Spring 6-10-2017

RESOURCE MOBILIZATION IN SOCIAL MEDIA: THE ROLE OF INFLUENTIAL ACTORS

Jose Ortiz
University of Auckland, j.ortiz@auckland.ac.nz

Arvind K. Tripathi
University of Auckland, a.tripathi@auckland.ac.nz

RESOURCE MOBILIZATION IN SOCIAL MEDIA: THE ROLE OF INFLUENTIAL ACTORS

Research in Progress

Jose, Ortiz, University of Auckland, Auckland, New Zealand, j.ortiz@auckland.ac.nz

Arvind, Tripathi, University of Auckland, Auckland, New Zealand, a.tripathi@auckland.ac.nz

Abstract

This research in progress studies the role of social media as a resource for contemporary social movements in their endeavors to bring about social change. Current studies on this topic have largely regarded social media as an alternative channel for communicating situational information during protests against repressive regimes or perceptions of fraudulent democracy. Drawing on theories of resource mobilization and social networks, we present a framework for studying how the presence of influential and popular actors in social networks, can influence the acquisition process and the number of new followers by a social movement organization. We collected Twitter data for a major social movement organization in the global justice movement and found evidence suggesting that the existence of popular figures, impacts to some extent, the audience acquired by the social movement organization. We also conclude that the geographic location of these popular figures acts as a moderator for this effect. Our study lays the groundwork for answering questions regarding the sociotechnical dynamics that influence the propagation of ideologies in online environments promoted by groups and organizations concerned with societal issues.

Keywords: Resource Mobilization Theory, Social Network Theory, Online Social Networks, Twitter, Influential Users.

1 Introduction

In recent decades, information and communication technology (ICT) has been recognized as an enabler of social transformation and national progress (Majchrzak et al., 2012). Social movements have relied on ICT to increase user (volunteer) participation across the world (Majchrzak et al., 2012) as part of their repertoire of tactics to bring about social change (Staggenborg, 2011, p. 2). The increasing popularity of ICT and its efficiency for diffusing information creates an advantageous choice for social movements for spreading their messaging (Lerman and Ghosh, 2010) and extend their base of supporters (Selander and Jarvenpaa, 2016).

For instance, in the battle against international financial institutions driven by the global justice movement, the Internet has functioned as a bridge for civil society organizations to network transnationally (Ayres, 2005, p. 17). As a result, the Internet has enabled multiple non-governmental organizations (NGOs) around the world to share information and expand the movement geographically (Tarrow, 2005, p. 32). The reliance on electronic forms of communication has also helped transnational social movement networks to become more closely connected with the everyday routines of greater numbers of people (Smith, 2008, p. 126). Forms of online activism that range from online petitions (Selander and Jarvenpaa, 2013) to more extreme campaigns such as netstrikes (Della Porta and Mosca, 2005) have also used the Internet as means to support policy change efforts.

Furthermore, social media technologies have also played a pivotal role in recent social uprisings. Several studies explain the role of social media in the wave of revolutions that unfolded during the

Arab Spring in 2011 (Howard et al., 2011, Lotan et al., 2011, Ghonim, 2012, Oh et al., 2012, Oh et al., 2015). Ghonim (2012) in his book Revolution 2.0, attributes the overthrow of the Egypt President in 2011 to a multitude of individuals who collaborated online towards a "unified revolutionary goal" (Oh et al., 2012). In line with Ghonim's claims, Oh et al. (2012) explain how Twitter functioned as an engine for translating collective discomfort into collective action that lead to the demise of President Mubarak in 2011. In addition to the democratic uprisings of the Arab Spring, it is also known that social media played a significant role during the 2009 Moldovan parliamentary elections protests (Mungiu-Pippidi and Munteanu, 2009), the 2009 Iranian Green Movement (Burns and Eltham, 2009, Khonsari et al., 2010), and online political activism against Australian security policies in 2013 (Chatfield et al., 2015).

The literature recognizes the potential of social media as an alternative channel for communicating situational information in times of social unrest, but little is known about the role of social media as channels for social movements to expand their base of followers. This paper examines how the presence of influential and popular actors in social networks, can influence the acquisition process and the number of new followers by a social movement organization. We collected Twitter data for a major social movement organization in the global justice movement and found evidence suggesting that the existence of popular figures impacts the audience acquired by the social movement organization. We also conclude that the geographic location of these popular figures acts as a moderator for this effect.

