

# **Are Social Media Challenging Politics? Interaction in Catalan Parties' Facebook Pages and among Catalan MPs' Twitter Accounts**

Doctoral Thesis Dissertation in Political Science

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# TABLE OF CONTENT

|  |            |
|--|------------|
| <b>EXTENDED ABSTRACT .....</b>   | <b>IV</b>  |
| <b>ACKNOWLEDGEMENTS .....</b>  | <b>VII</b> |
| <b>CHAPTER I: INTRODUCTION .....</b>   | <b>9</b>   |
| 1.1.-SUMMARY .....   | 9          |
| 1.2.-METHODS .....   | 21         |
| 1.3.-POLITICAL AND TECHNOLOGICAL CONTEXTS: THE CATALAN CASE.....   | 24         |
| 1.3.1.- <i>The political context</i> .....   | 24         |
| 1.3.2.- <i>The technological context</i> .....   | 28         |
| 1.4.-CONCLUSIONS .....   | 33         |
| <b>CHAPTER II: INTERACTION IN CATALAN PARTIES' FACEBOOK PAGES .....</b>  | <b>35</b>  |
| 2.1.-INTRODUCTION.....   | 35         |
| 2.2.-PREVIOUS STUDIES ON PARTIES' BEHAVIOUR ON THE WEB 1.0 AND 2.0 .....   | 36         |
| 2.2.1.- <i>Changing relationships between parties, members and the public through the Internet</i> .....                                     | 38         |
| 2.2.2.- <i>Characteristics of the parties influencing their use of the internet</i> .....  | 39         |
| 2.2.3.- <i>Political parties and social media</i> .....  | 41         |
| 2.3.-METHODS AND HYPOTHESES .....  | 42         |
| 2.4.-ANALYSES AND FINDINGS .....   | 46         |
| 2.5.-DISCUSSION AND CONCLUSIONS .....  | 58         |
| <b>CHAPTER III: POLITICAL INFLUENTIALS IN THE CATALAN PARLIAMENTARIAN FOLLOWING-FOLLOWER<br/>TWITTER NETWORK .....</b>                       | <b>63</b>  |
| 3.1.-INTRODUCTION.....   | 63         |
| 3.2.-PREVIOUS STUDIES ON PARLIAMENTARIAN NETWORKS AND THE USE OF TWITTER BY MPS.....   | 64         |
| 3.2.1.- <i>Parliamentarian networks</i> .....  | 66         |
| 3.2.2.- <i>Use of Twitter by members of parliament</i> .....   | 70         |
| 3.3.-METHODS AND HYPOTHESES .....  | 72         |
| 3.4.-AN EXAMPLE OF AFFILIATION NETWORK: THE CATALAN MPS' FOLLOWING-FOLLOWER TWITTER NETWORK .....  | 76         |
| 3.5.-ANALYSES AND FINDINGS.....  | 81         |
| 3.6.-DISCUSSION AND CONCLUSIONS.....   | 88         |
| <b>CHAPTER IV: COMMUNICATION FLOWS, POLITICAL POLARIZATION AND OPINION LEADERS IN THE<br/>CATALAN PARLIAMENTARIANS' TWITTER NETWORK.....</b> | <b>93</b>  |
| 4.1.-INTRODUCTION.....   | 93         |
| 4.2.-PREVIOUS STUDIES ON POLITICAL POLARIZATION AND OPINION LEADERS IN TWITTER NETWORKS.....   | 94         |
| 4.2.1.- <i>Political Polarization on Twitter</i> .....   | 94         |
| 4.2.2.- <i>Opinion leaders in Twitter networks</i> .....   | 96         |
| 4.3.-METHODS AND HYPOTHESES .....  | 99         |
| 4.4.-FINDINGS .....  | 103        |
| 4.4.1.- <i>Political Polarization</i> .....  | 103        |
| 4.4.2.- <i>Opinion Leaders</i> .....   | 107        |
| 4.5.-DISCUSSION AND CONCLUSIONS.....   | 116        |
| <b>CONCLUSIONS.....</b>  | <b>119</b> |

|   |            |
|---|------------|
| <b>BIBLIOGRAPHY</b> .....   | <b>127</b> |
| <b>APPENDICES</b> .....   | <b>144</b> |
| APPENDIX I: DESCRIPTION OF VARIABLES AND CODIFICATION .....                                     | 144        |
| APPENDIX II: THE 26 OR 27 PARLIAMENTARIANS WITH HIGHER IN-DEGREE AND BETWENEES CENTRALITY ..... | 146        |
| APPENDIX III: DESCRIPTION OF VARIABLES AND CODIFICATION .....                                   | 147        |

*To all those who do not have the means to afford Education*

## **Extended abstract**

Web 2.0 gave room for the appearance of a new realm in Politics: the social media political arena. Parties and their representatives understood that social networking sites could give them an advantage over their competitors and adopted these new Information and Communication Technologies (ICTs). However, the adaptation of political parties and their representatives to this new media environment has followed different paths and rhythms depending on their goals, organization, ideology, power situation and electoral strength.

This research focuses on sorting out plausible and refutable explanations of parties' and their representatives' interaction on Facebook and Twitter. It tries to answer a simple and clear question: Are social media challenging Politics? In doing so, it addresses previous studies on parties and their representatives' adaptation and use of ICTs and social media, and on online political networks. The dissertation proposes to answer that question by bridging statistical and social network methods.

The dissertation is composed of four chapters. Chapter 1 introduces the theoretical background, the research questions and the methods of the research. It concludes with some explanations regarding why Catalonia was chosen as a case study. Chapter 2 investigates the relationship between Catalan parties' with parliamentary representation (CIU, ERC, PSC, PP, ICV-EUiA, C's and CUP) main characteristics, their

Facebook posting behavior and the responses of their Facebook followers to these posts. The study builds on empirical data of Catalan parties' official Facebook pages and on the analysis of their statuses and posts. The data sustain that Catalan parties' characteristics (party size, institutionalization, centralization of decisions, left-right ideology and national identification) in conjunction with issues of the Catalan political agenda have an influence over their posting behavior on Facebook and mold the reactions (comments, likes and shares) of their Facebook followers to these posts.

Chapter 3 aims to ascertain if social media are changing party politics and leadership in communication flows in Parliament. To do this, a social network analysis of relationships (following-follower) between Catalan parliamentarians with Twitter accounts (115 of the 135 members) was carried out to reveal the political influentials of the network. Then, regression analyses were done to uncover the factors behind the influencers' centrality position in the network. The findings sustain that while the deputies' brokerage position is only explained by their network behavior, the following relations among the parliamentarians are indeed determined by their political position.

Chapter 4 seeks to test if Twitter is opening communication flows between parties and paving the way for the appearance of new opinion leaders or if it is reducing them to representatives of the same party or ideology and empowering party leaders. The study is based on a dataset spanning from 1 January 2013 to 31 March 2014 which covers all *relationships* (4,516), *retweets* (6,045) and *mentions* (19,507) of Catalan parliamentarians. The data sustain that the political polarization of Catalan parliamentarians' Twitter flows is deeper in the relationship and retweet networks

than it is in the mention and that despite the centrality of party leaders in those communication flows, other parliamentarians are taking the floor and becoming new opinion leaders.

As a result, the thesis as a whole advances the research of the factors influencing parties and their representatives' interactions on social media. The dissertation shows that parties and their representatives' interactions on social media depend on contextual, organizational, ideological, electoral and network factors. Also, the dissertation's findings points to the fact that social media are opening a new political arena in which new opinion leaders are taking the floor and competing with parties' leaderships. In short, this thesis corroborates that social media are challenging Politics by opening a new online political arena within which parties and their representatives' are maneuvering to guarantee their political survival.

## Acknowledgements

This thesis represents my passion for Politics. It is a milestone in my life as a political scientist. The thesis presents the lessons learned from more than 10 years in understanding the relationships between Information and Communication Technologies and political actors. This thesis is a representation of my insatiable thirst for knowledge.

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# Chapter I: Introduction

## 1.1.-Summary

Political communication between parties, their representatives and the general public has mutated with the appearance of new forms of communication technologies. The controversy regarding parties and their representatives' political communication changes due to new channels of communication was given a boost with the upsurge of the Internet and Information and Communication Technologies (ICTs).

The debate on the capacity of Information and Communication Technologies on changing Politics emerged since the appearance of the web 1.0. Cyber-pessimist argued that the Internet will simply provide a new forum of deliberation and participation without changing the pillars of the political process (Davis, 1999) or that it could diminish collective action (Lofgren & Smith, 2003). On the other hand, cyber-optimist arguments pointed to the capacity of the Internet to reinforce party democracy, strength the links between parties, their members and the citizenry, and deter ramping disengagement of the electorate (Rheingold, 1993; Negroponte, 1995; Margetts, 2001; Heidar & Saglie, 2003). Nonetheless, the research that followed demonstrated that for most parties, party websites were only another one-way communication strategy of their political communication repertoire and that they did scarce use of the intra-party and extra-party linking opportunities offered by ICTs in order to interact with their members and reach the electorate (Ward & Gibson, 1999;

Bimber & Davis, 2003; Gibson et al., 2003; Lusoli & Ward, 2004; Pedersen & Saglie, 2005; Vissers, 2009).

The advent of the Web 2.0 (O'Reilly, 2005) opened a new dimension in the possibilities offered by ICTs to political parties and their representatives. The changing role of the citizenry from political information consumers to political information co-producers (Rommele & Copeland, 2009) blurs parties' organizational capacity to control the one-way information flows which characterized the web 1.0, thereby triggering multiple and unexpected consequences on parties' relations with their members and voters.

The Internet and the social networking sites offer to political parties an open window to blur the classical party strategy built on a sharp difference between their members and the citizenry (Margetts, 2001; Gibson et al., 2003; Löfgren, 2003) and add new technological resources for their electoral struggle. In this context, parties are pushed into using ICTs in order to reach new electorate, to increase their membership or to mobilize their militants and sympathizers by improving their participatory tools. Nonetheless, there are some impediments to the parties' adaptation to the ICTs such as the organizational barriers, the risk of factionalism and the fear of the leaders to lose control over militancy (Padró-Solanet, 2009).

It is in this new Internet mediated context in which some authors started to question the validity of Olson's collective action rationale in explaining the 21<sup>st</sup> century political activism. Bimber et al., (2005; 2012) were among the first who worked on sorting out the particular characteristics framing organizations' behavior in the network society (Castells, 2000). They pointed to the necessity to take into account the socio-

technological context in which organizations are embedded. Also, they stated that the organizations capacity to adapt to the new Internet environment could be understood as one of the main crucial challenges that they faced, for it unleashes a revolutionary change: the pressures for mutation from hierarchical structures to network organizations which place power and agency at the margins of the networks, in the hands of individuals, rather than in central locations like leaders or formal organizations. Along these lines, Bennett and Segerberg (2012) go a step further and they tried to update the pillars of Olson's collective action by pointing the appearance of a new "Connective Action". According to these authors, in contrast to traditional forms of collective action the logic of "Connective Action" is derived from beliefs in individuality and distrust of hierarchy and authority, a desire to be inclusive, and the availability of open technologies. With Internet-mediated communication technologies people contribute to movements through personalized expressions, rather than group actions that coalesce around collective identities. This high level of personalization allows individuals to connect in flexible ways, adapting political movements to fit their own lifestyles, beliefs, and biographical meanings. Ideology and shared identity become subordinate to individuality and expression. Communication becomes then the basic form of organization, replacing hierarchical structures and professional leaders. However, Bennett and Segerberg also recognize that in many situations standard models of collective action coexist with connective action. In brief, as Bennett and Segerberg put out:

"In place of the initial collective action problem of getting the individual to contribute, the starting point of connective action is the self-motivated (though

not necessarily self-centered) sharing of already internalized or personalized ideas, plans, images and resources with networks of others. This 'sharing' may take place in networking sites such as Facebook or via more public media such as Twitter and Youtube through, for example, comments and retweets" (Bennett & Segerberg, 2012, p. 753).

