Modelling Twitter Conversations in #Favela towards the Conceptualization of the eVoices of Unheard

Nigel Williams

Abstract

Purpose

The purpose of this study to shed light on the importance of social media hosted content related to socially-motivated discussions. Moving from the field of communication for development, the research leverages social media as a powerful tool for collecting and analyse peer-to-peer communication towards the conceptualization of eVoices of Unheard. The deep understanding of these conversation can generate recommendations for organizations and governments designing and providing interventions fostering local socio-economic development.

Design/methodology/approach

The study presents a large-scale analysis of social media interactions on the topic "#favela" to generate insights into a social network structure, narrative contents and meaning generated.

Findings

Structurally, the analysed networks are comparable with those presented in current academic literature; automatic text analysis confirmed the promise of the inner value of communication for development opening the floor to conceptualization of the "eVoices of unheard", which is the collective and conscious use of social media to mediate community discussions about tangible and intangible issues related to socio-economic development.

Originality/value

Framed within the rise of interactive communication for development this research show that social media an support the notion of voice proposed by Couldry (2010) moving from process (i.e. the recording of the voice) towards value (i.e. the possibility of giving an account of one's life and its conditions to have an impact on human life and resources) thereby understanding intangible issues related with socio-economic development.

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1. Introduction

Although research on social media has been very popular in social sciences, such as marketing (e.g. Godey et al., 2016) and politics (Eddington, 2018), it is argued here that an understanding of user-generated content aggregation can also transform and enhance research about socio-economic development, informing policies and interventions (Blazquez & Domenech, 2018). In fact, social media users are part of a digital network and they participate in different conversations based on interest, clustering around the so-called 'Communities of Interest' (e.g. Papadopoulos, Kompatsiaris, Vakali, & Spyridonos, 2012). Previous studies pointed out how this form of digital communication can provide insights into socially-motivated discussions (Inversini, Sage, Williams, & Buhalis, 2015) as a catalyst for social change for the advocacy of social issues (Isa & Himelboim, 2018) and support for marginalized communities (Dagron & Tufte, 2006). Whoever participates in these conversations shares issues relevant to/for the community (at large) and engages with each other on this basis (Siapera, Boudourides, Lenis, & Suiter, 2018) rather than on a commercial basis, as in marketing (e.g. Chu & Kim, 2011).

In emerging markets, social media platforms are seen as tools used to promote democratic and inclusive discussions (Nemer, 2016) because they provide an interactive means for stimulating conversations, information search and, ultimately, residents' engagement in rural and urban communities, as well as in informal settlements, such as ones like Brazilian favelas. Social media support local forms of expression (Gallaugher & Ransbotham, 2010) thus widening the possibility of people, who are generally 'unheard' (i.e. whose opinions are not relevant for decision makers), having a forum for discussion and ultimately giving voice (Siapera et al., 2018) to marginalized people to eventually influence decisions that affect their lives (Tacchi, 2012).

This paper builds on related research of social network structures (i.e. Williams et al., 2015) and social media narratives (i.e. Kozinets et al., 2010), as well as on the call for multi-disciplinary research in the field of social media analysis and unstructured data (Chang, 2018). It extends the theoretical boundaries of extant research by providing insights into the network structure and content shared as well as meanings discussed by given users in a developing context, overcoming traditional approaches that look in the relational structure (Himelboim, Smith, & Shneiderman, 2013) or in the content or, often, the hashtags (e.g. Eddington, 2018). Methodologically, this is in line with the claim of Lipizzi and colleagues (2016) who called for a more holistic view of social media analysis, essentially combining structural analysis with a lexical one to shed light on structure as well as on content/ meaning. Theoretically, this work aims at contributing to the discussion of voice as a process (i.e. the network analysis, its actors etc.) and voice as a value (i.e. topics discussed within digitally hosted communities - Couldry, 2010). Authors claim that this understanding could trigger actions towards valuing the opinions of the marginalized to support the organization of human life and resources.

In order to do so, this research undertakes a large-scale analysis based on one year's public conversations on twitter.com mentioning the hashtag #favela. While existing research has suggested that social media may be less critical than traditional media (Laurell & Sandström, 2018), this research indicates that social media can host a number of relevant discussions. This

work proposes the conceptualization of the 'e-Voices of the Unheard', a new construct that extends current understanding of user-generated content aggregation towards a more holistic view of social media as a mediator of socially-motivated discussion in urban places.

2. Literature Review

2.1. The Concept of Voice

Lister (2004) defines 'voice' as the right to participate in decision making across social, economic, cultural and political spheres and as a crucial human and citizenship right and a critical component in our understanding of what constitutes poverty. Tacchi (2008) reinforces this definition by adding that 'voice poverty' can be understood as the denial of the right of people to influence decisions that affect their lives and the right to participate in that decision making. The notion of voice helps in overcoming the reductionist interpretation of development (i.e. achieving material progress) to look more into subjectively felt (Siapera et al., 2018) and relational wellbeing (Tacchi, 2012). Therefore, the notion of 'voice' can be understood as a multidimensional construct linked with a variety of dimensions of development (Couldry, 2010). One relevant example of the application of the 'voice' concept to a developing context is the Word Bank Publication 'Voices of the Poor' (Narayan-Parker, 2000) which gathered poor and marginalized people's views on poverty. Common characteristics of voicelessness relate to the concepts of powerlessness, dependency and humiliation framed within an own psychological dimension of poverty. These characteristics are related with the concept of marginalization that is defined broadly here as involving exclusion from participation in normal spheres of social life, leading to a state of economic, cultural or political deprivation (Wong, Li, & Song, 2007).

Voice is about the agency to represent oneself and the right to express an opinion (Tacchi 2012). As in Couldry (2010), the concept of voice can be understood both as a process and as a value; process refers to the possibility of giving an account of one's life and its conditions whilst value refers to the act of valuing and choosing to value those frameworks for organizing human life and resources that themselves value voice. Therefore, value should be considered as an end rather than a means of voice Tacchi (2008). So far, there has been interest in the basic act of voice, not the wider reasons for valuing voice (Tacchi 2012). It is therefore imperative that the act of valuing and choosing to value those frameworks for organizing human life and resources themselves value voice as 'open social arrangements' (Smith & Elder, 2010).

The concept of voice is deeply rooted in the body of knowledge of communication for development (Waisbord, 2008) which sees communication as participatory processes for social change and dialogue as key to socially-inclusive processes (Fraser & Villet, 1994).

For communication in general and in communication for development, the advent of digital media has shifted the communication paradigm towards participatory and interactive communication models (Hoffman & Novak, 1996; Selwyn, 2004). There is growing evidence (Dagron & Tufte, 2006) that marginalized groups are utilising a range of digital platforms to challenge dominant perspectives on their political and cultural identity. Loader and Mercea, (2011) highlight that digital communication at a minimum plays a disruptive role, "challenging traditional interests and modes of communicative power". Digital media particularly allow marginalised groups to reach out across international boundaries to agencies (government and

non-government) in order to publicise their predicament and garner support for action that addresses the conditions that cause their marginalization (Castells, 2013).

Participatory and interactive communication promote horizontal models of development rather than vertical, one-way, top-down or trickledown models more suited to modernization and economic growth approaches to development (Servaes, 2007; Waisbord, 2008). Although modernization and diffusion models of development and of development communication are generally considered to be outdated (Waisbord 2008), they still appear to guide policy and practice (Mansell, 2011). One other important issue related to communication models in development is the key aspect of listening (Honneth, 1996). To follow Couldry (2010), it is crucial to listen to voice(s) in order to move from process to value; in fact, development communication and, particularly, the concept of voice requires recognition.

Digital social networks and hosted conversations (i.e. social media - O'Reilly, 2007) offer for the first time the unprecedented opportunity to listen and analyse interactive conversations in different domains, including politics (Kruikemeier, 2014), travel and tourism (Hays, Page, & Buhalis, 2013), product environments, including goods and services (Tsagkias et al., 2011) and organization in general (Mangold & Faulds, 2009). Anecdotal evidence is present in the literature about research discussing social media content and structure (Lipizzi, Iandoli, & Marquez, 2016) in a social context (Akaev, Korotayev, Issaev, & Zinkina, 2017). However, scant research has considered social media as a tool to listen to those marginalized and act accordingly (Siapera et al., 2018; Blazquez & Domenech, 2018), leveraging the power of social media to create real value for marginalized communities (Couldry, 2010).