2 Resource Mobilization Theory: A Conceptual Framework

Resource Mobilization Theory (RMT) is one of the most popular theories for understanding the importance of resource acquisition in the endeavors of social movements for succeeding social change (Klandermans and Staggenborg, 2002, p. ix). Traditional collective perspectives of 1950s paid particular attention to the psychological state of the participants, regarding social movements as spontaneous and uncoordinated bursts of action amid common grievances and perceptions of fraudulent systems of governance (Hannigan, 1985). Conversely, RMT asserts the rise and success of social movements depend on the acquisition of resources by actors who engage with the causes of the movement through formal organization (Tilly, 1978, McCarthy and Zald, 1977). An issue or idea becomes an opportunity for succeeding collective action only when framed by "a group of actors sufficiently well orgnanized to act on this shared definition of the situation" (Hargrave and Van de Ven, 2006, p. 871).

RMT argues that social movements rely on strategies and structures shaped by cycles of mobilization to diffuse sentiments of dissent and raise public awareness (Jenkins, 1983). In this way, cycles of mobilization are processes whereby groups that share grievances gain access to resources (Tilly, 1978, p. 54), increasing the readiness of movements to act collectively (Edwards and McCarthy, 2004, p. 116). RMT emphasizes that resources available for social movements do not only take the form of material objects like financial capital or physical equipment, but they also include immaterial assets such as the commitment, time or social networks around the participants (Edwards and McCarthy, 2004, p. 125).

Correspondingly, RMT introduces the concept of social-organizational resources (Edwards and McCarthy, 2004, p. 127) built on top of theories of social capital developed by Coleman (1988) and Bourdieu (1986). Social-organization resources take the form of formal organizations created for purposes of the movement goals such as social movement organizations (McCarthy and Zald, 1977), or informal networks maintained around the actors of the movement such as their social circles or friendship networks (Edwards and McCarthy, 2004, p. 127). Resource mobilization theorists further discern the concept of mobilizing structures as the building blocks of social movements for recruiting participants and organizing action campaigns (McAdam et al., 1996). Mobilizing structures, in turn, interact with social-organizational resources to access larger networks of individuals with the objective to promote the motives of the movement. Concisely, RMT argues that movements arise out of the out-

come of mobilization processes and highlights the importance of social movement organizations for the acquisition of resources (Jenkins, 1983). Furthermore, the presence of different forms of social-organizational resources increase the overall likelihood of mobilization processes for succeeding collective action (Edwards and McCarthy, 2004, Staggenborg, 2011, p. 13).

2.1 Audience Acquisition as a Process of Network Formation

According to RMT, social-organizational resources create opportunities for social movements to increase awareness of their messaging and recruit a larger number of participants during cycles of mobilization. From a social network perspective, the social structures embedded in social-organizational resources enable social movements to connect with the grievances felt by larger networks of individuals, facilitating the formation of linkages to new followers. This conception is underpinned by the principle of triadic closure from social network theory. This principle posits that "if two actors in a social network have a common friend, then there is an increased likelihood that they become friends themselves at some point in the future" (Rapoport, 1953). The principle of triadic closure highlights opportunities for the creation of new social relationships that result from existent linkages to a common friend that acts as a mediator (Easley and Kleinberg, 2010, p. 50). In the context of resource mobilization, we contend actors of social-organizational resources play the role of mediators in the creation of linkages between new followers and social movement organizations. As the social movement gains new followers during cycles of mobilization, the principle of triadic closure provides the basis for understanding the effects of social-organisational resources in the acquisition of new participants. In other words, during processes of mobilization actors from social-organisational resources facilitate the creation of linkages between potential adherents to the causes of a social movement and a specific social movement organization. In this fashion, we could measure the incidence of triplets formed between actors in social-organisational resources, a particular social movement organization, and its new followers.