It is in this in-between techno-political context that this dissertation should be positioned and where it can make its more relevant contributions. And I use the term in-between because I do not think neither that a new "Connective Action" is replacing Olson's collective action nor that Olson's half a century ago theoretical pillars are able to give plausible answers to the present networked political activism. What I will show in this dissertation is that organizations still have a lot to say in facilitating individuals' networked political activism but that individuals' information power is perhaps today highest than ever and that this factor increases their capacity to influence or even guide the communications of the organizations to which they pertain or are attentive to. That is, the networked and personalized political actions triggered by social media seem to be shaking our Political Science theoretical pillars thereby obliging us to go a step further in conceptualizing and interpreting the internet mediated sociopolitical environment in which political actors are embedded.

Specifically, this dissertation will study Catalan parties and their representatives' behavior on Facebook and Twitter. The choice of these two social media has not been arbitrary but based on several factors: Firstly, Facebook and Twitter are widely used by Catalan parties, their representatives and the Catalan citizenry. Secondly, the disparate

interactive and technical elements of Facebook and Twitter permit testing the effects of the personalized network action structures by studying the power that parties' still retain in their communications on their Facebook pages and operating within a more decentralized social media like Twitter. Thirdly, parties and their representatives' followers on Facebook and Twitter tend to respond to different online behaviors, thereby helping us to analyze from multiple angles the complex phenomena addressed by this dissertation. Lastly, Facebook and Twitter are the most studied social media from a Political Science point of view due to their relevance in terms of parties and their representatives' new communication logics and organizational effects.

Taking into account all these elements, in 2012 I started to research parties and their representatives' use of social media by studying the behavior of Catalan parties on their Facebook pages. At that time parties were still embedded in a transitional period from Web 1.0 to Web 2.0 which means that Political Science research and literature about party behavior on Facebook was not as abundant as it is today. Nonetheless, the analyses of the parties' behavior on the Web 1.0 have been extremely useful for drawing some theoretical and methodological insights in order to tackle parties' behavior on Facebook. Among these works (Gibson & Ward, 1999; Margetts, 2001; Heidar & Saglie, 2003; Lusoli & Ward, 2004; Vissers, 2009) I found those which pointed out the role played by parties' goals (Gibson & Römmele, 2003; Römmele, 2003) and their organizational characteristics (Padró-Solanet & Cardenal, 2008; Cardenal, 2011; Wall & Sudulich, 2011) on their online behavior to be the most revealing. The reader will later be presented with a discussion about why and how these works inspired my investigation (Chapter 2).

As I have already mentioned, I started this dissertation when works approaching the relations between social media and parties were scarce, nonetheless, this observation does not imply that political scientists did not plunge in that stream of research. Some authors investigated the effects of social media on parties' organizations, specifically, on parties' hierarchies (Lynch & Hogan, 2012; Gustaffson, 2012). Others studied the particularities of Facebook usage by politicians and its consequences for their relations with party members and the electorate (Skovsgaard & Van Dalen, 2013; Larsson & Klasnes, 2014). Lastly, some works analyzed parties and their social media followers Facebook use in the contexts of political campaigns (Klinger, 2013; Gibson, 2013). All in all, these works have tackled multiple and diverse facets of party behavior on Facebook, yet this dissertation aims to contribute to the previous research on the field by carrying out a deep analysis of the effects of parties' characteristics, and the cleavages within the party system in which parties operate, on their behavior in Facebook. That is, on the one hand, this investigation will update the analysis of the role played by party characteristics in the transition from the Web 1.0 to the Web 2.0; on the other, it will add the cleavages of the party system as explanatory variables in order to take into account the contextual factors which are so characteristics of the Political Science discipline.

In sum, the investigation that I will carry out on party behavior on Facebook aims to complement the majority of studies on the field, which seem to have underestimated the effects of party characteristics and their position on the cleavages of their respective party systems on parties' posting behavior and the responses of their

Facebook followers to these posts. Specifically, the research question that I will try to answer is:

- RQ1: How do party characteristics and their position on the cleavages of their respective party system affect both posting behavior on Facebook and the responses by their Facebook followers to these posts?

It was during the process of analyzing Catalan parties' Facebook pages that I came to the conclusion that, in order to give a better account of the effects of social media in Catalan Politics, I would also have to study Catalan parties and their representatives' behavior on Twitter. The reasons behind that acknowledgment were multiple and diverse, yet they could be narrowed down to three research aspects: Firstly, the technological infrastructure behind Facebook facilitates a two-way communication between page owners (through posts) and their followers (who can like, share and comment on those posts), but the initiative of the communicating mainly depends on page owners' willingness to post. That is, in the specific political scenario of Catalan Politics, in principle, Catalan parties could permit to their followers to initiate a post on their Facebook pages, but only two of them (CUP and C'S) did so during the study period. Furthermore, user posts within a Facebook page are relegated to a marginal frame. It can therefore be stated that the technological characteristics of that social medium empowers the transmitter (parties) of the message (post) over the receivers (followers) on the conduction of the communications flows. Consequently, I felt the necessity to investigate other social media with different technical specificities in



which the communication threats could be initiated either by parties or followers, that is, a more non-restrictive, horizontal and open communication channel than that provided by Facebook pages. Secondly, the interaction in parties Facebook pages is mediated by parties' communication departments whereas in other less circumscribed social media such as Twitter there is no mediation of any kind between the nodes of the network. I therefore assumed that the decentralized communication logic behind Twitter could pave the way for the appearance of new opinion leaders in Catalan Politics who may have different characteristics than those of the formal party leaders. Lastly, amidst a context of a deep economic crises and independence claims, the Catalan civil and social movements' appropriation and use of a variety of social media as political contestation tools pushed parties and their representatives to integrate and engage with the Twitter cyber sphere. In that regard, I found the Catalan Parliament to be a particularly interesting context due to the extraordinary high presence of Catalan deputies on Twitter (85% of their members) in comparison to those in other Western parliaments. All in all, these factors pushed me to enlarge the research beyond parties' Facebook pages and add the analysis of Catalan politicians' use of Twitter.

I started the analysis of the effects of Twitter on the Catalan political realm by paying attention to the previous research on the field. The studies on the relation between Politics and Twitter are very recent, having followed an exponential increase after Barack Obama's 2008 victory. From that moment a first stream of research appeared that studied the effects of Twitter use by parties and candidates in electoral campaigns. The studies on the role of Twitter in electoral campaigns covered many facets such as parties and candidates use of Twitter during the political campaigns

(Hendrick & Denton, 2010; William & Gulati, 2012; Aman, 2010; Izquierdo, 2012; Gibson, 2013), Twitter capacity to forecast the elections' results (Tumasjan et al, 2010; Aragón et al, 2011), or the effects of network movements on the candidates' use of Twitter during electoral campaigns (Esteve, 2015). In short, electoral campaigns and the role played by social media in these political contests have always caught the attention of political scientists' researches. However, over time and in parallel with the increasing technological capacity to gather incredible amount of data from Twitter users, researchers have explored other political aspects related to parties and their candidates' use of Twitter. To the purposes of this research I will only pay attention to some of them, yet I recommend the reader to take a look at literature covering those aspects related to the relation between Twitter and Politics such as virality issues (Bakshy et al, 2012; Nahon & Hemsley, 2013) or the role played by social media in the social movements' networked political activism (Castells, 2012; Lotan, 2012; Bennett & Segerberg, 2012).

I started the analysis of Twitter by studying the core components of this social medium from a social network analysis perspective in order to understand its effects on the Catalan political scenario. I jumped on network analysis without being aware of the research "Pandora box" that I was opening. I still remember the advice of my Director on that regard, yet I was brave, perhaps too much, and my insatiable thirst for knowledge pushed me in that direction.

For several decades, before the upsurge of the Internet, social scientists from structuralist and relational perspectives have studied networks of political or social actors in order to detect the relationships of influence, power and dominance that

pervaded among them (Laumann & Pappi, 1976; Freeman, 1979; Knoke, 1994; Diani, 2003; Knoke & Yang, 2008). However, the emergence of social media and the technological capacity to gather huge amount of data in short period of time paved the way for the revival of social network analysis as a method to study social relations in Internet mediated networks.

Social network analysis has been used to reveal multiple facets of the interactions among Twitter nodes in online political networks. In general terms, the streams of research of the field have covered (a) the structural characteristics of Twitter online political networks (Verwig, 2012; Smith et al., 2014); (b) the role of social networks in information diffusion or contagion (Bakshy et al., 2012; Paranyushkin, 2012); (c) the political polarization in Twitter networks (Yardi & Bold, 2010; Conover et al, 2011; Himbelboim, 2012; Yoon & Park, 2014); and (d) the opinion leaders of Twitter political networks (Dubois & Gaffney, 2014; Xu et al., 2014). Keeping the previous research in mind, I asked myself which may be the particular Catalan political scenario in which to conduct a social network analysis of Twitter relations among Catalan politicians and after numerous coffees, seminars and talks with my Director and other colleagues I concluded that the Twitter network of Catalan parliamentarians was the most appropriated to my research aims for, on the one hand, the relations among MPs in parliaments have already been deeply studied from a network perspective (Patterson, 1952, 1972; Patterson & Caldeira, 1987; Arnold, 2000) providing me with a developed body of theoretical works to which my investigation could engage with and, on the other, some research has also been conducted on several aspects of MPs' Twitter behavior such as the factors behind their Twitter adoption (Lessen & Brown, 2010; Chi

& Yong, 2010; Williams & Gulati, 2010), MPs' use of Twitter (Goldbeck et al., 2010; Small, 2010; Margaretten & Gaber, 2014), or the characteristics of parliamentarians' Twitter interactions by studying their retweets and mentions (Grant et al., 2010; Conover et al., 2011; Tham & Bleier, 2012). In short, I assumed that parliamentarians' social relations woven in the particular network of the Catalan Parliament may be reflected on their Twitter interactions, and as a social scientist, I felt the necessity to study the MPs' relations in this new Internet-mediated network context.

Once I had already chosen the particular network that I wanted to study, the next research step was to focus on a social phenomenon derived from Catalan MPs interaction on Twitter. In that regard, I found the literature on opinion leaders in Twitter networks very helpful to my research aims for it paved me the way to scientifically think about the capacity of Twitter to open a room for the appearance of new opinion leaders who may not be the established party leaders. In doing so, I captured the data of the following-follower Twitter network of Catalan parliamentarians during a three month period (January-March 2014) and I measured the parliamentarians' centrality position in these networks by rating their in-degree and betweenness centrality. Regression analyses were also done to uncover the factors behind the opinion leaders' centrality position in these networks (see Chapter 3 of this dissertation). In short, in the second phase of my dissertation the research question that I wanted to answer was:

- RQ2: Who are the opinion leaders of the Catalan parliamentarians' following-follower Twitter network and what are their characteristics?

The research conducted on the following-follower Twitter network of Catalan parliamentarians brought me to further investigate the appearance of new opinion leaders emerging from MPs' use of Twitter. In doing so, I tried to solve some of the pitfalls which I considered that the previous research on the following-follower network of Catalan MPs had such as its short period of time and the fact that I only analyzed one of the three possible Twitter networks (following-follower, retweet and mention) derived from Catalan representatives' use of Twitter.

Moreover, in this new phase of my investigation my research aims were not only to find who the opinion leaders of Catalan Twitter network were and which characteristics they had, but also to know whether MPs use of Twitter was opening the communication flows among Catalan parties or circumscribing them to representatives of the same party or ideology. That is, I wanted to know if, as it has been previously observed in other researches (Conover et al, 2011; Yoon & Park, 2014), the degree of polarization of Catalan parliamentarians Twitter flows was deeper in the following-follower and retweet Twitter networks than in the mention network.