2.2 The Rise of Social Media

Social media sites host and distribute text, images and video content created by users (Parent, Plangger, & Bal, 2011). This information may not only be factual but can also include opinions and rumours (Dellarocas, 2003) shared with a variety of different publics. By overcoming space and time constraints (Holt, 2016), social media sites enable small, geographically-distributed groups of users to create and maintain discussions on niche and controversial topics (Kaplan & Haenlein, 2010), generating digital *crowd-cultures* (Holt, 2016). Academics and practitioners alike see social media as a new collaborative tool (Godey et al., 2016). Existing researches on social media have used methodologies that include surveys and interviews (e.g. Phua, Jin, & Kim, 2017) for investigating concepts related to users' perceptions, motivation and propensity towards a given subject (e.g. Leung, Law, van Hoof, & Buhalis, 2013). More recent research has started to examine social media postings directly (e.g. Lahuerta-Otero & Cordero-Gutiérrez, 2016) in order to understand the topic or the network context of social media conversations (Lu & Stepchenkova, 2015).

In the latter domain and building on communication theories, Kozinets and colleagues (2010) provided a framework to describe social media conversation (using the lens of e-Word-of-Mouth - Hennig-Thurau, Gwinner, Walsh, & Gremler, 2004) being influenced by four important factors. These are (i) social media conversations being generally embedded in 'character narratives' or enduring personal stories; (ii) communications taking place and being embedded in a given forum and/or digital location; (iii) the actual communication being affected by norms regulating the given communication space and (iv) the message being affected by the product or service under discussion (Kozinets et al., 2010). From a network perspective (Ahn, Han, Kwak, Moon, & Jeong, 2007), social media contribute to creating communities of interest (Brown & Duguid, 2001). Moving from this perspective, Williams and

colleagues (2015) described social media hosted conversations and the communities created by the participants in terms of size (volume of the conversations), span (pattern of topic engagement) and scope (geographic range of engaged stakeholders). Most of the academic research in this field has failed to merge the network, content and meaning dimensions (Lipizzi et al., 2016); there is therefore a call to bridge this gap methodologically.

2.3 Social Media in Emerging Markets

Social media platforms can be seen as tools for promoting democratic and inclusive discussions in emerging market contexts (Nemer, 2015). Previous research in developing contexts examined the impact of social media in politics and riots (e.g. Pang & Ng, 2016). It has been reported that social media had an influence on Egypt's revolution because the former Egyptian President, Mubarak, shut down the Internet in the whole nation for 5 days in 2011 and that YouTube played a crucial role in Iranian Elections in 2009 (Ali, 2011). A more instrumental use of social media, especially twitter.com, was reported within the Little India Riot in Singapore, in which the social network played a critical role in updating the population about the evolution of the riot (Pang & Ng, 2016). Monroy-Hernández and Spiro (2013) gave an account of Brazilian protests in 2013 by collecting 1.5 Mio tweets in 20 days and analysing the content and structure of the created networks. Results showed the high activity of the top 1% of users re-posting protest-relevant content in networks with cyclic behaviour. However, there is an open discussion about the role of social media during political unrest. Commentators have viewed the role of social media in these episodes in different ways. On one side, Khondker (2011) praised the role of social media in light of the absence of an open media and a civil society whereas, on the other side, Fuchs (2012 - p. 383) argues that "social media has become a new fetishism of technology that distracts from the contradictions of capitalism underlying contemporary societal changes and conflicts"

Social media can be classified as non-traditional sources of social and economic data that needs the internet for working (Blazquez & Domenech, 2018). Even if there is increasing penetration of the Internet in almost every social and economic activity, there is, however, a call for a nuanced view on social media and web2.0 in a developing country context (e.g. McLennan, 2015). The emancipatory promises of social media are also questioned critically as those who face social and digital marginalization have yet to experience them (Nemer, 2016). A country's economic circumstances, which result in differences in disposable income, can result in differing usage levels of social media (Ali, 2011). This has been mitigated somewhat by the development of new business models, such as pre-paid internet usage and state/non-profit organizations' intervention to improve internet access (Aksoy et al., 2013) via, for example, community-based multimedia telecentres, Community Technology Centres (CTCs) and LAN Houses (Rega, Vannini, Fino, & Cantoni, 2013).

Nonetheless, social media provide the unprecedented possibility to listen to marginalized people's socially motivated discussions (Inversini et al., 2015), thus understanding tangible and intangible issues related with their life, their community and, ultimately, local socio-economic development (Pimmer, Linxen, & Gröhbiel, 2012). As a virtual public space, social media can function in multiple roles outside of the sharing of commercial information about brands or eWOM, which can be influenced by country context (Rauchfleisch & Kovic, 2016). Social media can build a collective identity in users who share and comment on a given content (Dobusch & Schoeneborn, 2015). They can be seen as a catalyst to support local forms of expression, thereby widening the possibility of marginalized people having a forum and voice

for discussion (Nemer, 2015). This will help in overcoming the reductionist interpretation of development (i.e. achieving material progress) to look more into subjectively felt and relational wellbeing (Tacchi, 2012).

2.4 The Context of the Study

Brazilian favelas have witnessed a dramatic expansion of digital technology usage (Nemer, 2013). Pew Research Institute reported a growing adoption rate for the internet in Brazil, from 49% in 2013 to 70% in 2017 (pewresearch.org, 2018); however, Nemer (2016), who conducted an ethnographic enquiry in Brazilian informal settlements, confirmed that, as Neri (2012) suggested, only a small portion of favela residents are effectively connected to the internet. Nevertheless, there are active Community Technology Centres (CTCs) and LAN Houses where residents use connections to surf the web and, especially, utilise social media (Nemer, 2016). Favela residents are conscious and active social media users (Nemer, 2015) and their use of technology goes beyond the functional and utilitarian frame of modern development paradigms. In Nemer's research (2016), social media were seen as sources of inspiration, training and well-being promotion, as well as a tool to overcome social deprivation. Within the social media landscape, Twitter seems to be one of the major social networks used in the country; following Statista (2019), Brazil ranks as 7th country worldwide for twitter users (8.15 million). Twitter is popular in the country both for its open structure, which allows direct communication and contact with popular figures (Fastenberg, 2010), and for its ease of use as a communication tool during political unrest and riots (Monroy-Hernández & Spiro, 2013).

However, as Kleine (2010) maintains, empowerment is achieved when people are able to choose their desired outcome; social media can therefore represent an initial step in the community empowerment process. This research uses the #favela to identify conversations about Brazilian informal settlements in general without looking specifically at any of them.

3. Research Design

Framed within the rise of interactive communication for development (Selwyn, 2004), the overarching aim of this research is to understand if social media and, in particular, twitter.com can support the notion of voice proposed by Couldry (2010). This involves moving from process (i.e. the recording of the voice) towards value (i.e. the possibility of giving an account of one's life and its conditions to have an impact on human life and resources), thereby understanding intangible issues related with socio-economic development (Pimmer et al., 2012). This will be achieved following Lipizzi and colleagues' (2016) notion of integrating structure, content and meaning in social networking analysis by deeply engaging with a network (Williams et al., 2015) and communication (Kozinets et al., 2010) perspectives. The research proposed the direct investigation of social media postings (Lu & Stepchenkova, 2014) to examine the use of social media (Nemer, 2016) in a developing country context. Data obtained from non-traditional socio-economic sources are generally large, heterogeneous and unstructured or semi-structured (Blazquez & Domenech, 2018); despite their potential for treating socio-economic data, the application of analysis and mining techniques in the socio-economic development field, is still at an early stage.

In order to tackle this issue, this research moves from the work of Blazquez & Domenech (2018), who highlighted the need of using non-traditional, unstructured (big) data to inform socio-economic research. The study presents large-scale analysis of social media interactions for the topic "#favela" (Nemer, 2016) on twitter.com. Conversations presenting the hashtag

"#favela" were archived utilising the online service Netlytics.com. Twitter.com is popular in Brazil (Brazil is the 7th country by Twitter.com user base – Statista, 2019) and even if does not have the largest base of social media users, it has particular strengths for this research area. These are (i) Twitter.com updates do not require significant online bandwidth, making it accessible to individuals with limited or intermittent access to the internet, such as underprivileged groups; (ii) the default option for Twitter.com posts is 'public', which enables any user to interact with content supporting multiple modes of communication that incorporate individual and group information interactions. These two features enable the creation of various discussion groups of variable size and the 'real-time' nature of Twitter.com supports the creation of discussions about events, such as protests, as they unfold (Kwak, Lee, Park & Moon, 2010). Finally, (iii) Twitter.com provides access to historical data and metadata that enable analysis of online discussions generated at a particular point in time later.