In addition to the principle of triadic closure, social network theory also encompasses the study of heavy-tailed or power-law distributions to explain the emergence of influential actors in social networks (Barabási and Albert, 1999, Jackson and Rogers, 2007). Under this view, social networks are the result of processes of preferential attachment where new members in a population connect preferentially to already well-connected members (Jackson and Rogers, 2007). As a result, these processes explain the emergence of actors with a relative high number of connections with the potential to influence a significant number of members in a social network (Easley and Kleinberg, 2010, p. 479). Drawing on the principle of triadic closure and power-law structures, we can formulate hypotheses regarding the role of social-organizational resources in facilitating opportunities for social movement organizations to grow a greater audience.

2.2 Resource Mobilization in Social Media

Social media enables the formation of online social networks which have profoundly transformed the way we interact with each other and cultivate new social relations (Ellison et al., 2007). Online social networks (OSNs) are Internet-based services that allow individuals to construct a profile and articulate a list of users whom they share an interest (Boyd and Ellison, 2007). As for 2016, analysis on the Internet traffic has ranked Twitter among the most popular online social networks alongside Facebook, LinkedIn, and Sina Weibo (Alexa, 2016).

Twitter is essentially a microblogging service with the features of an online social network (Myers et al., 2014). Unlike other popular online social networks, the relationships among users do not need to be reciprocal (Kwak et al., 2010). In other words, a user can "follow" the updates (tweets) of another user, without the approval of the user being followed. This non-reciprocal mechanism of relationships formation allows information to flow faster compared to other online social networks (Lerman and

Ghosh, 2010). The popularity of Twitter and its efficiency for diffusing information creates an advantageous choice for mobilizing structures to use Twitter as a tool for raising awareness and mobilizing new participants (Lerman and Ghosh, 2010). Furthermore, the goal of contemporaneous social movements for developing a global audience (Tarrow, 2005, p. 32), posits Twitter as an effective platform for attracting a large number of participants worldwide.

Few studies have applied RMT for studying the role of social media in supporting the mobilization efforts undertaken by social movements. Leong et al. (2015) studied how grassroots movements relied on online social networks as a resource to mobilize members of communities in Malaysia by raising environmental awareness and protesting against an industry feared to have caused environment degradation. Selander and Jarvenpaa (2016) describe how a social movement organization fighting against human rights abuses uses online social networks for mobilizing large numbers of supporters by creating new forms of interaction that deepen the involvement of its followers.

Accordingy, we are interested in assessing wheather highly connected users in Twitter networks behave as actors of social-organizational resources that influence the number followers acquired during cycles of mobilization. Defining influential actors in online environments is a problem widely studied through the examination of structural properties of the underlying social networks (Pal and Counts, 2011). Several studies specific to Twitter networks identify the existence of highly influential actors through the examination of power-law distributions (Myers et al., 2014, Kwak et al., 2010, Oh et al., 2012). In this paper, we want to assess if the high connectivity of influential actors depicted by power-law distributions and processess of preferential attachment has any incidence in the number of followers gained by a social movement organization.

Ultimately, the epistemology of sociomateriality (Orlikowski, 2007) is essential for recognizing the potential of social media in shaping large-scale social processes (Oh et al., 2015). In our context, online social networks can only be properly conceptualized as social-organizational resources in the way we regard social media environments to be inseparably intermingled with cycles of mobilization. In this way, we lean towards the notion of affordances of social media exploited by social movement organizations for resource mobilization (Zheng and Yu, 2016).

3 Research Method

3.1 Background of the Global Justice Movement

The global justice movement is deemed as a “movement of movements” to protest neoliberal economic policies promoted by global financial institutions (Staggenborg, 2011, p. 149). According to Staggenborg 2011, the targets of the global justice movement are international financial institutions and their policies as activists regard them as the cause for income inequality, environmental destruction and lowering labor standards. Under the frame of RMT, the World Social Forum (WSF) has become the most critical mobilizing structure for the global justice movement in recruiting participants and providing educational space for people to learn about global issues (Smith, 2008, p. 224). The WSF has also facilitated transnational coalitions that have attracted a large number of participants and expanded the movement geographically (Tarrow, 2005, p. 32). According to the WSF, their goal is to attract “tens of thousands of people from groups in the civil society, organizations and social movements who want to build a sustainable and inclusive world” (WSF, 2016).