In order to test the polarization of Catalan parliamentarians Twitter flows and to uncover the opinion leaders of the following-follower, retweet and mention networks, a research engine was created which gathered all the relations (4,516), retweets (6,045) and mentions (19,507) of Catalan parliamentarians from 1<sup>st</sup> January 2013 to 31 March 2014. Also, regression analyses were done to uncover the characteristics of Catalan MPs opinion leaders in the three networks of Twitter relationships. In brief, this new research on Twitter aimed to answer the following questions:

- RQ3: Is Twitter facilitating Catalan parliamentarians' exposure to cross-ideological opinion or is it confining them to like-minded clusters?
- RQ4: Who are the opinion leaders of the following-follower, retweet and mention networks of Catalan MPs and what are their characteristics?

## **1.2.-Methods**

This dissertation relies on the idea that it is through mixing a variety of methods that the researcher can unfold different elements of parties and their representatives' behavior on social media. The reader will have the opportunity in Chapters 2, 3 and 4 of this thesis to comprehend in detail what I am saying by blending these methods for I will expose them more accurately. Nonetheless, I consider that a brief introduction to the methods employed should integrate the summary of this dissertation. That said, with respect to the analysis of party behavior on Facebook (Chapter 2), I read the statutes provided by Catalan parties on their Facebook pages in order to determine their degree of centralization of decisions by adopting a coding scheme based on K. Janda's (1980) measure of the centralization decision making. Also, the content of parties' posts was coded according to the salient issues of the Catalan political agenda. On the other hand, Netvizz application was used to capture from parties' Facebook pages all the parties' posts and their followers' responses. I applied then measures of association between parties' characteristics and parties' posting activity and followers'

responses and I carried out analyses of variance to ascertain the role played by the different types of issues posted by the Catalan parties and the diverse format of the posts on the level of engagement of the followers. That statistical analysis was mainly descriptive and it tackled bivariate associations and differences in means for I was aware of dealing only with seven cases and of the difficulty that that triggered in providing any explanatory analysis which controls for rival influence of variables.

I started the analysis of the Catalan MPs' behavior on the following-follower network (Chapter 3) by compiling a list of the total number of parliamentarians holding a Twitter account. I then used the NodeXL program to gather the data of the following-follower Twitter network in a longitudinal perspective (13-01-2014; 24-02-2014; 24-03-2014) and I ascertained the degree centrality (indegree) and brokerage position (betweenness centrality) of the parliamentarians to identify those who could be classified as the opinion leaders of these networks. In addition, Gephi program was used to visualize MPs' following-follower Twitter network. I used then the data captured from MPs' Twitter accounts and from the Catalan Parliament webpage to create my own data base from which I constructed a model to explain MPs' centrality position in the following-follower Twitter network. The independent variables in the model included 6 dimensions related to the MPs: (a) socio-demographic characteristics; (b) Internet behavior and Twitter activity; (c) electoral characteristics; (d) parliament activity; (e) political position; (f) relational variables.

In the analysis of the following-follower, retweet and mention networks (Chapter 4), I used the same methods applied in the study of the following-follower network, with some relevant changes. Firstly, a research engine was created to gather all the

relations, retweets and mentions among the MPs from January 1<sup>st</sup> 2013 until 31 March 2014. Secondly, I measured the centrality of MPs in the following-follower, retweet and mention network by rating their number of followers and the retweets and mentions that they received from the other parliamentarians. That is, the most followed, retweeted and mentioned parliamentarians were classified as being the opinion leaders of the networks. Thirdly, I partially use the data base created to unfold the opinion leaders' characteristics of the following-follower network and by adding other network variables (such as the MPs retweets and mentions received and sent) I tried to determine the factors behind the opinion leaders of the Catalan MPs' following-follower, retweet and mention networks. Lastly, instead of measuring the centrality position of the MPs by their number retweets or mentions, I used the total number of parliamentarians following, retweeting or mentioning a particular parliamentarian. By doing so what I expected to find was not the centrality position of the Catalan MPs based on the quantity of retweets and mentions that they received but to ascertain the distribution of the retweets and mentions that a parliamentarian received. That is, the Catalan parliamentarians with a higher centrality position will be those who receive more mentions and retweets from the total number of deputies (and vice versa).

Summarizing, this dissertation stems in a broader conception of methods which independently taken could only reveal some facets of parties and MPs' behavior on Facebook and Twitter, but give plausible answers to the research questions posed by this dissertation when employed together. Furthermore, the open and free software used to capture the data facilitate replication by other researchers in the field.



### **1.3.-Political and technological contexts: the Catalan case**

The particularities of Catalonia such as the large use of the Internet and social media, the variety of parties represented in the Catalan Parliament and, currently, a conflictual political environment that is being reflected and expanded by social media are interesting traits in the frame of this dissertation.

#### *1.3.1.-The political context*

The most recent elections to the Catalan Parliament in November 2012 were exceptional elections. Following the massive protest march in Barcelona on 11 September 2012 in favour of the independence of Catalonia and the failed talks in Madrid on 20 September 2012 between the Spanish prime minister, Mariano Rajoy, and the Catalan prime minister, Artur Mas, on the proposal by *Convergència i Unió* (CiU)<sup>1</sup> for a new Fiscal Agreement for Catalonia, Artur Mas dissolved the Catalan Parliament on 28 September 2012 and called elections for 25 November 2012. These elections were characterised by three factors: (1) Artur Mas's decision to call early elections two years before the end of the 9th Legislature and CiU's positioning in favour of the independence of Catalonia; (2) the dominance of the nationalist position on Catalonia's right to hold a referendum on independence or to become an independent state; (3) the discussion on the effects of the economic crisis and the expenditure cuts implemented by the Catalan government.

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<sup>1</sup> CiU is the centre-right Catalan nationalist party that is governing Catalonia since 2010. In the 2010 elections gained 62 seats but in the last elections got 50 seats in the Catalan Parliament.

The results of the elections could be summed up in three aspects: (a) participation was up by almost 9 percentage points with respect to the 2010 elections (from 58.8% in 2010 to 67.8% in 2012); (b) there was a decline in support for CiU and PSC<sup>2</sup> in terms of votes and seats; there was a huge increase in support for ERC<sup>3</sup> and C'S<sup>4</sup> in terms of votes and seats; there was a slight increase in support for PP<sup>5</sup> and ICV-EUIA<sup>6</sup>; and CUP<sup>7</sup> entered and Solidaritat<sup>8</sup> left the Catalan Parliament; (c) There was an increase in the Catalan public's support for the independence of Catalonia (46.4 % of respondents were in favour)<sup>9</sup>.

Far from vanishing from the Catalan political agenda, the government agreement reached by CIU and ERC boosted the independence claim and polarized the Catalan party system around the Nationalist axis. Also, the pressure exerted by the Catalan civil society (guided by *Assemblea Nacional Catalana* and *Òmnium Cultural*, two civil associations supporting the independence of Catalonia) pushed the Catalan government to celebrate a “participatory process” on 9 November 2014 that replaced the original consultation vote which had been banned by the Spanish authorities. According to the official results released by the Catalan Government, 2,305,290 people

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<sup>2</sup> PSC is the Socialists' Party of Catalonia and it is federated with the Spanish Socialist Party. In the 2010 elections gained 28 seats but in the last elections got 20 seats in the Catalan Parliament.

<sup>3</sup> ERC stands for Republican Left of Catalonia and it is a leftwing party in favor of the Catalan independence. 10 seats in 2010 and 21 in 2012.

<sup>4</sup> C's stands for 'Citizens' and it is a relative new centrist and against Catalan nationalism party. 3 seats in 2010 and 9 in 2012.

<sup>5</sup> PP is the Popular Party of Catalonia, which is member of the Spanish Popular Party, a rightwing and Spanish nationalist party. 18 seats in 2010 and 19 in 2012.

<sup>6</sup> ICV-EUIA is a leftwing party self defined as eco-socialist and an autonomous part of the Spanish United Left (IU). 10 seats in 2010 and 13 in 2012.

<sup>7</sup> CUPs stands for 'Candidacies of Popular Unity' and are an extreme left and independentist coalition. In the 2012 election they won 3 seats in the Parliament.

<sup>8</sup> Solidaritat Catalana per la Independència is, basically, an independentist party. 4 seats in the 2010 elections.

<sup>9</sup> According to the First Round in February of CEO Surveys in 2013.

cast their ballot in November 9's participatory process with 80.76% (1,861,753) in favour of the independence, 10.07% (232,182) in favour of a federal state and 4.54% (104,772) of citizens who backed the Autonomous Community system or recentralization power. These results, together with the non recognition of the right to a referendum for the independence of Catalonia by the Spanish central government and the pressure of ERC on the government, led President Mas to call new elections for 27<sup>th</sup> September 2015.

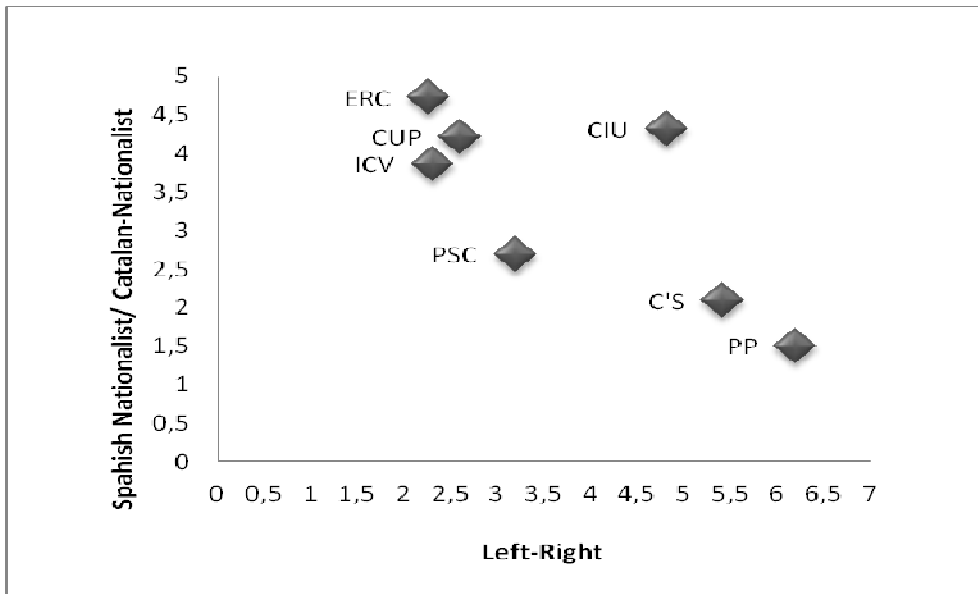
Nonetheless, even if the nationalist cleavage has been dominating the Catalan political agenda since 2013, the Left-Right axis has also played an important role due to the economic crises that Catalonia is witnessing and to the austerity measures taken by the Catalan Government. According to the figures of the Catalan Home Ministry, from January to May 2013 eleven demonstrations per day took place in Catalonia, more than the double than in the same period of 2012 (5.5 per day). In addition, the Catalan political agenda of our period of study has been shaken by a large number of corruption scandals amongst which the Barcena's (PP) and Pujol's cases (CIU) have been the most notorious.

In brief, the fragmentation and ideological divisions in the Catalan party system enable us to test in depth hypotheses related to interaction and communication among and between Catalan parties and their MPs. The Catalan party system is fragmented into a wide variety of fringe and medium-sized parties. In fact, following the elections of 25 November 2012, there are seven parties in the Catalan Parliament: CiU (50 seats), ERC (21 seats), PSC (20 seats), PP (19 seats), C'S (9 seats), ICV-EUIA (13 seats) and CUP (3 seats). Furthermore, the Catalan party system is distributed along two main ideological

cleavages (see Figure 1), the Left-Right and the Spanish Nationalist-Catalan Nationalist.