3.1 Research Methodology

3.1.1 Social Network Analysis

Social media like twitter.com, create virtual social communities (Shu & Chuang, 2011) by enabling information-sharing and interpersonal relationship ties of varying strength between users (Etzioni, 1998). More active users having frequent contacts with others are considered strong ties, whereas weak ties tend to have unidirectional, less frequent contact with other members (Gilbert & Karahalios, 2009). Strong ties tend to dominate information exchange within network subgroups or clusters whilst weak ties connect sub-groups or clusters, facilitating information distribution (Haythornthwaite, 2001). In the social media environment, norms and expectations for communications are heavily influenced by users with stronger ties, i.e. influencers in social media marketing (Lindsay et al., 2015), which can shape the structure and content of the network (DeSanctis & Poole, 1994) and can support the process of diffusion of dominant meanings. The structure and content/meaning of twitter.com discussions can be examined from interaction or network perspectives, known as Social Network Analysis (SNA) (Hansen, Shneiderman, & Smith, 2010). SNA has been used in various fields, such as management (Sedereviciute & Valentini, 2011), sociology (Mützel, 2009) and international development (Friend & Rapport, 1991) to examine relationships between entities. For business and management research, SNA applications fall into two domains. The first stream attempts to explain the influence of social networks on real world outcomes, such as Social Capital Theory (Antoniadis & Charmantzi, 2016). The second domain uses SNA as a means to identify and visualise patterns of interactions among users to identify the influence on information flow and, hence, communication (Culotta & Cutler, 2016). SNA has also been used to examine the influence of relational ties on the diffusion of e-WoM (Hennig-Thurau et al., 2004) on social media (Lee, Lee, Kim & Lee, 2013) and the roles particular actors perform in sharing review data (Hinz, Schulze, & Takac, 2014). It is expected that the network formed by the actor in this context will feature both personalities and organizations as nodes on the network (Williams et al., 2015).

3.1.2 Automated Text Analysis

Whilst network approaches can provide insight on interactions between entities, they do not provide deep analysis of the content of interactions (Inversini et al., 2015). Content in twitter.com can take the form of unstructured text data and can provide additional understanding of social media discussions (Carley & Palmquist, 1992). Furthermore, as in Lipizzi and colleagues (2016), the study of meaning within communities of interest can give additional

insights, enhancing content and structure studies. Common social media discussion topics and narratives, such as politics (McPherson, Smith-Lovin, & Cook, 2001), news (Tsagkias et al., 2011), entertainment (Atefeh & Khreich, 2015) and products and services (Chevalier & Mayzlin, 2003), are likely to appear in the analysis. However, Twitter.com data can be unstructured and difficult to understand using text approaches that merely attempt to count the frequency of keywords. This issue can be addressed by utilising additional approaches adopted from network analysis (Diesner & Carley, 2010) to understand not only keyword frequency but also to examine semantic interconnectivity among concepts (Carley & Palmquist, 1992). Narrative study in the form of network analysis can be performed on text data to identify patterns of word and language usage that can then be classified. In this form of analysis, words and their forms are considered "nodes" and lexical distance between them or co-occurrences can be modelled as links (van Meter & de Saint Léger, 2008). These networks can then be clustered into "lexical worlds" (Lebart, Salem & Berry, 1998) that can be examined to identify emergent topics of discussions in unstructured text.

3.2 Research Questions

Theoretically, this paper moves from the work of Couldry (2010) and Tacchi (2012). The in-depth analysis of social media conversations (i.e. structures of conversations, hedges of communities of interest and specific theme discussions) will support a more specific view of topics discussed (i.e. what communities care about) and their relative size and opinion leaders (i.e. how big are communities of interest and who are the opinion leaders). This will give a more nuanced view of the needs and wants of the communities and will help in ranking the importance of them. In accordance with Tacchi (2012), this will overcome a reductionist approach to development, enhancing the value of voice (Couldry, 2010). Since network structures can influence information flow (Gomez Rodriguez, Leskovec & Schölkopf, 2013), the differences in online network structures may generate an understanding of information sharing and communication strategies (Hanna, Rohm & Crittenden, 2011). The first question is therefore:

RQ1: *What is the variation of network structure by language type?*

Similarly, research has examined the type of entities considered to be key influencers (Lindsay, Kaykas-Wolff & Mathwick, 2015) and whose content is more likely to be observed by network participants (Kim, Pai, Bickart & Brunel, 2014). However, research has not examined them by language type or any temporal variations. In this paper, these users will be identified by the network metric of betweenness centrality, which indicates potential brokers or individuals, who act as an informational bridge between clusters in the network (Scott, Cooper, & Baggio, 2008). For this research, the top 10 users in each network in Research Questions 1 and 2 were identified by betweenness centrality. The profile of each of these users was reviewed and a classification framework adapted from Wu, Hofman, Mason & Watts (2011) was applied to categorise users. Therefore, the second research question is:

RQ2: *What are the types of key influencer by language type and season?*

Additionally, moving from a communication and narrative perspective (Kosinets et al., 2010) and from the construct of 'voice' elaborated by Tacchi (2012), the research looks into the semantic similarity (e.g. Eddington, 2018) of the two networks in terms of topic discussed. Research demonstrated that socially motivated conversation may appear generally if stimulated

by organizations (Inversini et al., 2015) or if social movements find in social media a possibility of expression (Isa & Himelboim, 2018).

Therefore, the last research question is:

RQ3: *What are the differences in terms of topics of conversations between insiders (i.e. people living in the favela) and outsiders (i.e. people visiting the favela)?*

3.3 Data Collection and Filtering

Tweets with the hashtag '#favela' were collected for a period of one year using Netlytics.com. In current research, it is quite common to find single hashtag analysis (e.g. Stewart, Arif, Nied, Spiro, & Starbird, 2017) to explore the use of social media in a given context for a given purpose (Carroll, 2018). Authors acknowledge that this could be a simplistic approach but, considering the scale and complexity of the conversation, it was sufficient to investigate the aim and research questions at stake. Based on the peculiarities of Twitter.com outlined above (i.e. low bandwidth needed, public nature of the content, metadata associated to the content), the present research used: (i) time zone metadata and (ii) language as proxy to filter the data collected for the hashtag #favela. Time zone metadata was used to capture conversations containing the hashtag #favela that originated from Brazil in order to avoid discussions about the term happening in other countries with other meanings. The remaining tweets were separated by language into two different groups: Portuguese language (people living in the favela) and English language (people visiting the favela). Although this choice can trigger criticism (due to the fact that favela dwellers can also use the English language to communicate on Twitter), it seemed the most natural way to segment two different type of actors in the communication process, as twitter metadata were poor in creating users' profiles.

In order to prepare the sample for the two analyses (i.e. Social Network Analysis and text analysis), two different filtering operations have been made (See Figure 1 for details).

1. To identify the information network of users, interactions in the form of retweets, replies and mentions were identified (Stieglitz & Dang-Xuan, 2012), an approach used in previous works (Yardi & Boyd, 2010). This filtering technique allowed filtering only interactions among network participants. These were then modelled as a directed graph using Social Network Analysis (SNA - Gephi) and statistics were calculated to identify the overall structural characteristics and key users by network metrics. The text of Twitter profiles for these key users were then reviewed to identify their characteristics.

2. Automatic text analysis has been designed to generate a broad understating of the richness of the topic discussed rather than looking at the main (i.e. popular) discussions. To this end, duplicate tweet content (i.e. retweets are a piece of content semantically similar to original tweets) was removed to avoid bias related to popular conversations (i.e. music songs, twitter.com popular hashtags). This is consistent with previous work (e.g. Ratinaud & Marchand, 2015) and essential in order to shed light on the diverse range of topics discussed and on the breadth of subjects debated within the medium. Automatic text analysis was conducted using Iramuteq (http://www.iramuteq.org/) with the semantic similarity analysis technique (belonging to social representation theory – (Levidow & Upham, 2017). This was developed by Flament (1981) in order to investigate the proximity and relations among elements of a given cluster. It does so by calculating a contingency coefficient between the elements of the cluster, which is

called a similarity index (Flament, 1981). The semantic similarity analysis has, as output, a connected and cyclical graph (the maximum tree of the system), in which all elements are linked together and there is only one way to move from one element to another (Clemence, Doise & Lorenzi-Cioldi, 2014). Additional operations carried out on the corpus to facilitate text mining regarded the cancellation of text strings referring to URLS, videos and images, as well as user names, to gain pure data.