3.2 Data Collection: Building an Ego Network

Ego-centred networks or ego networks consist of a focal node, known as the ego, and the nodes to whom ego is connected. According to Wasserman and Faust (1994, p. 42), ego networks “have been used to study the effects of the social environment surrounding a single actor.” Based on the notion of

ego networks, we are interested in examining how the sociotechnical environment comprised by the followers of the WSF in Twitter influences the formation of linkages to the WSF.

We have developed a Web crawler using the Python programming language to build an ego network with the WSF as its focal actor based on data collected from the Twitter API. We implemented the breadth-first search algorithm (Easley and Kleinberg, 2010, p. 29) with two levels using the WSF's account as the starting node. We rely on the distinction of direct relations from one actor to another to represent the ego network as a directed graph (Scott, 2012, p. 66). Under these guidelines, we built directed graph representations of the WSF ego-network corresponding to 54 days from July 08, 2016 to August 31, 2016, as part of a mobilization cycle orchestrated by the WSF for their campaign at Montreal, Canda on August 2016 (WSF, 2016). We performed measurements on a daily basis and for each measurement day, we crawled the entire ego network running our implementation of the breadth-first search algorithm. We stored the ego network for each measurement day in a document-oriented (NoSQL) database and used the R programming language for further analysis. In the first measurement, we crawled the accounts of 976 followers of the WSF, and for the last day, we crawled 2,085 followers. At the end of our measurement period, we collected a total of 97,281,234 linkages for our analysis. In addition to network ties, we also collected the location reported by each actor in their profile as a qualitative attribute. We used the Google Maps Geocoding API (Google, 2016) to convert the location of each actor into geographic coordinates of latitude and longitude.

3.3 Analysis

Since our implementation of the breadth-first-search algorithm includes two levels, we were able to identify at a given time, the followers of the WSF (level 1) and also the followers of each follower of the WSF (level 2). In this way, for any two consecutive measurements at times t and t', we were able to identify new followers gained by the WSF at time t'. By looking at the second level of the ego networks, we were able also to determine whether these new followers were followers of a follower of the WSF at time t. Consequently, we identified followers gained by the WSF that existed in the ego network before they become followers of the WSF.

Figure 1 shows a time series for the followers acquired by the WSF across the measurement period. The solid line represents new followers that existed in the ego network before they become followers of the WSF (existent group with mean = 20.88). The dashed line denotes new followers that did not exist in the ego network, and therefore, no relationship were detected between these new followers (non-existent group with mean = 3.35) and any follower of the WSF. Figure 1 also shows a spike in the number of followers gained by the WSF during the first two weeks of August that coincides with the gathering of the WSF from the 9th to 14th of August 2016. The difference between the two groups ($p < 0.01$) with a greater mean for the existent group motivated the examination of factors in existing followers that could predict increments in the number of followers gained by the WSF.

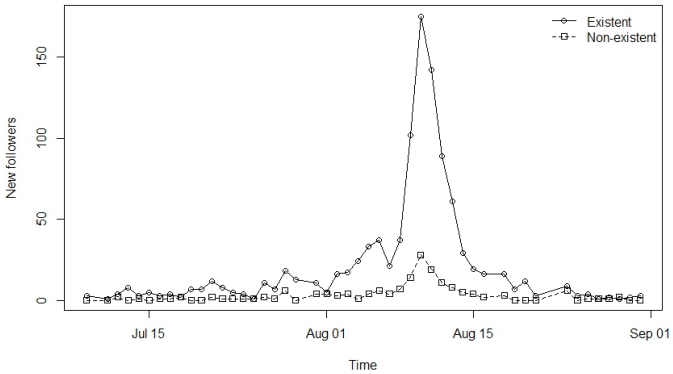

Figure 1. Time series for followers gained by the WSF.

Using the data from our directed graph representations of the WSF ego-networks, we first generated the in-degree distribution of the actors following the WSF using the poweRlaw statistical package for R (Gillespie, 2015). The in-degree of an actor refers to the number of followers she or he has. The x-axis in Figure 2 represents the in-degree of the actors following the WSF, and the y-axis represents the cumulative distribution function (CDF). The tail of the distribution in Figure 2 shows the existence of users with a high number of followers suggesting a power-law distribution. To verify this presumption, we fit the in-degree distribution to a power-law distribution as illustrated in the straight line in Figure 2. To test the fit, we performed a hypothesis test ($p = 0.54$) following the bootstrap procedure in which the null hypothesis asserts that the data in Figure 2 is generated from a power-law distribution (Clauset et al., 2009, Gillespie, 2015). The vertical line at 1,222 represents the value estimated for the parameter x_{min} that denotes the value after which the distribution exhibits the properties of a power law structure i.e. the beginning of the tail (Clauset et al., 2009).