Figure 1 below places the Catalan parties on these two axes:

*Figure 1: The position of the Catalan parties on the Catalan political spectrum according to the CEO respondents*



*Source: Second round of the CEO surveys (20 June 2013); N=2000; Simple answer %.*

On another realm of things, the Catalan Parliament is also a good case study for several reasons: First, there is the early adoption of networking sites by the Catalan Parliament and its members. On 17 March 2009, the Catalan Parliament initiated the project "Parliament 2.0" which consisted in 'adapting the Parliament to the new active role of users with social media' (Benach, 2010). As a result, the Parliament launched a YouTube channel, a Facebook page, and a Twitter profile. Furthermore, in October

2013, the Catalan Parliament initiated the project *Escó 136*<sup>10</sup>, consisting in a web page on which Catalan citizenry could leave comments and suggestions to projects and laws proposed by the Catalan Parliament<sup>11</sup>. On the other hand, in 2014 the ratio of Catalan parliamentarians with Twitter was 84.5%<sup>12</sup>, greater than in the Spanish Central Government parliament (52.6%)<sup>13</sup>, the Spanish Senate (33.06%)<sup>14</sup>, the German Bundestag (31.61%) (Thamm & Bleier, 2013), the UK House of Commons (72.3%)<sup>15</sup>, but it fell somewhat behind the US senate (100%) and House of Representatives (90%)<sup>16</sup>.

Lastly, several studies have already shown that social media are contributing to the equalization of opportunities for political communication among Catalan parties, as new, fringe and medium-sized parties and parties from varied different political positions are able to achieve greater online interaction and participation than larger and more institutionalized parties (Balcells & Cardenal, 2013; Esteve & Borge, 2013).

### *1.3.2.-The technological context*

I consider that the understanding of Catalan parties' and their MPs' behavior on Facebook and Twitter would be somehow difficult without comprehending some of the technological characteristics of the Catalan society in which they are embedded. For this reason, I will point out some characteristics of the Catalan Facebook and

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<sup>10</sup> Seat 136 as the Parliament seats 135 members.

<sup>11</sup>The comments and suggestions of the citizenry are transferred to the authorities in charge of elaborating Catalan legislation and they will be annexed to the law initiative. See <http://www.parlament.cat/web/participacio/esco-136> [visited on 31 March 2015]

<sup>12</sup><http://www.gutierrez-rubi.es/tag/parlament-de-catalunya/> [visited on 31 March 2015]

<sup>13</sup><http://parlamento20.es/twitter-en-el-congreso-de-los-diputados> [visited on 31 March 2015]

<sup>14</sup><http://www.blogsdepolitica.com/el-senado-tambien-existe-presencia-y-actividad-en-twitter-de-los-senadores/> [visited on 31 March 2015]

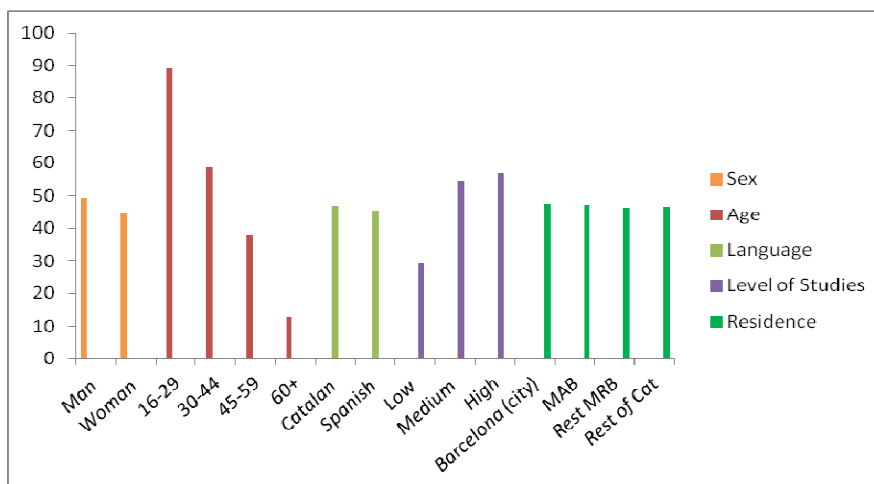
<sup>15</sup><http://blogs.telegraph.co.uk/news/willheaven/100228088/how-long-before-every-single-mp-is-on-twitter> [visited on 31 March 2015]

<sup>16</sup><https://blog.twitter.com/2013/100-senators-and-57th-inauguration> [visited on 31 March 2015]

Twitter users and the platforms used by the Catalan citizenry to obtain political information.

According to the survey *The Use of Social Media among Catalans* carried out by GESOP in July 2013 (N=1600), 47% of Catalans (almost 3,000,000 people) use some social networking site. Among the Catalan citizens using some social media, Facebook (44.6%) is the most used, followed by Twitter (17.8%), LinkedIn (6.5%) and Instagram (3.1%). Regarding the characteristics of the Catalan social media users, Figure 2 shows that the main difference in the usage of social networking sites among Catalan citizenry are associated with the age of the users and their level of studies:

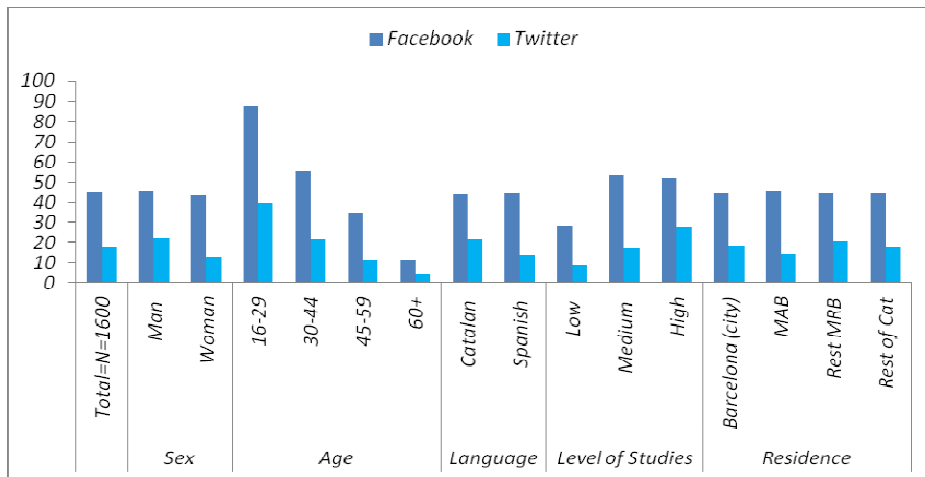
Figure 2: Catalan citizenry use of social media



Source: GESOP, 2013 (N=1600); MAB= Metropolitan area of Barcelona; Rest MRB= The rest of the Metropolitan Region of Barcelona; Rest of Cat= The rest of Catalonia

With respect to the profile of the Catalan Facebook and Twitter users, Figure 3 shows that, again, young (16-29) and highly educated Catalan citizens (High Level of Studies) are among those who use the most these social media:

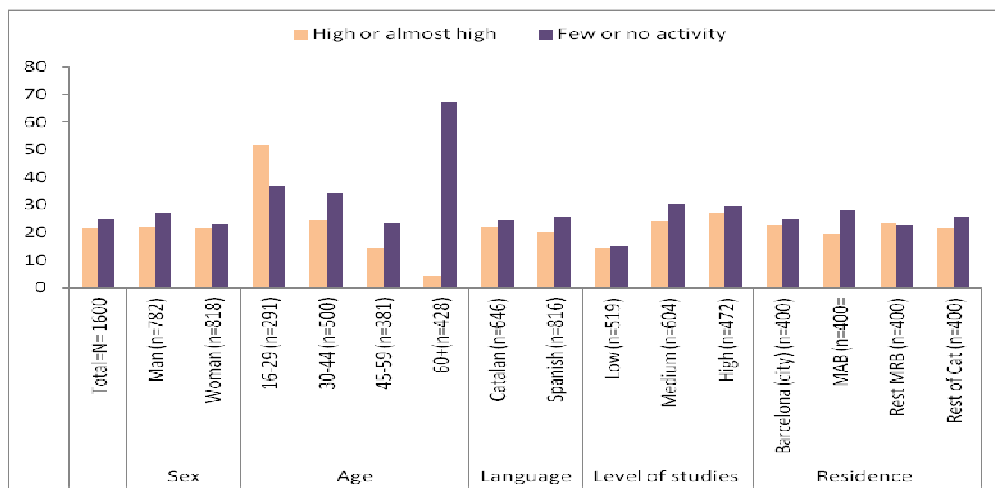
Figure 3: The profile of the Catalans Facebook and Twitter users



Source: GESOP, 2013 (N=1600); MAB= Metropolitan area of Barcelona; Rest MRB= The rest of the Metropolitan Region of Barcelona; Rest of Cat= The rest of Catalonia

In terms of the Catalan citizenry activity on Facebook and Twitter, Figure 4 indicates that neither their sex, their language nor their residence show important differences on their level of activity in these social media, but only their age and level of studies:

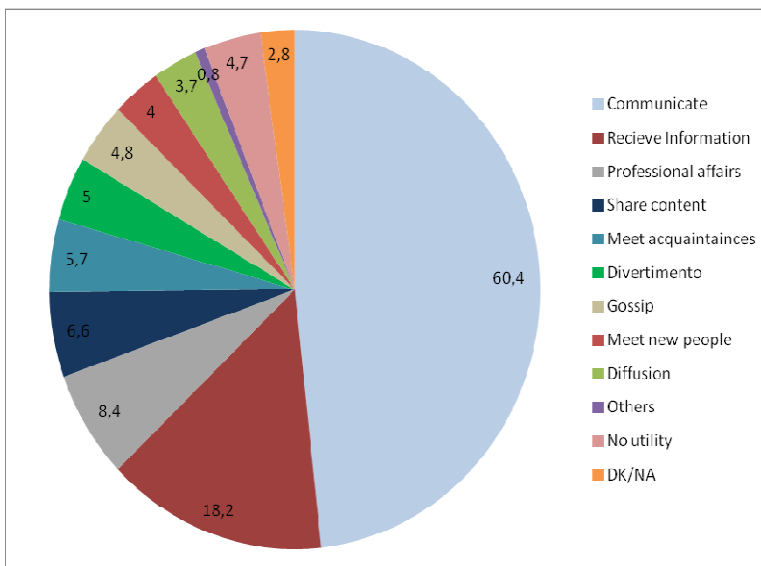
Figure 4: Factors of the activity levels of the Catalan citizenry on Facebook and Twitter



Source: GESOP, 2013 (N=1600); MAB= Metropolitan area of Barcelona; Rest MRB= The rest of the Metropolitan Region of Barcelona; Rest of Cat= The rest of Catalonia

Lastly, with respect to Catalan citizens' usage of social networking sites, Figure 5 shows that the majority of them use social media to communicate with other people (60.4%), yet it is also important to note that 18.2% of the respondents affirm that they use social networking sites to reach information:

*Figure 5: The Catalan citizenry use of social networking sites*



*Source: GESOP, 2013 (N=1600)*

On the other hand, with respect to the way the Catalan citizenry obtains political information, it seems important to point out the fact that according to CEO survey (N=2000) of 13<sup>th</sup> June 2013, social networking sites were used by the 18.3% of the respondents, the highest figure of all the CEO's surveys (11.9% of the respondents in the 2<sup>nd</sup> Round of CEO surveys -13<sup>th</sup> June 2012).

Furthermore, Table 1 shows the different platforms used by Catalan voters (of each of the parties with representation to the Catalan Parliament) with respect to the Mass Media and the Internet. Regarding the ways of reaching political information different facts can be observed: First, for the voters of all parties, television is still the



predominant platform for obtaining political information. Second, radio is used by the voters of all parties in a similar way, yet we observe a decline of its use in C'S and CUP voters. Third, with regard to newspapers, similar figures can be observed among voters of all parties, but the PP and the PSC voters use them slightly less. Fourth, the most important differences among party voters come to the internet. In that sense, while CUP (71.7%) and ICV (55.2%) voters occupy the highest positions, the PPC (22.1%) and PSC (24.8) voters occupy the lowest ones. Last but not least, CIU (39.6%), ERC (49.5) and C'S (42.1) show similar levels. Fifth, with respect to the use of *Friends, acquaintances and relatives* in order to obtain political information, the main difference between parties' voters is with respect to the PPC figures (22.1%) - the other parties have similar levels. Last but not least, with regard to the social networking sites (Facebook and Twitter) the most interesting aspect is the high levels reached by ERC (21,1), ICV-EUIA (26,2) and CUP (25,3) in comparison with the other parties.