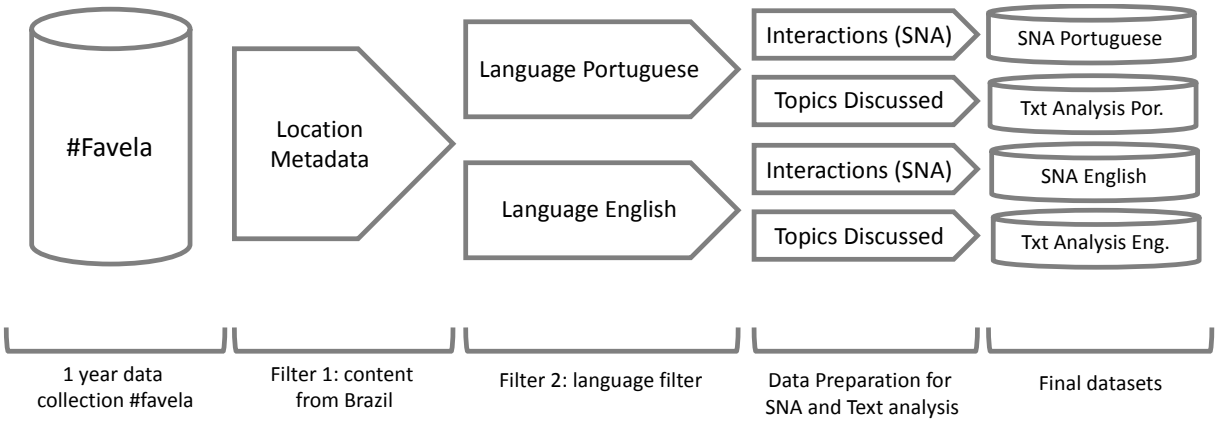

Figure 1: Dataset refinement process and filter applied to the Twitter.com corpus.

Figure 1 proposes the different steps to reach the final samples analysed in the research. The final sample for Social Network Analysis contained a total of 1,344,165 tweets (1,037,766 Portuguese plus 131,835 English). The final sample for text analysis contained a total of 1,722,015 tweets (1,529,931 Portuguese plus 192,084 English).

4. Results

4.1 Network Structure (RQ1)

Tables 1 and 2 present an overview of the twitter.com networks by language; networks were analysed on a three by three month basis (i.e. seasons) due to the huge number of edges and due to popular events taking place in Brazil (i.e. Carnival). The Portuguese networks are significantly larger than the English networks with significantly higher network diameter and path lengths, which suggests information may propagate more slowly through Portuguese language networks (Ahn, Han, Kwak, Moon & Jeong, 2007). The high modularity suggests the existence of sub-communities that may have distinct interests (Zaglia, 2013). Figure 1 presents, as an example, the illustration of the English language network sub-communities and the connections among them.

While the English language networks exhibit relatively little variation over time, the Portuguese language networks exhibit high seasonal variation. The network scale varies from a low of 102,632 users to a high of 166,355 for the periods starting June and September respectively. Furthermore, the March-May period exhibited a significant fall in network diameter and average path length. This finding may reflect a relative lull in online activity after the carnival period of peak tourism and domestic cultural activities (December-February).

English Language Networks	*December to February*	*March to May*	*June to August*	*September to November*
Vertices	16762	14773	14875	13734
Total Edges	17252	30912	26892	24115
Network Diameter	23	27	29	23
Average Path Length	8.075654	9.075129	9.111104	9.265306
Modularity	0.880111	0.89495	0.517104	0.518022
Centralization	0.0804	.070	.018	.06

Table 1: English Language Network's Description

Portuguese Language Networks	*Dec to Feb*	*March to May*	*June to August*	*September to November*
Vertices	114300	114950	102632	166355
Total Edges	151208	121244	106203	183985
Network Diameter	68	32	48	52
Modularity	0.941	0.923	0.928	0.895
Average Path Length	21.603	9.638	15.112	14.361
Centralization	.062	.006	.009	.010

Table 2: Portuguese Language Network's Description

The English and Portuguese language networks have significant differences in total edges, network diameter and path length. Since the diameters and average path lengths of the Twitter networks are relatively high, it suggests they may not be small world networks, further suggesting that these networks have scale-free properties similar to other real-world networks (Bild, Liu, Dick, Mao & Wallach, 2015). Large twitter networks with low centralization and a high average path length have been classified previously as fragmented (brand) clusters (Himelboim et al., 2013). As indicated by the high modularity, they are a collection of diverse interests that communicate within distinct topic groups but not across them. These properties are also maintained across seasons, which suggests the relatively small number of individuals with high centrality scores can attract interest in these networks. These individuals can be named 'influencers' (Kim et al., 2014) within the networks; it is therefore possible for them to reach users in both the English and Portuguese language networks.

4.2 Types of Influencer (RQ2)

A small number of individuals holding power positions within a network may be able to shape the conversation within it (Lindsay et al., 2015) by posting or re-posting a series of contents they find relevant. Prominent individual accounts for the English network are US music celebrities, ordinary individuals and English language media; the Portuguese network includes Brazilian celebrities, Brazilian NGOs, Brazilian online media and ordinary individuals. This is not surprising as most social media and twitter.com research had similar findings showing these individuals discussing political issues (Stieglitz & Dang-Xuan, 2012), entertainment topics (Souza et al., 2016) and sharing opinions about products and services (Chevalier & Mayzlin, 2003). The structural characteristics of these networks, however, limit the extent of influence of a single individual account. The low centralization and high average path length suggest that multiple connections are required to reach the entire network. The networks (English and Portuguese) may be sustained by the interactions among them. Further, the high modularity indicates that distinct subgroups exist that may not interact with each other. These findings

indicate that the Portuguese and English Favela networks may be hosts to a variety of discussions which will be discussed in the next section.

4.3 Text Analysis (RQ3)

Text units were reduced into their original form before being separated into active forms and auxiliary forms (Ratinaud, 2013). Data were grouped visually according to the vicinity in which the words occur most frequently by utilising semantic similarity analysis (Clemence et al., 2014). Similar approaches were already used in the literature; for example, Eddington (2018) applied a similar technique to study the network around US elections. Graphs (i.e. Figure 2 and Figure 3) present the clusters of lemmas in accordance with Sematic Similarity analysis (REF) and quotes from the twitter dataset have been cherry picked in an explorative way to give more substance to the explanation of results.

4.3.1 Semantic Similarity Analysis of the Portuguese Data Set

The Portuguese data set, when taken in its entirety, is dense (1,529,931 original tweets). Attempts were made to reduce the complexity for the entire data set into major evident clusters (Figure 2). These were identified as a funk, music and culture cluster (funk, música, cultura) shared by the community (comunidade). A series of tweets with cultural and community value (especially related to the carnival) can be found.

> *"carnaval vai descer a favela toda"* [The entire favela will go to the Carnival]

And

> *"o lado bom de morar na favela e que sempre tem pessoa louca retarda, sempre tem alegria em meio de tanta coisa ruim e sempre tem samba"* [The good side of living in the favela is that there is always a crazy person, always in the middle of all the bad things and always samba]

Once more, a cluster around associations and representations is made with the notion of a house and home (casa) and the cluster of the pauper (pobre), in combination with his homestead (barraco), which is under threat of being destroyed (destruir); this was also related with the Olympic Games (i.e. RIO 2016, taking place near the favela).

> *"Favela começou a demolição apesar dos protestos dos moradores"* [Demolishing the favela began despite protests by residents]

Additionally, a pobre (poor person) cluster emerges as a povo (people, citizen) cluster form, with associations of being humble (humilde), helpful (socorro – help) and the favela as a refuge for those amongst them who are discriminated against (discriminar). Especially, the notion of humble people and a humbling experience of going to a favela can be found frequently:

> *"Caminhar por uma favela é uma experiência de humildade é um ambiente muito complexo e em constante mudança"* [Walking through a favela is an experience of humbleness; it is a very complex environment and in constant change]

And

> *"Não quero dizer que là não existe tristeza não quero dizer que là não existe pobreza porque favela sem miséria nao é favela"* [I don't want to say that sadness doesn't exist; I don't want to say poverty doesn't exist because a favela without misery is not a favela]

A very distinct cluster of money (dinheiro) also emerges, ascribing different connotations to it. On the one hand, it enables fleeing from misery but it is also associated with alcohol (álcool) abuse and immoral gain.