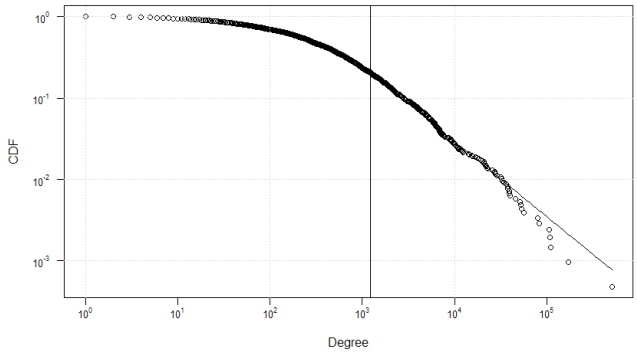

Figure 2. In-degree distribution and power law fit.

We are interested in determining if the popularity reported by actors with high in-degree following the WSF depicted in Figure 2 has any prediction capabilities on the number of followers gained across time by the WSF. Using data from the ego-networks at two consecutive measurements times *t* and *t′,* we identified followers of the WSF that had a direct linkage with new followers of the WSF at time *t′*. From a network point of view, each of these identified followers creates a three-vertex structure or triplet between the WSF, the new follower at time *t′* and the existent follower at time *t*. Thus, drawing on the concept of triadic closure, we propose the hypothesis that followers of the WSF with higher in-degree form a greater number of triplets as the WSF gains new followers. We propose to test our hypothesis with the following regression model:

$$Num\_Triplets_i = \beta_0 + \beta_1 log(In\_degree_i) + \beta_2 Location_i + \varepsilon \quad (1)$$

The dependent variable is the total number of times in which a follower *i* of the WSF formed a triplet during the full length of the measurement period. The independent variable is the in-degree associated with each follower. We also included the location of each follower, outlined by the longitude and longitude, as a moderator. The coordinates obtained from the geocoding process were not always accurate as users not always report a valid location in their profiles. We filtered out actors with invalid conversions resulting in a final working sample of 560 followers. We included the geographic coordinates of each follower in Equation 1 as qualitative (dummy) variables. For this purpose, we performed a cluster analysis to group together followers that are geographically close to each other. Since geographic coordinates are a type spatial data, we used the DBSCAN clustering algorithm (Ester et al., 1996). As a result, we obtained four clusters corresponding to four areas worldwide: western coast of North America, central part of Canada, eastern coast of Canda and Western Europe. We included these clusters as qualitative variables in Equation 1 leading to the following model:

$$Num\_Triplets_i = \beta_0 + \beta_1 log(In\_degree_i) + \sum\_(j=1)\text{^}4 \beta_j Cluster_{i,j} + \varepsilon \quad (2)$$

Variable	Estimate	Std. Error	t value	Pr(>|t|)
Intercept	-62.8824	6.5586	-9.588	< 2e-16 ***
Log(In_degree)	9.1353	0.5962	15.321	< 2e-16 ***
Cluster 1: Western coast of North America	7.8748	5.2676	1.495	0.135
Cluster 2: Eastern part of Canada	20.5309	4.9306	4.164	3.63e-05 ***
Cluster 3: Central part of Canada	-1.6859	8.0526	-0.209	0.834
Cluster 4: Western Europe	11.7009	8.6896	1.347	0.179

Figure 3. Results of the general model in Equation 2.

The results of the final model presented in Figure 3 indicates a significant logarithmic relationship exists between the in-degree and the number of triplets with $R^2 = 0.31$ and $F(5, 554) = 51.48$ at $p < 0.05$. Amongst our qualitative variables, only the cluster that corresponds to the eastern part of Canada was found significant. The plot in Figure 4 illustrates the model in Equation 2 with cluster 2 labeled as "Major cluster" and the remaining clusters labeled altogether as "Others." The vertical line corresponds to the x_{min} parameter estimated from the power-law test and shows that many of the followers that participated in the formation of triplets are influential under the criteria of power-law structures.