*Table 1: Platforms used by Catalan voters in order to obtain political information (2013)*

| Political Parties/                             | PPC  | CIU   | ERC   | PSC   | ICV-EUIA | C'S  | CUP  |
|--|------|-------|-------|-------|----------|------|------|
| Media (%)                                      | (57) | (561) | (313) | (134) | (203)    | (73) | (68) |
| Television                                     | 93.5 | 88.5  | 88.1  | 88.9  | 76.5     | 87.9 | 64.1 |
| Radio  | 44.8 | 46.1  | 52.4  | 46.2  | 49.3     | 40.3 | 38.3 |
| Newspapers                                     | 48.5 | 66.0  | 66.9  | 48.2  | 68.9     | 65.5 | 58.8 |
| Internet                                       | 22.1 | 39.6  | 49.5  | 24.8  | 55.4     | 42.1 | 71.7 |
| Friends, relatives and acquaintances           | 26.6 | 43.6  | 49.9  | 41.0  | 45.8     | 44.7 | 54.3 |
| Social Networking Sites (Facebook and Twitter) | 14.7 | 11.1  | 21.1  | 10.0  | 26.2     | 10.4 | 25.3 |

*Source: 1<sup>st</sup> Round of CEO surveys (22<sup>nd</sup> of February 2013); N=2000 (Weighted base)*

Summarizing, it can be stated that young and highly educated Catalans are those who use the most and who are the most active on these social networking sites. Also, regarding the voters of Catalan parties, Catalan-Left (ERC and ICV-EUIA) and new parties (CUP) voters are those who seem to be obtaining more political information through Facebook and Twitter in comparison to the other parties.

#### **1.4.-Conclusions**

This dissertation focuses on sorting out plausible and refutable evidences either corroborating or neglecting the challenging role of social media on the Catalan Politics by using social network and statistical methods. More precisely, the investigations that I carried out on Catalan parties and their representatives' use of Facebook and Twitter aim to complete a majority of studies in the field that have:

- 1.- Underestimated the effects of parties' characteristics and the cleavages of party systems on their use of Facebook.
- 2.- Understudied the factors behind the behavior of the opinion leaders of parliamentarian's Twitter networks.
- 3.- Relied on statistical methods without bridging them with network methods or vice-versa.

The main contribution of this research is that social media are challenging Politics. The results of the research show that social media have triggered the appearance of a new-internet mediated political arena which its own particularities and characteristics. The thesis also highlights the role played by organizational, electoral and contextual factors

when analyzing parties and their representatives' use of Facebook and Twitter. Moreover, this dissertation uncovers the particular dynamics of online political networks by interpreting its findings related to parliamentarian's Twitter networks with emphasis on the appearance of new opinion leaders. Lastly, the dissertation shows that, by bridging social network methods and statistical analysis social scientists are able to capture the interdependent and individual characteristics inherent to any social and political formation, thus conduct sound political science investigations.

The first Chapter of this dissertation has introduced the theoretical background, the research questions and the methods that support the research. Also, it has pointed the political and technological contexts of the Catalan case study. In the following chapters the reader will have the opportunity to explore in more detail Catalan parties and their representatives' behavior on Facebook and Twitter. In Chapter 2 the reader will be presented with the main traits of Catalan parties posting behavior and their Facebook followers' answers to the parties' posts. In Chapter 3 she will know who the opinion leaders of the Catalan MPs following-follower Twitter network are and what their characteristics are. Lastly, in Chapter 4, the reader will ascertain if Twitter is opening communication flows between Catalan parties and paving the way for the appearance of new opinion leaders or if it is reducing them to representatives of the same party or ideology and empowering party leaders.

## CHAPTER II: INTERACTION IN CATALAN PARTIES' FACEBOOK PAGES

### 2.1.-Introduction

Social media pose a variety of challenges and opportunities to political parties. They<sup>17</sup> offer the possibility of a level of interaction between parties and the public that was previously absent, and give voters the 'chance of entering into a real online dialogue with representatives' (Mackay, 2010, p. 23), enhance relationship building (Briones et al., 2011) and allow individual citizens to make, contribute, filter and share content (Bechmann & Lomborg, 2012). However, the organizational adaptation of parties to these new channels of electronic communication puts participatory pressure on their hierarchical structures (Gustafsson, 2012, p. 1,123), blurring their classic strategy, based on a sharp differentiation between their members and the public (Margetts, 2001; Gibson, Ward & Lusoli, 2003; Löfgren, 2003; Scarrow, 2013).

Parties are political actors with primary goals (Harmel & Janda, 1994) and organizational characteristics, and behaving strategically in order to win elections and influence policies. All of these determine how they deal with social media, just as what happened with previous online tools such as websites, chats and forums (Padró-Solanet & Cardenal 2008; Cardenal, 2011). In brief, the adaptation of parties to this

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<sup>17</sup> Social media are web-based services that allow individuals to construct a public or semi-public profile within a bounded system, articulate a list of other users with whom they share connections, and view and traverse their list of connections and those made by others within the system (Boyd & Ellison, 2008, p. 2).

new digital environment seems to be mediated by their goals, organization, position on the ideological cleavages, power situation and electoral strength.

Chapter II of this dissertation studies the behaviour of Catalan parties with seats in the Catalan parliament, together with their followers on the party Facebook pages. I consider that party characteristics in general and party organization in particular have an influence over interaction on parties' Facebook pages. Specifically, I examine the relationship between the main characteristics of Catalan political parties, their Facebook posting behaviour and the responses given by their Facebook followers to these posts.

The period of analysis is not long, between 15 January and 15 February, 2013; it is perhaps thus prone to short term conditions and factors. However, since this is a first attempt to investigate the field, with the research considering the entirety of current Catalan parties, I believe that the time span is sufficient to shed light on some of the present controversies concerning social media and parties; and I hope that it might inspire additional comparative research as well as studies expanding the time frame used in this research.

## **2.2.-Previous studies on parties' behaviour on the Web 1.0 and 2.0**

Since their inception, political parties' organizations have mutated hand in hand with the changes in society unleashed by the appearance of new forms of communication. In fact, this particular political science domain has been deeply analysed by academia for the understanding of the changes in political parties' organizations is a key step for figuring out how they adapt to their respective societies and, in turn, to their political

arena. In that sense, there is a vast literature framing this controversy, which runs from the elite concept of parties' organizational power in Michels (1911), through the 'mass party' in Michels and Duverger (1964), the 'catch-all party' in Kirchheimer (1966) and the 'cartel party' in Katz and Mair (1995).

Nevertheless, the controversy regarding parties' organization and communication was given a boost with the appearance of the Internet. The Web could shape the way these entities of aggregation of societal wills organise the relationship between parties, their members and their electoral arena. In addition, the use parties would be doing of the Internet would depend on party goals, organizational characteristics and electoral situation. In this light, parties could find incentives to use the internet for different purposes depending on their goals, organizational traits, positioning at the cleavages and strategic situation in the electoral market (Cardenal, 2011). Also, the shift from Web 1.0 to Web 2.0 and, specifically, the spread of social media, could modify even more the relationship among parties, members and the public in general, into a more participatory role for the citizens.

I will review the literature dealing with these three aspects: a) The role of the Internet in affecting the relationship between parties, members and the public; b) The parties' characteristics influencing their use of the Internet c) The parties' social media use, specifically Facebook.

### *2.2.1.-Changing relationships between parties, members and the public through the Internet*

Gibson and Ward (1999) were among the first authors to observe that most political parties developed interior networks that computerised their communications. However, they also discovered that while most parties were very sanguine about the possibilities offered by ICTs to improve deliberation and consultation with their members, the benefits were not so evident. According to these authors, all around parties appreciated ICTs far more as instruments of coordination and information than as tools of internal organization, discussion and debate. This stance, which could be considered 'cyberrealist', was rapidly counteracted by H. Margetts (2001), whose concept of the 'cyber party' opened the door to the 'cyberoptimist' current. More precisely, Margetts pointed that ICTs could modify parties' organizational structures in a threefold sense by: (1) democratising their decisions; 2) promoting new lax and informal interrelation networks; and (3) offering new fundraising possibilities. This same current was followed by Heidar and Saglie (2003), whose claim of the 'network party' stated that the use of ICTs will promote a decentralisation of political parties which will be based on networks of informal topics (that could even be virtual). According to them, these networks will be more open to the public's demands, to lobbies and to experts on public policies and they could even become a starting point for political debate and the recruitment of new leaders.

Nevertheless, the study of intranet users in the Liberal Democrat party and the Labour party in the UK carried by Lusoli and Ward (2004) revealed that party members rarely checked parties' webpages and a minority of them never did it. In this same line of

research, Vissers (2009) and her concept of the 'spiral of demobilisation' among party members corroborated this behaviour and Pederson and Saglie's (2005) study of the ICTs' use by the members of Norwegian and Danish parties revealed that only one out of three of them visited the parties' webpages. In fact, on the party members' use of technology, these authors predicted a sharp division among the active and passive members and they pointed that this trend could even empower party elites.

### *2.2.2.-Characteristics of the parties influencing their use of the internet*

From a more explanatory perspective several authors have studied the goals, organizational factors and political and institutional environment that could have an effect on political parties' online behaviour (Ward & Gibson, 2000; Gibson & Römmele, 2003; Römmele, 2003; Padro-Solanet & Cardenal, 2008; Chadwick & Anstead, 2009; Sudulich, 2009; Cardenal, 2011; Wall & Sudulich, 2011; Gibson, 2013). Most of these studies are inspired in the classic literature that understands parties as actors with their own goals and organizational characteristics, constrained by the institutional and political context (Deschouwer, 1992; Harmel & Janda, 1994; Janda, 1980; Ström, 1990).

Römmele (2003) was one of the first to point out that the political parties' use of ICTs will not be uniform and will depend on parties' goals and objectives. She argued for the necessity to 'look at more possibilities than electoral performance as the primary force behind a party's behaviour' (Römmele, 2003, p. 12). From there, she elaborated a classification of the parties' adaptation to ICTs based on the link between their primary goals (maximize votes, implement policies, promote internal democracy and seek office) and their online behaviour (communication strategy, target audience and



message). According to her, parties which focus on maximizing their votes and seeking office will adopt a top-down communication strategy, whereas those seeking to implement policies and increase their internal democracy will develop bottom-up and participatory communication strategies. The former goals and communication strategy would correspond to catch-all and cartel parties and the later would be related to mass parties (Römmele, 2003, p. 14).

Padró-Solanet and Cardenal (2008) and Cardenal (2011) showed that in the specific case of Catalan and Spanish political parties, their internal characteristics and their position in the electoral market (ideology and ideological coherence, the type of the party, the degree of centralisation of their decisions, the importance of the organization, the existence of internal conflict, and their position either in government or at the opposition) structure the interactive and participatory channels that parties offer on their webpages. They also discovered that big parties (above all when they are in opposition) tend to open more communication and participatory channels on their webpages (Cardenal, 2011, p. 95). By the same token, parties that are less ideologically coherent and have small organizations tend to develop more horizontal channels of participation and communication (Ibidem). This fact triggers a much more development of centralised channels to support the party or activate its networks of contacts (Cardenal, 2011, p. 96-97; Padró-Solanet & Cardenal, 2008, p. 58).