> *"os ricos fazem campanha contras as drogas mais pro outro lado promovem e ganham muito dinheiro com o alcool que é vendido na favela*" [The rich campaign against drugs but, on the other hand, they promote and gain a lot of money from the alcohol sold in the favela].

Moreover, solidarity, beauty and respect, as well as refuge from discrimination from others, creates humble (humilde) people (povo) in the favela. Out of this community, the upbringing of children has a complexity of its own related to these conditions. Thus, a criança (child) is associated with joy (alegría), purity (pureza) and sorriso (smile) but also with hardship (dificuldade) and the fear of someone's life being cut short in a gunfight (tiroteio).

The criança cluster (child cluster) contains and represents values such as comunidade (community) and esperança (hope), as well as positive and negative connoted words, such as sorriso (smile) and sofrimento (suffering) respectively. A smaller cultura-cluster comprises aspects of education (educação) and intelligence (intêligencia), as well as compromise (compromise).

As one can see, tweets related to these clusters indicate the complexity and interrelatedness of these concepts, connecting childhood, joy and despair:

> *"olho o sorriso da criança que na favela não tem mais esperança de viver tranquilamente"* [I see the smile of a child who does not have any hope of living peacefully in a favela]

> *"sorriso estampadao no rosto dando um rôle na favela"* [A smile embossed on the face is giving a role to the favela]

Figure 2: Portuguese Cluster for All Seasons: Similarity Analysis

Gunfights are related to the police/trafficker (policía/traficante) and comprise drugs (droga), prostitution (prostitução) and execution (execução) in the cluster. Lastly, in this presentation of data, tourism (turismo, turista) emerges as a cluster by itself; however, as is evident, the association with a notion of misery (miséria), which appears throughout the different seasons, did not change.

A branch concerning (sex) tourism and relating to tourism and alcoholism can be found within this cluster.

> *"terra do alcoolismo favela domínio de um turismo sexual"* [land of alcoholism: favela – a dominion of sex tourism]

From analysis of the Portuguese data, it can be said that the favela seems to be the living environment for most of the people contributing to this data set, which is reflected in the multitude, diversity and complexity of this data set. As in real life, all aspects of life are represented and interrelated.

4.3.2 Semantic Similarity Analysis of the English Data Set

Looking at the depiction of all data in the English dataset (192,084 original tweets), it can be said a clear tourism and travel cluster is found, comprising items related to Rocinha (Figure 3). Brazil has hosted several mega events and media outlets reported in English. In relation to resisting re-housing plans to make room for Olympic buildings, a cluster around #vilaautódromo (the favela demolished to accommodate new Olympic buildings) has emerged. Additionally, other clusters include only a discourse about Rocinha, a group to remove stigmata from the favela, as well as a cluster around the term 'paint', representing an initiative to paint favela walls.

> *"Painting revitalizing #brazil slums #travel #ttot #riodejaneiro #expatlife"*

> *"Community local Facebook page coordinator launches #crowdfunding campaign to paint walls in #complexodoalemão".*

In relation to this, an additional cluster was formed around funk and music related to tourism:

> *"favela funk party every Sunday night, we take you there #bealocaltours #bealocal funkparty #bailefunk"*

A police violence cluster was formed, as well as a cluster containing notions around drug trafficking. This cluster can mostly be explained as being the result of news websites' reporting rather than tourists posting their perceptions:

> *"News: this morning residents and police reported a shooting in #morrodafallet, a Santa Teresa community with a #upp"*

Figure 3: English Cluster for All Seasons - Similarity Analysis

Central to the clusters is that items relating to the police are concentrated, such as the military, pacification, shooting, shoot-outs and death. This leads to clusters similar to the Portuguese clusters of childhood and community, with topics within the child cluster revolving around shootings. The community cluster indicates different projects stabilising this community through education, security and own initiatives. Furthermore, the exploratory analysis of the discussions and discourses generated within the two networks reveals digital dialogue about politics (Bastos, Raimundo, & Travitzki, 2013), entertainment (Atefeh & Khreich, 2015), products and services (Chevalier & Mayzlin, 2003) and, eventually, socially-motivated discussions (Inversini et al., 2015). This enabled the researchers to discuss the similarity of the two networks in terms of topics debated.

Finally, for the English cluster, it can be said that despite travel and leisure time clusters representing a major share of the tweets, discussions on civic engagement, injustice and other issues relating to the everyday life worlds of favela residents can also be identified. Therefore, both differences and similarities with the Portuguese data set can be found.

5. Discussion and Conclusions

This research was designed to harness the power of social media in a given developing context to understand intangible issues related with socio-economic development (Pimmer et al., 2012) in a given community. This was done primarily to support the promise of interactive communication for development (Selwyn, 2004) towards generating a better understanding of the voice and the possible value for the community (Couldry, 2010). Social media analysis is very popular in several disciplines but particularly in marketing (e.g. Godey et al., 2016) and politics (Eddington, 2018) above all. However, they could help in supporting local socio-economic development by flagging up issues that are not directly visible and/or explicated. Social media can definitively support a more nuanced view of the needs and wants of local communities by coupling text analysis with network analysis. In accordance with Tacchi (2012), this will overcome a reductionist approach to development, enhancing the value (Couldry, 2010) of voice.

The research was built around twitter.com conversations in an emerging market and methodologically tackled the syntactic analysing (i.e. structure) of the network (Williams et al., 2015) and the semantic (i.e. content) of the narratives (Kozinets et al., 2010) by focusing on internal and external network perspectives (Lipizzi et al., 2016). Twelve months' twitter.com conversations under the hashtag #favela were collected. Language (i.e. English and Portuguese language) and geolocalization (tweets from Brazil) were used as proxy to create two samples; within those samples, two network-based analyses were performed. The first concerned the metadata of information connections aimed at understanding the network structure and the role of key influencers (social network analysis), whilst the second enquiry (semantic similarity analysis) aimed at discovering the main topics discussed within the networks.

From a structure perspective, the analysed networks present the same characteristics of networks already presented in the literature (Gomez Rodriguez et al., 2013; Himelboim, Smith, Rainie, Shneiderman, & Espina, 2017). However, additional insights can be driven by moving from the 3S framework presented by Williams and colleagues (2015); meanwhile, the network scope (geographic range of engaged stakeholders) was controlled by researchers (i.e. the analysed English and Portuguese tweets for the #Favela are from Brazil). The study highlights that:

- In terms of size (volume of tweets), the Portuguese network is larger than the English network and has a higher degree of variation, especially during a hallmark event, such as the carnival in the summer season. Additionally, when looking at the main users and influencers in the networks, it is possible to see that celebrities, sports personalities and ordinary individuals act as hubs (i.e. are highly visible to network members). This is also in line with previous research (Zhang, Moe & Schweidel, 2016). However, it is difficult to find active public figures and/or politicians and institutions and/or organizations within the network. It is quite common for the latter to emerge as hubs, such as during hallmark events (such as carnivals), attracting a significant amount of attention in the given event (Williams et al., 2017); this has not been noted in the analysed network;

- In terms of span (pattern of topic engagement), popular social media topics, such as entertainment (e.g. music, politics and community discourses), are present in the networks. However, socially-motivated discussions emerge in both languages (Inversini

et al., 2015), confirming Nemer's (2016) claim related to the responsible use of digital technologies, especially social media, as well as supporting the notion of voices elaborated by Tacchi (2012).

Following (Kozinets et al., 2010) characteristic of social media discussion, the analysed corpus clearly presents and gives meaning to personal stories of favela dwellers in a given digital location. Additionally, results from the semantic similarity analysis and from the network analysis also confirmed that the communication and topic discussed are deeply affected by norms regulating the given communication space (retweet and mention - Kozinets et al., 2010). What is slightly different from Kozinets and colleagues' (2010) discussion is the fact that analysed messages are not only affected by product and/or service but actually reflect social issues and highlights the presence of socially-motivated discussions (Inversini et al., 2015).

This means that besides traditional topics discussed on social media, the analysed corpus shows that social media can be used to understand social conversations. In fact, the analysed conversations appear to have similar psychological boundaries and motivations with respect to the ones highlighted by Narayan et al. (1999). This was possible thanks to a semantic discussions analysis that overcame the ones based on hashtags (e.g. Eddington, 2018), which is able to discover nuances and meaning clusters' in the text.