3.4 Interpreting the Results

The statistical significance attained for the in-degree variable confirms our hypothesis that followers of the WSF with higher in-degree form a greater number of triplets as the WSF gains new followers. However, the logarithmic correlation suggests this relationship dwindles as the in-degree reaches extreme large values.

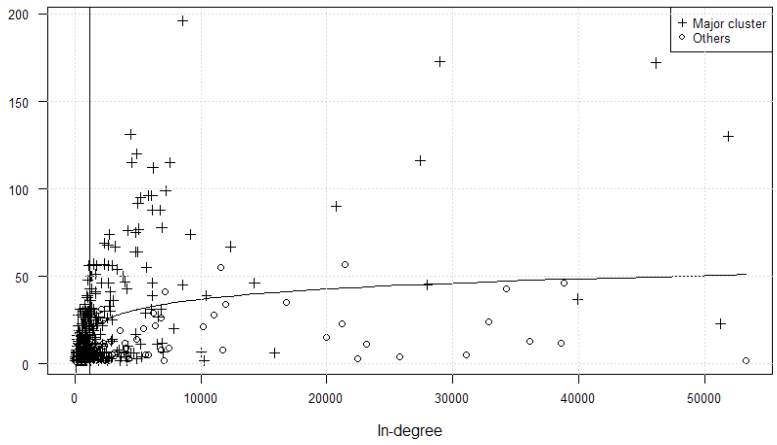

Figure 4. Plot of the general model in Equation 2.

Under the lens of our theoretical foundation, our model suggests that highly connected users behave as actors of social-organizational resources that influenced, to some extent, the audience acquired by the WSF durying the mobilization cycled captured in our measurement period. Our model shows that the geographic location moderates this relationship as influential actors whose coordinates correspond to the eastern coast of Canada had a greater impact on the number of triplets they formed. This effect suggests that geographical aspects largerly dominated the process of audience acquisition taken on by the WSF. This finding aligns with previous studies in which geographical proximity impacts processes of network formation (Liben-Nowell et al., 2005, Stephens and Poorthuis, 2015). In the context of resource mobilization, we found interesting this effect given the global coverage of the WSF on its

depiction as an important mobilizing structure for the global justice movement portrayed by several authors (Staggenborg, 2011, p. 149, Smith, 2008, p. 224, Tarrow, 2005, p. 32). Although the results of our cluster analysis reveals the acquisition of followers worldwide, our findings suggest that influential actors became influential only for a geographically proximate population in terms of facilitating the WSF access to a broader audience.

4 Limitations and Future Work

This research in progress has limitations, which give direction for future study. The first limitation is that we focus solely on structural properties of social networks. Future work could include diffusion metrics, e.g. retweets, to assess how many of the followers gained by a social movement organization contribute to the promotion and support of its causes. Furthermore, the stastistical insignificance of users with extreme large number of followers in mediating processes of audience acquisition depicted in the logarithmic relationship of our model appeals for the application of alternative measures of influence that pay less attention to the high connectivity of popular figures. For instance, the reliability of social media users for creating and disseminating relevant content (Pal and Counts, 2011) to the ideologies of the social movement. Another limitation is that our findings are based on the global justice movement which depends notably on the long-term engagement of its members. In a nascent social movement, the role of mediators in raising awareness and recruiting new participants might be even more salient. All these questions converge into a more general issue regarding the sociotechnical dynamics that influence the propagation of ideologies in online environments promoted by groups and organizations concerned with societal issues**.** This research in progress lays the groundwork for these questions to be answered as future research topics.

References

Alexa. (2016). *Alexa Top 500 Global Sites*. http://www.alexa.com/topsites (visited April 2016).

Ayres, J. (2005). From "Anti-Globalization" to the Global Justice Movement: Framing Collective Action Against Neoliberalism. *Transforming Globalization: Challenges and Opportunities in the Post 9/11 Era.* Leiden, NLD: Brill Academic Publishers.

Barabási, A.-L. & Albert, R. (1999). Emergence of Scaling in Random Networks. *Science,* 286**,** 509-512.

