propose to concentrate on online relations to investigate how this "creation of meaning" is translated intro practice though the exploitation of social media platforms' characteristics. Thus we proposed to trace and analyze online networked structures of participation looking at the actor that enter these networks, the connection they establish with other users, the contents they produce and the patterns through which these contents are circulated.

We made a case for the application of this overall framework using as an example the case of a yearly campaigning effort against gender-based violence, i.e., the Take Back the Tech! (TBTT) campaign promoted by the Association for Progressive Communications Women's Network Support Program. We considered a snapshot of the campaign (its first day) for how it develops on Twitter amongst 100 of its supporters. Although not representative of the whole campaigning effort, this exercise helped us to show that our claim to shift attention to relational structures enabled by social media can be not only translated into empirical analysis at different levels but that it can also point out the different ways in which one social media platform can transform participation dynamics.

The cohesive and the interactional features of the network we examined confirmed that online contributions do not result in a myriad of disconnected inputs

but that, quite the opposite, provide an overall relational infrastructure upon which exchanges can take place thus encompassing different local needs and claims. The prominence of both individuals and organizational actors confirmed that contemporary collective action systems deploy according to a logic of mixed agency (i.e., individuals and organizations together). Thus a closer examination of some nodes attributes (their level of proficiency in dealing with the issue, the level of popularity in the platform, their quantitative use of the services and the quality of contents they post) seems to suggest that centrality in campaigning dynamics ties more to contents rather than to the number of connection established. Finally, the examination of contents allowed us not only to see that social media can be used to "organize" on a large scale spreading calls for action but that there is an actual use to construct an overall collective meaning and a shared symbolic universe, which passes through different insights on the issue addressed (in this case, violence against women) but also though an effort of contextualizing the campaigning effort within the broader institutional landscape where it operates side by side with other (in this case supranational institutional) actors.

Despite limited, the analysis of exchanges during the first day of the campaign reveal that enhanced communication potentials provided by social media can be exploited at different levels, to reinforce the social as well as the thematic reach of collective action efforts and through a combination of individual and organizational inputs in a common framework of reference. Beyond the test of the heuristic potential of this approach, more systematic analysis, also in comparative terms with other case studies, are required to assess if the trends that emerged in this brief overview are confirmed and to deepen the interplay between the dynamics online and those deploying offline, during physical presence occasions. However, we think that these future efforts could be pursued along the way presented here – according to a logic that valorizes the joint contribution of social and technical elements and with a specific attention to how communication possibilities are exploited relationally to shape those "shared interests and programs" which, in the end, underpin the emergence of collective action dynamics [Tilly and Tarrow 2007, 6].

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Collective Action and Web 2.0

An Exploratory Network Analysis of Twitter Use During Campaigns

Abstract: In this article we address the nexus between Internet and politics looking in particular at the link between social media and collective action. In making a general plea for abandoning radical approaches that either consider social media as causative of collective action or fear the spread of "slacktivism," we propose to implement current reflections on transformative effects of social media on collective action dynamics with an explicit focus on the networked structures of participation that derive from the use of these communication tools. Thus we propose to consider these structures as an integral part of what we call collective action socio-technical systems, i.e., a multipolar and multidimensional system of technologically enabled social relations that deploys simultaneously online and offline; and to analyze them empirically through a network approach and techniques paying specific attention to *actors, connections between them, contents they produce* and *patterns of contents circulation*. We provide here a preliminary application of our framework to the study of a snapshot of online campaigning on Twitter considering the case of the annual campaign Take Back the Tech! to reclaim media to end gender-based violence.

Elena Pavan is post-doc research fellow in Sociology at Trento University. She has worked on multistakeholder processes within the United Nation and, in particular, on the Internet Governance Forum (IGF). Her most recent research interests pertain to the relationships between collective action and social media. Her network analysis of the IGF has been published in 2012 with Lexington Publication.