Therefore, social media analysis promotes horizontal and participative models of development (Servaes, 2007) and can support the promise of an interactive communication for development (Selwyn 2004). Particularly, these can simplify the process for collecting the voice of the marginalized, offering an interactive listening deck to make a proper transition towards the transformation of voice into an impact in the community (Couldry, 2010). Therefore, by coupling structural analysis (e.g. social network analysis) with semantic analysis, it is possible to examine the depth and breadth of digital and interconnected narratives posted on social media to generate a better understanding of the voice of given communities. Following Couldry (2010), this social media analysis could support voice as a process by studying communities of interest, as well as opinion leaders and/or influencers, in addition to voice as value unfolding frameworks and issues around human life in a marginalized context.

This digitized conceptualization of the voice gives room to the concept of 'e-Voices of the Unheard' to be theorized. Social media host non-traditional forms of data (Blazquez & Domenech, 2018) and can serve as an amplifier for marginalized communities by providing an online space for discussion and engagement. This enables developing community dwellers to attract attention and sustain conversations among publics and counter publics (Jackson & Foucault Welles, 2015) about crucial issues of socio-economic development.

Lastly, this study has some limitations that need to be acknowledged. Firstly, although penetration and adoption of digital technologies is growing in developing and rural areas, not all individuals have access to these media; therefore, e-Voices of the Unheard should be treated as a representation of the needs and wants of the communities. However, it is acknowledged that no strategy could capture all voices within a community. Secondly, although there could ethical concerns about social media discussion harvesting (Williams, Burnap, & Sloan, 2017; Williams et al., 2017), the authors believe that twitter.com provides content published to the internet 'at large' and with no complex privacy settings to bypass (Bruns, Burgess, Crawford, & Shaw, 2012). Therefore, the authors believe that publicly accessible and anonymized information does not bridge any ethical issues (Zimmer & Proferes, 2014).

References

Ahn, Y.-Y., Han, S., Kwak, H., Moon, S., & Jeong, H. (2007). Analysis of Topological Characteristics of Huge Online Social Networking Services. *Proceedings of the 16th International Conference on World Wide Web*, 835–844. https://doi.org/10.1145/1242572.1242685

Akaev, A., Korotayev, A., Issaev, L., & Zinkina, J. (2017). Technological development and protest waves: Arab spring as a trigger of the global phase transition? *Technological Forecasting and Social Change*, *116*, 316–321. https://doi.org/10.1016/j.techfore.2016.08.009

Aksoy, L., van Riel, A., Kandampully, J., Bolton, R. N., Parasuraman, A., Hoefnagels, A., … Komarova Loureiro, Y. (2013). Understanding Generation Y and their use of social media: A review and research agenda. *Journal of Service Management*, *24*(3), 245–267.

Ali, A. H. (2011). Power of Social Media in Developing Nations: New Tools for Closing the Global Digital Divide and Beyond, The. *Harvard Human Rights Journal*, *24*, 185.

Antoniadis, I., & Charmantzi, A. (2016). Social network analysis and social capital in marketing: Theory and practical implementation. *International Journal of Technology Marketing*, *11*(3), 344–359.

Bastos, M. T., Raimundo, R. L. G., & Travitzki, R. (2013). Gatekeeping Twitter: Message diffusion in political hashtags. *Media, Culture & Society*, *35*(2), 260–270. https://doi.org/10.1177/0163443712467594

Bild, D. R., Liu, Y., Dick, R. P., Mao, Z. M., & Wallach, D. S. (2015). Aggregate characterization of user behavior in twitter and analysis of the retweet graph. *ACM Transactions on Internet Technology (TOIT)*, *15*(1), 4.

Blazquez, D., & Domenech, J. (2018). Big Data sources and methods for social and economic analyses. *Technological Forecasting and Social Change*, *130*, 99–113. https://doi.org/10.1016/j.techfore.2017.07.027

Brown, J. S., & Duguid, P. (2001). Knowledge and Organization: A Social-Practice Perspective. *Organization Science*, *12*(2), 198–213. https://doi.org/10.1287/orsc.12.2.198.10116

Bruns, A., Burgess, J. E., Crawford, K., & Shaw, F. (2012). *#qldfloods and @QPSMedia: Crisis Communication on Twitter in the 2011 South East Queensland Floods* [Report]. Retrieved from ARC Centre of Excellence for Creative Industries and Innovation, Queensland University of Technology website: https://eprints.qut.edu.au/48241/

Carley, K., & Palmquist, M. (1992). Extracting, representing, and analyzing mental models. *Social Forces*, *70*(3), 601–636.

Carroll, D. R. (2018). #Palestine2Ferguson a community created through words. *Journal of Information, Communication and Ethics in Society*, *16*(3), 328–337. https://doi.org/10.1108/JICES-03-2018-0026

Castells, M. (2013). *Communication Power*. OUP Oxford.

Chevalier, J. A., & Mayzlin, D. (2003). *The Effect of Word of Mouth on Sales: Online Book Reviews* (Working Paper No. 10148). Retrieved from National Bureau of Economic Research website: http://www.nber.org/papers/w10148

Chu, S.-C., & Kim, Y. (2011). Determinants of consumer engagement in electronic word-of-mouth (eWOM) in social networking sites. *International Journal of Advertising*, *30*(1), 47–75. https://doi.org/10.2501/IJA-30-1-047-075

Clemence, A., Doise, W., & Lorenzi-Cioldi, F. (2014). *The Quantitative Analysis of Social Representations*. Routledge.

Couldry, N. (2010). *Why voice matters—Culture and politics after neoliberalism*. Thousand Oaks, California: Sage Publications.

Culotta, A., & Cutler, J. (2016). Mining brand perceptions from Twitter social networks. *Marketing Science*, *35*(3), 343–362.

Dagron, A. G., & Tufte, T. (2006). *Communication for Social Change Anthology: Historical and Contemporary Readings*. CFSC Consortium, Inc.

Dellarocas, C. (2003). The Digitization of Word of Mouth: Promise and Challenges of Online Feedback Mechanisms. *Management Science*, *49*(10), 1407–1424. https://doi.org/10.1287/mnsc.49.10.1407.17308

DeSanctis, G., & Poole, M. S. (1994). Capturing the complexity in advanced technology use: Adaptive structuration theory. *Organization Science*, *5*(2), 121–147.

Diesner, J., & Carley, K. M. (2010). *A methodology for integrating network theory and topic modeling and its application to innovation diffusion*. 687–692. IEEE.

Dobusch, L., & Schoeneborn, D. (2015). Fluidity, identity, and organizationality: The communicative constitution of Anonymous. *Journal of Management Studies*, *52*(8), 1005–1035.

Eddington, S. M. (2018). The Communicative Constitution of Hate Organizations Online: A Semantic Network Analysis of "Make America Great Again." *Social Media + Society*, *4*(3), 2056305118790763. https://doi.org/10.1177/2056305118790763

Etzioni, A. (1998). *The new golden rule: Community and morality in a democratic society.* (Basic Books).

Fastenberg, D. (2010, October 20). Why Is Twitter So Popular in Brazil? *Time*. Retrieved from http://content.time.com/time/world/article/0,8599,2026442,00.html

Flament, C. (1981). L'analyse de similitude: Une technique pour les recherches sur les représentations sociales. [Similarity analysis: A technique for researches in social representations.]. *Cahiers de Psychologie Cognitive/Current Psychology of Cognition*, *1*(4), 375–395.

Fraser, C., & Villet, J. (1994). *Communication: A key to human development*. Retrieved from http://agris.fao.org/agris-search/search.do?recordID=XF9546741

Friend, A. M., & Rapport, D. J. (1991). Evolution of macro-information systems for sustainable development. *Ecological Economics*, *3*(1), 59–76. https://doi.org/10.1016/0921-8009(91)90048-J

Fuchs, C. (2012). Social media, riots, and revolutions. *Capital & Class*, *36*(3), 383–391. https://doi.org/10.1177/0309816812453613

Gallaugher, J., & Ransbotham, S. (2010). Social Media and Customer Dialog Management at Starbucks. *MIS Quarterly Executive*, *9*(4), 197–212.