Bourdieu, P. (1986). The Forms of Capital. *In:* Richardson, J. (ed.) *Handbook of Theory and Research for the Sociology of Education.* New York: Greenwood.

Boyd, D. M. & Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication,* 13**,** 210-230.

Burns, A. & Eltham, B. (2009). Twitter Free Iran: An Evaluation of Twitter's Role in Public Diplomacy and Information Operations in Iran's 2009 Election Crisis. *Communication Policy & Research Forum*. (Accessed 2009).

Chatfield, A. T., Reddick, C. G. & Brajawidagda, U. (2015). Government Surveillance Disclosures, Bilateral Trust and Indonesia-Australia Cross-Border Security Cooperation: Social Network Analysis of Twitter Data. *Government Information Quarterly,* 32**,** 118-128.

Clauset, A., Shalizi, C. R. & Newman, M. E. (2009). Power-Law Distributions in Empirical Data. *SIAM Review,* 51**,** 661-703.

Coleman, J. S. (1988). Social Capital in the Creation of Human Capital. *American Journal of Sociology,* 94**,** S95-S120.

Della Porta, D. & Mosca, L. (2005). Global-net for global movements? A network of networks for a movement of movements. *Journal of Public Policy,* 25**,** 165-190.

Easley, D. & Kleinberg, J. (2010). *Networks, Crowds, and Markets: Reasoning about a Highly Connected World,* Cambridge, Cambridge University Press.

Edwards, B. & McCarthy, J. D. (2004). Resources and Social Movement Mobilization. *The Blackwell Companion to Social Movements.*

Ellison, N. B., Steinfield, C. & Lampe, C. (2007). The Benefits of Facebook "Friends:" Social Capital and College Students' Use of Online Social Network Sites. *Journal of Computer-Mediated Communication,* 12**,** 1143-1168.

Ester, M., Kriegel, H.-P., Sander, J. & Xu, X. A Density-Based Algorithm for Discovering Clusters in Large Spatial Databases with Noise. International Conference on Knowledge Discovery and Data Mining, 1996. 226-231.

Ghonim, W. (2012). *Revolution 2.0: The Power of the People is Greater than the People in Power: A Memoir,* New York, Houghton Mifflin Harcourt.

Gillespie, C. S. (2015). Fitting Heavy Tailed Distributions: The poweRlaw Package. *Journal of Statistical Software,* 64.

Google. (2016). *Google Maps Geocoding API*. https://developers.google.com/maps/documentation/geocoding/intro (visited October 2016).

Hannigan, J. A. (1985). Alain Touraine, Manuel Castells and Social Movement Theory a Critical Appraisal. *Sociological Quarterly***,** 435-454.

Hargrave, T. J. & Van de Ven, A. H. (2006). A Collective Action Model of Institutional Innovation. *Academy of Management Review,* 31**,** 864-888.

Howard, P. N., Duffy, A., Freelon, D., Hussain, M. M., Mari, W. & Mazaid, M. (2011). Opening Closed Regimes: What Was the Role of Social Media During the Arab Spring? *Available at SSRN: http://ssrn.com/abstract=2595096*. Project on Information Technology and Political Islam.

Jackson, M. O. & Rogers, B. W. (2007). Meeting Strangers and Friends of Friends: How Random Are Social Networks? *The American Economic Review,* 97**,** 890-915.

Jenkins, J. C. (1983). Resource Mobilization Theory and the Study of Social Movements. *Annual Review of Sociology***,** 527-553.

Khonsari, K. K., Nayeri, Z. A., Fathalian, A. & Fathalian, L. Social Network Analysis of Iran's Green Movement Opposition Groups Using Twitter. Proceedings of the 2010 International Conference on Advances in Social Network Analysis and Mining, ASONAM, 2010. 414-415.

Klandermans, B. & Staggenborg, S. (2002). *Methods of social movement research*, University of Minnesota Press.

Kwak, H., Lee, C., Park, H. & Moon, S. (2010). What is Twitter, a Social Network or a News Media? *Proceedings of the 19th International Conference on World Wide Web.* Raleigh, North Carolina, USA: ACM.