Also, it is important to note that when analyzing any behaviour (online or offline) of Catalan parties, scholars (Molas & Bartomeus, 1998; Serrano, 2007; Bartomeus & Medina, 2010; Pallarès & Verge, 2010; Cardenal, 2011; Esteve & Borge, 2013) pointed to the necessity of considering their position on the cleavage structure of the Catalan

party system which is divided between the Left/Right-wing and Spanish Nationalist/Catalan Nationalist cleavages.

Finally, Wall and Sudulich (2011) focus their analysis on only one of the explicative factors, the degree of centralisation in Irish parties' decisions. In comparison with the two dimensions that Padró-Solanet and Cardenal used to measure the centralisation of decisions (2008, p. 52), Wall and Sudulich (2011, p. 579) added three new dimensions and discovered that in the Irish case centralized and hierarchically organized parties developed fewer opportunities for online interaction on their webpages than parties with less centralised and hierarchical organizations.

### *2.2.3.-Political parties and social media*

A number of authors have studied the relationship between Facebook and political parties from different perspectives. The study carried out by Lynch and Hogan was one of the first attempts to understand the effects of social media in political parties. It revealed an interesting dichotomy: while no Irish party regarded social networks as better than traditional communication methods (Lynch & Hogan, 2012, p. 92), the Generation Z<sup>18</sup> participants in the study felt social network sites should form part of a party's overarching communications strategy (Lynch & Hogan, 2012, p. 95). Following this political participation perspective, Gustafsson (2012) studied the characteristics of Swedish social media users and their participation around parties. His main concern was to analyze the effect of social media on political parties' hierarchies and he discovered that social network sites had eroded internal hierarchies as 'collaboration

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<sup>18</sup> Lynch and Hogan define this Generation Z such as 'the First World generation born after the advent of the internet. Generation Z is considered as beginning around 1990, making its oldest members 21 years of age (Lynch & Hogan, 2012, p. 87).

across local party branches had been made easier. As information no longer had to go through central boards, informal networks were perceived as easier to form and maintain' (Gustafsson, 2012, p. 1117).

In their research of Danish politics, Skovsgaard and Van Dalen (2013) found that politicians used Twitter and Facebook to strengthen their position in intraparty competition, and that communicating directly with voters was a key motivation for being active on social media. Moreover, Klinger's study of Swiss parties' behaviour on Facebook and Twitter showed that during the 2011 Swiss election, small parties did not benefit from the potential offered by social media, whereas the dominant parties with larger number of voters gained more resonance online and were better able to facilitate reciprocal activity on Facebook (Klinger, 2013, p. 731). Last but not least, another promising analytical line was recently initiated by Gibson (2013), in which she studies 'citizen-initiated campaigns'. These are online campaigns launched by party supporters (who are not necessarily members of these organizations) that use the web tools created by the parties or the candidates' teams (Gibson, 2013, p. 5). The Facebook and Twitter accounts of either the parties or their supporters are crucial elements in these campaigns.

### **2.3.-Methods and hypotheses**

In Chapter 2 of the dissertation I seek to test to what extent parties' characteristics affect the way in which Facebook is used by political parties and their Facebook followers. I will analyse five standard party characteristics drawn from the literature explained in previous sections, having been proven successful in explaining online

party behaviour: party size, institutionalization, centralization of decisions, left-right ideology and national identification. I will test these specific hypotheses:

H1: The Catalan parties' size, institutionalization, centralization of decisions and position on the left-right and national cleavages are related to their Facebook posting behaviour.

In line with this idea, the findings in the literature show that parties that are institutionalized, in power and centralized do not developed as much interactive and participatory features in their websites as smaller, newer, big but in opposition or decentralized parties (Padró-Solanet & Cardenal, 2008; Ward & Gibson, 2009; Wall & Sudulich, 2010; Cardenal, 2011). Also, in the particular case of Catalonia, the Catalan parties' position on the two cleavages (Left/Right-wing and Catalan Nationalist/Spanish Nationalist) may be considered as a factor of their online behavior (Serrano, 2007; Cardenal, 2011; Esteve & Borge, 2013).

H2: The Catalan parties' size, institutionalization, centralization of decisions and position on the left-right and national cleavages are related to the followers' responses to their posts. That is, the characteristics of the Catalan political parties could affect the interaction and participation arisen by the followers.

Recent studies on the use of social media by political parties show that larger and dominant parties have more followers online and develop more reciprocity than smaller and less institutionalized parties (Klinger, 2013). However, this is just the contrary of what we have just mentioned other studies have found for party websites. In any case, we have to take into account that Facebook and Twitter were born in 2004

and 2006, respectively, and there are fewer studies about party use of social media than on party websites.

In order to test these hypotheses empirically I will, first of all, measure the main characteristics of the Catalan political parties. In this light, following the studies by Padró-Solanet and Cardenal (2008) and Cardenal (2011) I will examine: (a) the size of the party<sup>19</sup>; (b) the party's ideology<sup>20</sup>; and (c) the party's institutionalisation<sup>21</sup>. However, in this research I have added one more characteristic to Padró-Solanet and Cardenal's research: (d) the party's position on the national identification. Finally, I will measure the (e) centralisation of party organizations by adopting a coding scheme based on K. Janda's (1980) measure of the centralisation of decision making, and inspiring on the analysis already carried out by Lundell (2004) and Wall and Sudulich (2010). I use therefore a standardised index made of the original 8 dimensions figured out by Janda (1980), that ranges from 1 (total centralisation of decisions) to 0 (total decentralisation). Party statutes showed in parties' websites during the period of analysis have been examined in order to ascertain the position of the parties in each dimension. The 8 dimensions are: 1) nationalisation of the structure; 2) selecting the leader of the party; 3) selection of the parliamentary candidates; 4) funding distribution; 5) formulation of the policies; 6) control of the communications; 7) administration of the discipline and 8) leadership concentration.

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<sup>19</sup> (a) Big parties: more than 30 seats in the Catalan Parliament; (b) Semi-big parties: 20 to 30 seats; (c) Medium parties: 10 to 20 seats; (d) Small parties: 1 to 10 seats.

<sup>20</sup> The party's ideology is measured using the positioning given by the respondents of the CEO survey of 20 June, 2013.

<sup>21</sup> I will measure the institutionalisation of the parties with a dummy variable: 1. Institutionalised parties: parties that have been around for 15 years or more; 2. New parties: parties that have less than 15 years old.

Secondly, I will extract from parties' Facebook fan pages all the parties' posts and followers' responses from the 15<sup>th</sup> of January to the 15<sup>th</sup> of February, 2013. In order to do that, I will use the Netvizz<sup>22</sup> application to gather all this data. Then I will process this data with the Gephi<sup>23</sup> program. I will tackle parties' Facebook posting behaviour (between 15 January and 15 February 2013) by analysing the following dimensions: (a) the total number of posts published by the Catalan parties (b) their daily average of posts published (c) the characteristics of their posts (text only, text with video or links, or text with photos) (d) the main type of issues deployed in the parties' posts that correspond to the salient issues of the Catalan agenda during our period of analysis: (1) nationalism; (2) corruption; (3) left-right (which includes social benefits cuts, economic readjustments and repression by the police); and (4) others<sup>24</sup>. Facebook followers' posting responses will be examined by looking at: (a) the total number of comments by the parties' Facebook followers' on their Facebook posts; (b) the total number of likes by the parties' Facebook followers' to their Facebook posts; (c) the total number of likes to the Facebook followers' comments; (d) the total number of shares of the parties' Facebook posts; (e) the engagement (likes + comments + shares) generated by the parties' Facebook posts; (f) the ratio of the total likes/engagement of the parties' Facebook posts; (g) the ratio of the total comments/engagement of the parties' Facebook posts; (h) the total number of deleted comments divided by the total number of comments posted on Facebook by the Catalan political parties.

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<sup>22</sup> Netvizz is a Facebook application which creates *gdf* files of the friends' network of a user, of the members of the group and the pages in which he or she pertains.

<sup>23</sup> Gephi is an open software to visualize and analyze networks.

<sup>24</sup> In which I place all the parties' posts not related to the three main categories, i.e. party meetings, organizational issues, etc..

I have to be cautious when determining the relationships claimed in our two hypotheses because I am dealing with only seven cases and it is therefore difficult to provide any explanatory analysis which controls for rival influence of the variables. Consequently, most of the analyses will be descriptive and will tackle only bivariate associations or differences in means. First, I will examine the differences in frequencies between the parties, their posting behavior and the followers' responses. Then, I will apply measures of association between the parties' characteristics and parties' posting activity and followers' responses. In addition, I will carry out analyses of variance to ascertain the role played on the level of followers' engagement by the different types of issues posted by the parties and the different format of the posts (photo, video, link, status or text only). Finally, as a summary of results I will use a biplot to show the relative position of parties with regard to their posting behavior and the followers' engagement.

## 2.4.-Analyses and Findings

First of all I present the values of the characteristics of the Catalan political parties which belong to the first part of the first and second hypothesis. In this light, Table 2 shows different aspects linked to the 5 main characteristics of the political parties with seats in the Catalan Parliament:

*Table 2: Characteristics of Catalan parties with seats in the Catalan Parliament*

| Parties | Party Size (seats) | Party institutionalisation | Ideology (0-7)* (Left-Right axis) | Degree of Centralisation (0-1) | Position on the national identification axis (0-5)** |
|---------|--------------------|----------------------------|-----------------------------------|--------------------------------|--|
| PP      | Medium-Size        | Institutionalised          | 6.2                               | 0.81                           | 1.51   |

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|              |                |                   |      |      |      |  |
|--------------|----------------|-------------------|------|------|------|--|
|              | (19)           |                   |      |      |      |  |
| CiU          | Major          | Institutionalised | 4.82 | 0.81 | 4.31 |  |
|              | (50)           |                   |      |      |      |  |
| ERC          | Semi-Big       | Institutionalised | 2.26 | 0.70 | 4.72 |  |
|              | (21)           |                   |      |      |      |  |
| PSC          | Semi-Big       | Institutionalised | 3.19 | 0.77 | 2.69 |  |
|              | (20)           |                   |      |      |      |  |
| ICV-<br>EUIA | Medium<br>Size | Institutionalised | 2.3  | 0.68 | 3.86 |  |
|              | (13)           |                   |      |      |      |  |
| C'S          | Minor          | New               | 5.42 | 0.75 | 2.09 |  |
|              | (9)            |                   |      |      |      |  |
| CUP          | Minor          | New               | 2.6  | 0.48 | 4.21 |  |
|              | (3)            |                   |      |      |      |  |

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\* Mean from total survey respondents, 0=extreme left to 7=extreme right. CEO survey of 20 June. N=2000.

\*\* Mean from total survey respondents, 0= only Spanish to 5=only Catalan. CEO survey of 20 June. N=2000.

First, from Table 2 it can be observed that after the last elections to the Catalan Parliament there is only one big party (CiU), two semi-big parties (ERC and PSC), two medium-size parties (PP and ICV) and two small parties (C's and CUP). Second, with respect to the degree of institutionalisation of the Catalan parties, 5 out of 7 are institutionalised parties (ERC, CiU, PSC, CiU and ICV), while C'S and CUP are new parties. Third, according to the CEO survey of 20 June, the Catalan political parties span a wide range from left to right. More precisely, CEO respondents rate the Catalan parties from 2.26 (ERC) to 6.2 (PP). Fourth, concerning the Catalan parties' degree of centralisation in their decisions, Table 2 shows that there are three groups of parties:



(a) decentralised parties (CUP=0.48; ICV=0.68); (b) semi-centralised parties (ERC= 0.7; C's= 0.75; PSC= 0.77); and (c) highly centralised parties (CiU= 0.81; PP=0.81). Last, the positioning of the Catalan parties on the national identification axis shows four Catalan (ERC=4.61; CiU=4.31; CUP=4.21; ICV=3.86) and two Spanish (PP=1.51; C's=2.09) identified parties. The PSC will be ranked in a middle position on this political axis (PSC=2.69).