Gilbert, E., & Karahalios, K. (2009). Predicting Tie Strength with Social Media. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 211–220. https://doi.org/10.1145/1518701.1518736

Godey, B., Manthiou, A., Pederzoli, D., Rokka, J., Aiello, G., Donvito, R., & Singh, R. (2016). Social media marketing efforts of luxury brands: Influence on brand equity and consumer behavior. *Journal of Business Research*, *69*(12), 5833–5841. https://doi.org/10.1016/j.jbusres.2016.04.181

Gomez Rodriguez, M., Leskovec, J., & Schölkopf, B. (2013). Structure and Dynamics of Information Pathways in Online Media. *Proceedings of the Sixth ACM International Conference on Web Search and Data Mining*, 23–32. https://doi.org/10.1145/2433396.2433402

Hanna, R., Rohm, A., & Crittenden, V. L. (2011). We're all connected: The power of the social media ecosystem. *Business Horizons*, *54*(3), 265–273. https://doi.org/10.1016/j.bushor.2011.01.007

Hansen, D., Shneiderman, B., & Smith, M. A. (2010). *Analyzing Social Media Networks with NodeXL: Insights from a Connected World*. Morgan Kaufmann.

Hays, S., Page, S. J., & Buhalis, D. (2013). Social media as a destination marketing tool: Its use by national tourism organisations. *Current Issues in Tourism*, *16*(3), 211–239. https://doi.org/10.1080/13683500.2012.662215

Haythornthwaite, C. (2001). Tie strength and the impact of new media. *International Conference on System Sciences*. Presented at the Hawaii. Hawaii.

Hennig-Thurau, T., Gwinner, K. P., Walsh, G., & Gremler, D. D. (2004). Electronic word-of-mouth via consumer-opinion platforms: What motivates consumers to articulate themselves on the Internet? *Journal of Interactive Marketing*, *18*(1), 38–52. https://doi.org/10.1002/dir.10073

Himelboim, I., Smith, M. A., Rainie, L., Shneiderman, B., & Espina, C. (2017). Classifying Twitter Topic-Networks Using Social Network Analysis. *Social Media + Society*, *3*(1), 2056305117691545. https://doi.org/10.1177/2056305117691545

Himelboim, I., Smith, M., & Shneiderman, B. (2013). Tweeting Apart: Applying Network Analysis to Detect Selective Exposure Clusters in Twitter. *Communication Methods and Measures*, *7*(3–4), 195–223. https://doi.org/10.1080/19312458.2013.813922

Hinz, O., Schulze, C., & Takac, C. (2014). New product adoption in social networks: Why direction matters. *Journal of Business Research*, *67*(1), 2836–2844.

Hoffman, D. L., & Novak, T. P. (1996). Marketing in hypermedia computer-mediated environments: Conceptual foundations. *Journal of Marketing*, *60*(3), 50.

Holt, D. (2016). Branding in the Age of Social Media. *Harvard Business Review*, *94*(3), 13.

Honneth, A. (1996). *The Struggle for Recognition: The Moral Grammar of Social Conflicts*. MIT Press.

Inversini, A., Sage, R., Williams, N., & Buhalis, D. (2015). The Social Impact of Events in Social Media Conversation. In I. Tussyadiah & A. Inversini (Eds.), *Information and Communication Technologies in Tourism 2015* (pp. 283–294). https://doi.org/10.1007/978-3-319-14343-9_21

Isa, D., & Himelboim, I. (2018). A Social Networks Approach to Online Social Movement: Social Mediators and Mediated Content in #FreeAJStaff Twitter Network. *Social Media + Society*, *4*(1), 2056305118760807. https://doi.org/10.1177/2056305118760807

Jackson, S. J., & Foucault Welles, B. (2015). Hijacking #MYNYPD: Social Media Dissent and Networked Counterpublics. *Journal of Communication*, *65*(6), 932–952. https://doi.org/10.1111/jcom.12185

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons*, *53*(1), 59–68. https://doi.org/10.1016/j.bushor.2009.09.003

Khondker, H. H. (2011). Role of the New Media in the Arab Spring. *Globalizations*, *8*(5), 675–679. https://doi.org/10.1080/14747731.2011.621287

Kim, S. (Julia), Pai, S., Bickart, B. A., & Brunel, F. F. (2014). *How Social Media Influencers Build a Brand Following by Sharing Secrets* (SSRN Scholarly Paper No. ID 2549040). Retrieved from Social Science Research Network website: http://papers.ssrn.com/abstract=2549040

Kozinets, R., de Valck, K., Wojnicki, A. C., & Wilner, S. (2010). Networked Narratives: Understanding Word-of-Mouth Marketing in Online Communities. *Journal of Marketing*, *74*(2), 71–89. https://doi.org/10.1509/jmkg.74.2.71

Kruikemeier, S. (2014). How political candidates use Twitter and the impact on votes. *Computers in Human Behavior*, *34*, 131–139. https://doi.org/10.1016/j.chb.2014.01.025

Lahuerta-Otero, E., & Cordero-Gutiérrez, R. (2016). Looking for the perfect tweet. The use of data mining techniques to find influencers on twitter. *Computers in Human Behavior*, *64*, 575–583. https://doi.org/10.1016/j.chb.2016.07.035

Laurell, C., & Sandström, C. (2018). Comparing coverage of disruptive change in social and traditional media: Evidence from the sharing economy. *Technological Forecasting and Social Change*, *129*, 339–344. https://doi.org/10.1016/j.techfore.2017.09.038

Lebart, L., Salem, A., & Berry, L. (1998). Cluster Analysis of Words and Texts. In *Exploring Textual Data* (pp. 81–100). Springer.

Lee, H., Lee, D. I., Kim, T., & Lee, J. (2013). The moderating role of socio-semantic networks on online buzz diffusion. *Journal of Business Research*, *66*(9), 1367–1374.

Leung, D., Law, R., van Hoof, H., & Buhalis, D. (2013). Social Media in Tourism and Hospitality: A Literature Review. *Journal of Travel & Tourism Marketing*, *30*(1–2), 3–22. https://doi.org/10.1080/10548408.2013.750919

Levidow, L., & Upham, P. (2017). Socio-technical change linking expectations and representations: Innovating thermal treatment of municipal solid waste. *Science and Public Policy*, *44*(2), 211–224. https://doi.org/10.1093/scipol/scw054

Lindsay, A., Kaykas-Wolff, J., & Mathwick, C. (2015). Key Influencers: Locating, Measuring, and Creating Programs to Influence Social Media Influencers. In D. R. Deeter-Schmelz (Ed.), *Proceedings of the 2010 Academy of Marketing Science (AMS) Annual Conference* (pp. 1–1). https://doi.org/10.1007/978-3-319-11797-3_1

Lipizzi, C., Iandoli, L., & Marquez, J. E. R. (2016). Combining structure, content and meaning in online social networks: The analysis of public's early reaction in social media to newly launched movies. *Technological Forecasting and Social Change*, *109*, 35–49. https://doi.org/10.1016/j.techfore.2016.05.013

Lister, R. (2004). *Poverty*. Cambridge:Polity Press.

Loader, B. D., & Mercea, D. (2011). Networking Democracy? *Information, Communication & Society*, *14*(6), 757–769. https://doi.org/10.1080/1369118X.2011.592648

Lu, W., & Stepchenkova, S. (2015). User-Generated Content as a Research Mode in Tourism and Hospitality Applications: Topics, Methods, and Software. *Journal of Hospitality Marketing & Management*, *24*(2), 119–154. https://doi.org/10.1080/19368623.2014.907758

Mangold, W. G., & Faulds, D. J. (2009). Social media: The new hybrid element of the promotion mix. *Business Horizons*, *52*(4), 357–365. https://doi.org/10.1016/j.bushor.2009.03.002

Mansell, R. (2011). Power and Interests in Information and Communication and Development: Exogenous and Endogenous Discourses in Contention. *Journal of International Development*, *26*(1), 109–127. https://doi.org/10.1002/jid.1805

McLennan, S. J. (2015). Techno-optimism or Information Imperialism: Paradoxes in Online Networking, Social Media and Development. *Information Technology for Development*, *0*(0), 1–20. https://doi.org/10.1080/02681102.2015.1044490

McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a Feather: Homophily in Social Networks. *Annual Review of Sociology*, *27*, 415–444.

Monroy-Hernández, A., & Spiro, E. (2013, July 4). How Brazilian protesters are using Twitter. *The Guardian*. Retrieved from https://www.theguardian.com/news/datablog/2013/jul/04/brazilian-protesters-twitter-microsoft

Mützel, S. (2009). Networks as Culturally Constituted Processes A Comparison of Relational Sociology and Actor-network Theory. *Current Sociology*, *57*(6), 871–887. https://doi.org/10.1177/0011392109342223

Narayan-Parker, D. (2000). *Crying Out for Change: Voices of the Poor*. World Bank Publications.