Leong, C., Pan, S. L., Bahri, S. & Fauzi, A. (2015). Digital Enablement: Social Media in Empowering the Grassroot Environmental Movement of Malaysia. *International Conference on Information Systems, ICIS.*

Lerman, K. & Ghosh, R. Information Contagion: An Empirical Study of the Spread of News on Digg and Twitter Social Networks. Proceedings of the 4th International AAAI Conference on Weblogs and Social Media ICWSM, 2010. 90-97.

Liben-Nowell, D., Novak, J., Kumar, R., Raghavan, P. & Tomkins, A. (2005). Geographic Routing in Social Networks. *Proceedings of the National Academy of Sciences of the United States of America,* 102**,** 11623-11628.

Lotan, G., Graeff, E., Ananny, M., Gaffney, D. & Pearce, I. (2011). The Revolutions Were Tweeted: Information Flows During the 2011 Tunisian and Egyptian Revolutions. *International Journal of Communication,* 5**,** 31.

Majchrzak, A., Markus, M. L. & Wareham, J. (2012). ICT and Societal Challenges. *MISQ Special Issue Call for Papers*.

McAdam, D., McCarthy, J. D. & Zald, M. N. (1996). *Comparative perspectives on social movements: Political opportunities, mobilizing structures, and cultural framings,* Cambridge, Cambridge University Press.

McCarthy, J. D. & Zald, M. N. (1977). Resource Mobilization and Social Movements: A Partial Theory. *American Journal of Sociology***,** 1212-1241.

Mungiu-Pippidi, A. & Munteanu, I. (2009). Moldova's Twitter Revolution. *Journal of Democracy,* 20**,** 136-142.

Myers, S. A., Sharma, A., Gupta, P. & Lin, J. (2014). Information Network or Social Network?: The Structure of the Twitter Follow Graph. *Proceedings of the 23rd International Conference on World Wide Web.* Seoul, Korea: ACM.

Oh, O., Eom, C. & Rao, H. R. (2015). Role of Social Media in Social Change: An Analysis of Collective Sense Making During the 2011 Egypt Revolution. *Information Systems Research,* 26**,** 210-223.

Oh, O., Tahmasbi, N., Rao, H. R. & de Vreede, G. J. A Sociotechnical View of Information Diffusion and Social Changes: From Reprint to Retweet. International Conference on Information Systems, ICIS, 2012. 3686-3696.

Orlikowski, W. J. (2007). Sociomaterial Practices: Exploring Technology at Work. *Organization Studies,* 28**,** 1435-1448.

Pal, A. & Counts, S. Identifying Topical Authorities in Microblogs. Proceedings of the 4th ACM International Conference on Web Search and Data Mining, WSDM 2011, 2011. 45-54.

Rapoport, A. (1953). Spread of Information through a Population with Socio-Structural Bias: I. Assumption of Transitivity. *The Bulletin of Mathematical Biophysics,* 15**,** 523-533.

Scott, J. (2012). *Social Network Analysis,* London, Sage

Selander, L. & Jarvenpaa, S. (2013). Online Impulse Activism at Amnesty International. *Thirty-Fourth International Conference on Information Systems ICIS.* Milan.

Selander, L. & Jarvenpaa, S. L. (2016). Digital Action Repertoires and Transforming a Social Movement Organization. *MIS Quarterly,* 40**,** 331-352.

Smith, J. (2008). *Social Movements for Global Democracy,* Baltimore, Johns Hopkins University Press.

Staggenborg, S. (2011). *Social Movements,* USA, Oxford University Press.

Stephens, M. & Poorthuis, A. (2015). Follow thy Neighbor: Connecting the Social and the Spatial Networks on Twitter. *Computers, Environment and Urban Systems,* 53**,** 87-95.

Tarrow, S. (2005). *The New Transnational Activism,* New York, Cambridge University Press.

Tilly, C. (1978). *From Mobilization to Revolution,* Massachusetts, Addison-Wesley.

Wasserman, S. & Faust, K. (1994). *Social network analysis: Methods and applications,* Cambridge, Cambridge University Press.

WSF. (2016). *World Social Forum 2016*. Montreal. https://fsm2016.org/en/ (visited June 30 2016).

Zheng, Y. & Yu, A. (2016). Affordances of Social Media in Collective Action: The Case of Free Lunch for Children in China. *Information Systems Journal*.