With regard to the first hypothesis –‘The Catalan parties’ size, institutionalization, centralization of decisions and position on the Left-Right and Nationalist cleavages, are related to their posting behavior on Facebook’- Table 3 shows the results about the Catalan parties’ posting behaviour on Facebook: First, in terms of posting activity (total posts and posting daily average), it can be observed that ICV and PSC are more active than CUP, CiU, C’S and PP, while ERC and CiU reach almost the same activity level. Second, a clear difference of the style of the posts between the way CIU and CUP communicate with their followers (99% posts with photo in the case of CiU<sup>25</sup> and 47.85% in case of CUP) compared with the other parties (which mainly use posts with videos or links or text) can be seen. Third, when it comes to the deletion of comments it can be observed that PP reaches the highest figure (93.29%) followed by CiU (31.4%) and PSC (11.93%).

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<sup>25</sup> The difference in elements used could be due to a strategic design. Experts recommend the use of photos with very short text in order to communicate better the partisan message and place the posts among the most seen (see EdgeRank).

*Table 3: Summary Table of the Catalan political parties' posting behavior*

| Parties  | Total Posts | Post/Day | Post+Video or Link/Total (%) | Post+Photo/Total (%) | Comments deleted by the party (% total comments of party) |
|----------|-------------|----------|------------------------------|----------------------|---|
| PP       | 52          | 1.48     | 99                           | 1                    | 93.29   |
| CiU      | 48          | 1.51     | 1                            | 99                   | 31.40   |
| ERC      | 47          | 1.51     | 84.70                        | 15.,30               | 5   |
| PSC      | 71          | 2.29     | 92                           | 8                    | 11.93   |
| ICV-EUIA | 77          | 2.48     | 72                           | 28                   | 4.10  |
| C'S      | 35          | 1.2      | 82.61                        | 17.39                | 5.3   |
| CUP      | 54          | 1.74     | 52.15                        | 47.85                | 2.2   |

Regarding the relationship between the parties' posts, the salient issues on the Catalan political agenda, and the five characteristics of the parties, in Table 4 several trends can be found: (a) It seems such as if Catalan parties follow that agenda but making emphasis on the issues that can benefit or differentiate them more in the electoral arena: C'S devotes 41.17% of posts to corruption affairs, in the case of CiU, ERC and PSC, 58.32%, 52.17% and 47.82% of the posts are related, respectively, to the nationalism issue while ICV, CUP and PP concentrate their Facebook posting activity on issues related to the left-right axis. Therefore, there is a clear relationship between the ideology of the parties in terms of nationalism and left-right issues and their posts, yet in this ideological dimension there are two fringe cases: PSC (with 47.82% of its posts linked to the nationalism issue) and C's (with 41.17% of its posts related to corruption); (b) the party that diversify the most their posting activity among different issues is the

right wing party PP; (c) it does not seem that the degree of centralisation of the decisions could be linked to the issues of the Catalan parties' Facebook posts.

*Table 4: Types of issues on the Catalan parties' posts (15 January-15 February 2013)*

| Parties  | Nationalism (%) | Corruption (%) | Left –Right (%) | Others (%) |
|----------|-----------------|----------------|-----------------|------------|
| PP       | 30.76           | 15.38          | 34.6            | 19.26      |
| CiU      | 58.3            | 8.3            | 6.25            | 27.15      |
| ERC      | 52.17           | 17.39          | 26.08           | 4.36       |
| PSC      | 47.82           | 7.24           | 28.98           | 15.96      |
| ICV-EUIA | 9.09            | 23.37          | 55.84           | 11.7       |
| C'S      | 2.94            | 41.17          | 5.88            | 50.01      |
| CUP      | 20              | 9.09           | 45.45           | 25.46      |

In order to test the first hypothesis on the relationship between the Catalan parties' characteristics and their Facebook behaviour I have analysed the association between the parties' main characteristics and the number of posts posted by each party and the number of comments deleted by each party. I have calculated the Pearson's R for ascertaining the association between the dependent variables (number of post and comments deleted) and four of the party characteristics (party size measured as number of seats at the Parliament, ideology, degree of centralization and position at the national axis) that are numeric variables. Cramer's V was used for measuring the association between the binary variable party institutionalization and the two dependent variables, in this case, recodified into categories.

The results show that with regard to the number of posts uploaded by each party, only one variable is strongly associated with the number of posts: ideology (left-right axis, Pearson's  $R = -0.5368$ ). That is, parties' posting activity decreases when moving to the right side of the axis. In the case of the number of comments deleted by each party, three variables show a strong association: ideology ( $R = 0.7341$ ), centralization ( $R = 0.5302$ ) and position at the national axis ( $R = -0.5860$ ). That is, the right wing parties, more Spanish identified and more centralised parties delete more comments than their counterparts.

Therefore, from all these statements H1 can only be partly corroborated, because the Catalan political parties' characteristics are more associated to the number of comments deleted but not to the number of posts uploaded. Only the left-right ideology clearly influences both parties' number of posts and comments deleted on Facebook. That is, parties on the right censor more and post less than parties on the left. Moreover, we also observed that this posting behaviour is affected by the salient political issues of the Catalan political agenda.

With respect to the second hypothesis -"The Catalan parties' size, institutionalization, centralization of decisions and position on the Left-Right and Nationalism cleavages, are related to the followers' responses to their posts"- Table 5 reveals some interesting aspects: First, it is important to note the low level of comments posted by ICV-Euia (218) and the high level of comments by C'S (1,058) and CUP (1,071) Facebook followers. Second, on the total number of likes of the Catalan parties' Facebook posts, CUP (24,194) leads here, followed by ERC (8,051). The last party in this dimension is PP (769). Third, concerning the followers' likes of the comments posted by other

followers, it seems that CUP (4,126) and C's (1,585) Facebook followers feel more enthusiastic on liking other followers' comments compared with the other parties' Facebook followers. Fourth, in terms of sharing the information posted on the parties' Facebook pages, CUP (9,830), ICV (5,123) and ERC (5,096) reach high levels here. Regarding the total engagement, again CUP reaches a degree sharply different from other parties (39,851), while PP has the lowest engagement (1,824); C's, CiU and ERC could be placed in a middle range, while PSC comes only sixth out of the seven parties (3,822). Fifth, with respect to the ratio likes/engagement, a slight predominance of CiU (66.4%) and CUP (60.7%) over the other parties can be observed. Sixth, when it comes to the ratio shares/engagement it is important to note the position reached by ICV (55.7%) and ERC (36.2%) compared to the lower levels of the other Catalan parties in this dimension. Last but not least, about the ratio of the likes on the comments over the engagement, PSC (13.65%), CUP (10.35%) and C's (13.1%) reach high levels in comparison to the other parties.

*Table 5: Features of the behavior of the Catalan parties' Facebook followers*

| Parties  | Total Comments | Total likes | Comment / likes | Total shares | Engagement | Likes/Engagement (%) | Shares/Engagement (%) | Comments/Engagement (%) | Like comment/Engagement (%) |
|----------|----------------|-------------|-----------------|--------------|------------|----------------------|-----------------------|-------------------------|-----------------------------|
| PP       | 923            | 769         | 11              | 121          | 1,824      | 42.16                | 6.6                   | 50.60                   | 0.64                        |
| CiU      | 629            | 6,831       | 319             | 2,509        | 10,287     | 66.4                 | 24.3                  | 3.1                     | 6.2                         |
| ERC      | 531            | 8,051       | 366             | 5,096        | 14,044     | 57.3                 | 36.2                  | 3                       | 3.5                         |
| PSC      | 662            | 2,094       | 521             | 545          | 3,822      | 54.78                | 14.25                 | 17.32                   | 13.65                       |
| ICV-EUIA | 218            | 3,718       | 136             | 5,123        | 9,195      | 40.4                 | 55.7                  | 2.37                    | 1.4                         |
| C'S      | 1,058          | 6,813       | 1,585           | 2,593        | 12,049     | 56.54                | 21.52                 | 8.7                     | 13.10                       |

Among all these different elements of interaction in the Facebook pages, I have selected the level of engagement (sum of comments, likes and shares) in order to test how the parties' characteristics relate with followers' behaviour. As with the first hypothesis, I have calculated the Pearson's R for ascertaining the association between the dependent variable and four of the party characteristics (party size measured as number of seats at the Parliament, ideology, degree of centralization and position at the national axis) that are numeric variables. Cramer's V was used for measuring the association between the binary variable party institutionalization and the engagement level, in this case, recodified into categories. The measures of association show that the five parties' characteristics are strongly related to the engagement level: party size ( $R=-0.4293$ ), party institutionalization (Cramer's  $V=0.6892$ ), left-right ideology ( $R=-0.4363$ ), centralization ( $R=-0.9275$ ) and position on the national axis ( $R=0.51$ ). Taking these associations into account and the distribution of engagement showed in table 5 it can be stated that: (1) small-parties (party size) such as CUP and C'S have more engaged and committed (comments, likes and shares) Facebook followers, although a semi-big party such as ERC rises a very high level of engagement as well; (2) in terms of institutionalisation, the less institutionalised parties (CUP and C'S) are among the most active (comments, likes and shares) Facebook followers, although ERC stands in second place regarding the level of engagement; (3) the centralisation of the parties' decisions, their ideology and position on the national axis seem to affect their Facebook followers' behaviour: centralised parties such as PP or semi-centralised

parties such as the PSC rank lower in engagement than decentralised parties such as CUP and ICV; in general Catalan identified parties and left wing parties arise more engagement than the rest.

Going further in the examination of the role of parties' ideological and national positions on the level of followers' engagement, I have studied the influence of the issues of the Catalan political agenda on the level of engagement using analysis of variance. That is, I have studied the differences in the level of engagement<sup>26</sup> by type of issue<sup>27</sup> on the parties' posts. The results of the one-way ANOVA in Table 6 show a statistically significant ( $F(3,81)=14,672, p=0.000$ ) difference between the issues of the posts (Nationalism, Corruption, Left-Right and Others):

*Table 6: One-way Analysis of Variance of Engagement by Issues of the posts*

| <i>Source</i>  | <i>df</i> | <i>SS</i> | <i>MS</i> | <i>F</i> | <i>P</i> |
|----------------|-----------|-----------|-----------|----------|----------|
| Between groups | 30.161    | 3         | 10.054    | 14.672   | .000     |
| Within groups  | 555.038   | 810       | .685      |          |          |
| Total          | 585.199   | 813       |           |          |          |

<sup>26</sup> The level of engagement did not follow a normal distribution (a fact that is common in social media data, see Hogan: 2008) because the lowest levels of engagement concentrate almost half of the posts. To solve that problem I have normalized the dependent variable by applying a logarithmic transformation.

<sup>27</sup> I showed in table 4 the main issues of the parties' posts that clearly correspond to the Catalan political agenda of the time period studied (from the 15<sup>th</sup> of January to the 15 of March, 2013): nationalism and sovereignty (the debate and approval of the Catalan Parliament's Declaration of Sovereignty), corruption (the *Barcenas* and the *Camarga* affairs) and the left-right axis (context of economic crises and social benefits cuts).

The Turkey and Games-Howell post hoc tests revealed that the engagement of the posts-others condition ( $M=1,18$ ,  $SD=.9$ ) was significantly different ( $p=.000$ ) from the posts Left-Right-condition ( $M=1,66$ ,  $SD=.72$ ), the posts-corruption condition ( $M=1,61$ ,  $SD=.83$ ), and posts-nationalism condition ( $M=1,55$ ,  $SD=.84$ ). Taken together, these results suggest that when the posts of the parties touch the cleavages of the Catalan party system or the issues framing the Catalan agenda they reach similar levels of engagement and that these engagement levels are by far higher than those reached by the parties' posts touching other issues.