Nemer. (2015). Online Favela: The Use of Social Media by the Marginalized in Brazil—Information Technology for Development -. *Information Technology for Development*. Retrieved from http://www.tandfonline.com/doi/abs/10.1080/02681102.2015.1011598#.V3pMh5MrL-Y

Nemer, D. (2013). *Favela Digital: The Other Side of Technology*. Vitoria, Brazil: Editora GSA.

Nemer, David. (2015). Online Favela: The Use of Social Media by the Marginalized in Brazil. *Information Technology for Development*, *0*(0), 1–16. https://doi.org/10.1080/02681102.2015.1011598

Nemer, David. (2016). Rethinking social change: The promises of Web 2.0 for the marginalized. *First Monday*, *21*(6). https://doi.org/10.5210/fm.v21i6.6786

O'Reilly, T. (2007). *What is Web 2.0: Design Patterns and Business Models for the Next Generation of Software* (SSRN Scholarly Paper No. ID 1008839). Retrieved from Social Science Research Network website: http://papers.ssrn.com/abstract=1008839

Pang, N., & Ng, J. (2016). Twittering the Little India Riot: Audience responses, information behavior and the use of emotive cues. *Computers in Human Behavior*, *54*, 607–619. https://doi.org/10.1016/j.chb.2015.08.047

Papadopoulos, S., Kompatsiaris, Y., Vakali, A., & Spyridonos, P. (2012). Community detection in Social Media. *Data Mining and Knowledge Discovery*, *24*(3), 515–554. https://doi.org/10.1007/s10618-011-0224-z

Parent, M., Plangger, K., & Bal, A. (2011). The new WTP: Willingness to participate. *Business Horizons*, *54*(3), 219–229. https://doi.org/10.1016/j.bushor.2011.01.003

pewresearch.org. (2018). Social Media Use Continues to Rise in Developing Countries. Retrieved December 3, 2019, from Pew Research Center's Global Attitudes Project website: https://www.pewresearch.org/global/2018/06/19/social-media-use-continues-to-rise-in-developing-countries-but-plateaus-across-developed-ones/

Phua, J., Jin, S. V., & Kim, J. (Jay). (2017). Uses and gratifications of social networking sites for bridging and bonding social capital: A comparison of Facebook, Twitter, Instagram, and Snapchat. *Computers in Human Behavior*, *72*, 115–122. https://doi.org/10.1016/j.chb.2017.02.041

Pimmer, C., Linxen, S., & Gröhbiel, U. (2012). Facebook as a learning tool? A case study on the appropriation of social network sites from mobile phones in developing countries. *British Journal of Educational Technology*, *43*(5), 726–738. https://doi.org/10.1111/j.1467-8535.2012.01351.x

Ratinaud, P., & Marchand, P. (2015). Des mondes lexicaux aux représentations sociales. Une première approche des thématiques dans les débats à l'Assemblée nationale (1998-2014). *Mots. Les langages du politique*, (108), 57–77.

Rauchfleisch, A., & Kovic, M. (2016). The Internet and Generalized Functions of the Public Sphere: Transformative Potentials From a Comparative Perspective. *Social Media+ Society*, *2*(2), 2056305116646393.

Rega, I., Vannini, S., Fino, E., & Cantoni, L. (2013). Exploring the Meanings of Community Multimedia Centers in Mozambique: A Social Representation Perspective. *Information Technologies & International Development*, *9*(4), 35–54.

Scott, N., Cooper, N. S. R. B. C., & Baggio, R. (2008). *Network Analysis and Tourism*. Channel View Publications.

Sedereviciute, K., & Valentini, C. (2011). Towards a More Holistic Stakeholder Analysis Approach. Mapping Known and Undiscovered Stakeholders from Social Media. *International Journal of Strategic Communication*, *5*(4), 221–239. https://doi.org/10.1080/1553118X.2011.592170

Selwyn, N. (2004). Reconsidering Political and Popular Understandings of the Digital Divide. *New Media & Society*, *6*(3), 341–362. https://doi.org/10.1177/1461444804042519

Servaes, J. (2007). *Communication for Development and Social Change*. SAGE Publications India.

Shu, W., & Chuang, Y. (2011). The perceived benefits of six-degree-separation social networks. *Internet Research*, *21*(1), 26–45. https://doi.org/10.1108/10662241111104866

Siapera, E., Boudourides, M., Lenis, S., & Suiter, J. (2018). Refugees and Network Publics on Twitter: Networked Framing, Affect, and Capture. *Social Media + Society*, *4*(1), 2056305118764437. https://doi.org/10.1177/2056305118764437

Smith, M., & Elder, L. (2010). Open ICT Ecosystems Transforming the Developing World. *Information Technologies & International Development*, *6*(1), 65–71.

Statista. (2019). Countries with most Twitter users 2019. Retrieved December 3, 2019, from Statista website: https://www.statista.com/statistics/242606/number-of-active-twitter-users-in-selected-countries/

Stewart, L. G., Arif, A., Nied, A. C., Spiro, E. S., & Starbird, K. (2017). Drawing the Lines of Contention: Networked Frame Contests Within #BlackLivesMatter Discourse. *Proc. ACM Hum.-Comput. Interact.*, *1*(CSCW), 96:1–96:23. https://doi.org/10.1145/3134920

Stieglitz, S., & Dang-Xuan, L. (2012). Political Communication and Influence through Microblogging–An Empirical Analysis of Sentiment in Twitter Messages and Retweet Behavior. *2012 45th Hawaii International Conference on System Science (HICSS)*, 3500–3509. https://doi.org/10.1109/HICSS.2012.476

Tacchi, J. (2008). Voice and poverty. *Media Development*, *1*(1).

Tacchi, Jo. (2012). Open content creation: The issues of voice and the challenges of listening. *New Media & Society*, *14*(4), 652–668. https://doi.org/10.1177/1461444811422431

Tsagkias, M., de Rijke, M., & Weerkamp, W. (2011). Linking Online News and Social Media. *Proceedings of the Fourth ACM International Conference on Web Search and Data Mining*, 565–574. https://doi.org/10.1145/1935826.1935906

van Meter, K. M., & de Saint Léger, M. (2008). Co-Word Text Analysis Applied to Political Science: 2006 International Political &" Parapolitical" Headlines. *Bulletin de Méthodologie Sociologique*, *97*(1), 18–38.

Waisbord, S. (2008). The institutional challenges of participatory communication in international aid. *Social Identities*, *14*(4), 505–522. https://doi.org/10.1080/13504630802212009

Williams, M. L., Burnap, P., & Sloan, L. (2017). Towards an Ethical Framework for Publishing Twitter Data in Social Research: Taking into Account Users' Views, Online Context and Algorithmic Estimation. *Sociology*, *51*(6), 1149–1168. https://doi.org/10.1177/0038038517708140

Williams, N. L., Inversini, A., Buhalis, D., & Ferdinand, N. (2015). Community crosstalk: An exploratory analysis of destination and festival eWOM on Twitter. *Journal of Marketing Management*, *0*(0), 1–28. https://doi.org/10.1080/0267257X.2015.1035308

Wong, D. F. K., Li, C. Y., & Song, H. X. (2007). Rural migrant workers in urban China: Living a marginalised life. *International Journal of Social Welfare*, *16*(1), 32–40. https://doi.org/10.1111/j.1468-2397.2007.00475.x

Wu, S., Hofman, J. M., Mason, W. A., & Watts, D. J. (2011). *Who says what to whom on twitter*. 705–714. ACM.

Yardi, S., & Boyd, D. (2010). Dynamic debates: An analysis of group polarization over time on twitter. *Bulletin of Science, Technology & Society*, *30*(5), 316–327.

Zaglia, M. E. (2013). Brand communities embedded in social networks. *Thought Leadership in Brand Management II*, *66*(2), 216–223. https://doi.org/10.1016/j.jbusres.2012.07.015

Zhang, Y., Moe, W. W., & Schweidel, D. A. (2016). Modeling the role of message content and influencers in social media rebroadcasting. *International Journal of Research in Marketing*. https://doi.org/10.1016/j.ijresmar.2016.07.003

Zimmer, M., & Proferes, N. J. (2014). A topology of Twitter research: Disciplines, methods, and ethics. *Aslib Journal of Information Management*, *66*(3), 250–261. https://doi.org/10.1108/AJIM-09-2013-0083