In sum, the second hypothesis can be corroborated: the 5 characteristics of Catalan political parties are related to the followers' responses to their posts and, in certain ways, mold the responses to their posts. However, as I have previously mentioned, I should take into account that our analyses focused on the role of parties' characteristics but other variables could be important in determining the level of followers' engagement. For example, parties' marketing strategies to get more involvement in Facebook pages could be relevant. The reader has seen in Table 3 that parties differed in their posting style (CiU and CUP mainly use posts with photo while the rest use more videos or links), so therefore I have checked if posting style has an influence on the level of engagement carrying out analysis of variance. There was a statistically significant ( $F(3,81)=122,579$ ,  $p=0.000$ ) difference between the type of posts (Link, Status, Photo and Video) as it can be observed in Table 7:

*Table 7: One-way Analysis of Variance of Engagement by Type of post*

| <i>Source</i>  | <i>df</i> | <i>SS</i> | <i>MS</i> | <i>F</i> | <i>P</i> |
|----------------|-----------|-----------|-----------|----------|----------|
| Between groups | 183.264   | 3         | 61.088    | 122.579  | .000     |



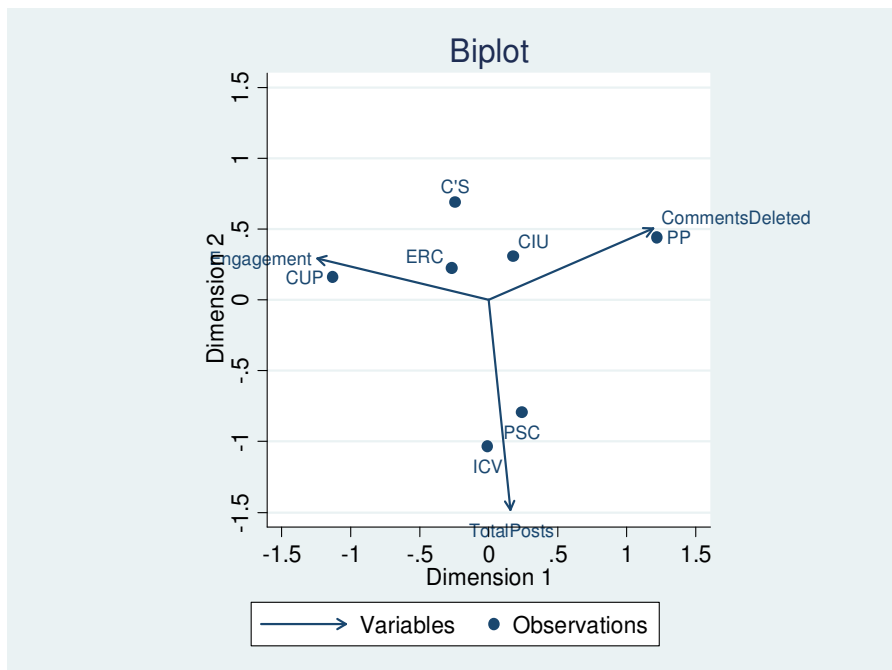
|               |         |     |      |
|---------------|---------|-----|------|
| Within groups | 404.168 | 811 | .498 |
| Total         | 587.431 | 814 |      |

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The Turkey and Games-Howell post-hoc tests revealed that the posts with photos condition ( $M=2.09$ ,  $SD=.68$ ), the post with videos condition ( $M=1.85$ ,  $SD=.63$ ), the posts with links condition ( $M=1.31$ ,  $SD=.61$ ) and the posts with status condition ( $M=.73$ ,  $SD=.95$ ) were significantly different between them. However, the posts with photo condition and the posts with video condition were less significant ( $p=0.011$ ) than the difference between all the other type of posts ( $p=0.000$ ). Taken together, these results suggest that visual posts (posts with photos and videos) reach higher engagement than textual posts (posts with links or status). Specifically, the highest difference can be observed between the posts with photos and the posts with status.

To conclude and in order to summarise the main results explained about the two hypotheses, I have carried out a biplot which displays a two-dimensional plot of the parties and their relative positions on the three main traits of parties' Facebook pages (number of posts, number of comments deleted, level of engagement), which are represented in arrows.

Figure 6: Party position in the three main traits of parties' Facebook pages.



As we can see, CUP and ERC load mainly in the 'Engagement' variable, PP and CiU in the 'CommentsDeleted' variable and ICV and PSC in the 'TotalPost' dimension. Ciutadans (C'S) appears in an equidistant location with respect other parties but closer to the engagement variable where CUP and ERC load heavily because C'S is the third Catalan party in level of engagement. Therefore this graphic corroborates what I have stated in the previous analysis.

Finally, I checked the relationship between the number of posts initiated by the party and the engagement level of their Facebook followers. I wanted to ascertain if the amount of updates and news posted by the parties could arise more comments, likes and shares by the followers. But this relationship is not proved since the Pearson's correlation is of -0.18. Studies from other countries show the same results (Klinger,

2013, p. 729): it seems that posting more does not necessarily imply more response from parties' followers. In this regard, it should be taken into account that the party with more posting activity -PSC- has the lowest level of engagement. Therefore, followers do not necessarily interact and respond more if parties update and post more.

## **2.5.-Discussion and Conclusions**

The research carried on Catalan parties and their Facebook followers' behaviour on parties' Facebook pages has shown that Catalan parties' characteristics, their posting behaviour, the issues of the political agenda and the reactions of the parties' Facebook followers to the parties' posts are related. Parties have a diverse posting activity in Facebook and their followers interact and participate differently.

However, parties' characteristics seem to affect more followers' level of engagement than parties' posting behaviour. In the case of parties' posting activity (first hypothesis), the differences in frequencies and the measures of association reveal a strong relation between parties' ideology (or party position on the left-right cleavage) and the number of posts, that is, parties' posting activity increases when the party leans to the left. In addition, the content of the parties' posts (left-right issues, nationalism, corruption and others) are very much connected to parties' position on the left-right and national cleavages which at the same time correspond to the issues shaping the Catalan political agenda. In the case of the number of comments deleted, three parties' characteristics play an influential role: left-right ideology, centralization and the national cleavage. That is, right-wing, Spanish identified and centralized

parties delete more comments than their counterparts. Similar to what Wall and Sudulich (2010) and Cardenal (2011) discovered for the parties' websites, centralisation of decisions, high levels of institutionalisation and a large size do not mean that parties are deploying more participatory or interactive online channels, regardless of the resources available to these kinds of parties.

With regard to followers' reactions to parties' posts (second hypothesis), the five parties' characteristics are strongly associated to the level of engagement. In Catalonia, small and less institutionalised parties (CUP, C'S) have the most active and committed Facebook followers, jointly with ERC that is an institutionalised but semi-big party. On the contrary, in another fragmented party system such the Swiss one, big and dominant parties have the more active Facebook followers (Klinger, 2011). Therefore, we can state that Catalonia is an example of how online environment can favour more the minor (CUP, C's), medium-size (ICV) or semi-big (ERC) and less institutionalised parties (CUP, C's). The majority of the voters of these parties obtain political information from Internet and more than 20% from Facebook and Twitter. Also, the centralisation of the parties' decisions, their ideology and position on the national axis seem to be related to Facebook followers' reactions: centralised parties such as PP or semi-centralised parties such as the PSC rank lower in engagement than decentralised parties such as CUP and ICV; in general Catalan identified parties and left wing parties arise more engagement than the rest. In addition, parties' posts touching the cleavages or the agenda issues reach a higher engagement than those touching other kind of issues.

In sum, not all the parties' characteristics play a role in parties' posting behaviour but all of them create differences in the case of the followers' engagement. In addition, the research found some evidence that the dominant cleavages and related issues in the political agenda dominate the content of the posts and increase the involvement of the followers. That is, Catalan nationalist parties have far more interaction in their Facebook pages probably because they focus on the current dominant issue (Bartomeus & Medina, 2010; Pallarés & Verge): Catalan sovereignty.

Summarizing, Catalan nationalist parties (CIU, ERC, CUP) and left wing parties (ERC, PSC, ICV, CUP) arise more engagement than the rest (PP, C's). In fact, parties' ideology makes a difference in followers' behaviour and in parties' Facebook behaviour: left wing parties initiated more posts, delete few posts and have more compromised followers, whereas Catalan identified parties have more engagement and censor less. These results are in line with those from other studies which found that parties' ideological position have an influence in their online interaction (Vergeer et al, 2011).

Last, the results of the analysis of variance show that visual posts (posts with videos or photos) trigger more engagement (comments, likes and shares) of parties' Facebook followers than parties' textual posts (posts with links or status). Precisely, CiU and the CUP, which enjoy high levels of followers' involvement, are using intensively photos and videos in their posts.

Could the conclusions of this research be applied to other cases? Even if Catalonia is witnessing a very specific political climate, I believe that if my argument is about parties' main characteristics and parties are conceived as comparable objects across

countries, in line with what has been already argued by Cardenal (2011), my argument could then be applicable to all kinds of political contexts. Moreover, the methods and the open software used in the research are also prone to be replicated in other studies.

Notwithstanding, a number of complementary hypotheses remain to be tested. First, it is reasonable to assume that other political parties' characteristics play a role in explaining parties' Facebook behaviour. For instance, a more in-depth analysis of the party primary goals and the corresponding online communication strategy (Römmele, 2003) should be carried out. Also, it is relevant to consider the perception of the party leaders with regard to the role to be played by social network sites (Lynch & Hogan, 2012) in the parties' communication strategy and the organization of parties' social media departments (which may be studied by doing in-depth interviews). Second, it could be interesting to analyse the parties' generation, appropriation and diffusion of the issues framing the Catalan political agenda that also pours the issues arisen in Facebook. Third, it may be useful for explanatory purposes to identify the socio-demographic characteristics of the parties' Facebook followers (by using online surveys) since these characteristics could explain part of the differences in participation in parties' Facebook pages. Finally, more studies overcoming the limited time span of this research and doing comparative analysis between parties of different and similar political systems could add powerful insights to the way in which parties deal with Social Media.

In a nutshell, considering the broader debate on cyberpolitics and the parties' online political behaviour, this research implies that parties' characteristics and the issues of

the political agenda are affecting Facebook followers' reactions to parties' posts. In Catalonia, social network sites could have an equalization effect since minor and new parties are achieving more participation than bigger and institutionalised parties. It also shows that other characteristics of the parties (centralisation of decisions, left-right ideology, national identification) still matter and that their influence is also affected by the political environment in which parties are embedded. In brief, this research has sorted out some of the ingredients of parties' and their Facebook followers' cocktail, but there is a long way to go in explaining parties' posting behaviour and followers' engagement.

## CHAPTER III: POLITICAL INFLUENTIALS IN THE CATALAN PARLIAMENTARIAN FOLLOWING-FOLLOWER TWITTER NETWORK

### 3.1.-Introduction

Twitter was launched on March 21, 2006 by Jack Dorsey and by December 31, 2013, it had a monthly average of 241 million active users (Twitter 2013), an increase of 30% year-on-year. As a social media Twitter<sup>28</sup> offers users the potential to deliver conventional forms of discourse to a wider audience (Saebo, 2011) while at the same time personalizing communication flows to levels that had never previously been reached in politics. Moreover, Twitter gives voters the chance to enter into a real online dialogue with representatives (Mackay, 2010, p. 23), enhances relationship building (Briones et al., 2011) and allows individual citizens to make, contribute, filter and share content (Bechmann & Lomborg, 2012). Notwithstanding, it also puts pressure on the hierarchical structures of parties (Gustafsson, 2012, p. 1,123), as it enables direct contact between the public and party representatives (Golbeck et al., 2010; Missingham, 2010; Thamm & Bleier, 2013) and blurs parties' traditional strategy, built on a clear difference between members and the general public (Margetts, 2001; Gibson et al., 2003; Löfgren, 2003).

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<sup>28</sup> An online social networking website and microblogging service that allows users to post and read text-based messages of up to 140 characters, known as "tweets". It gives its users the opportunity to share short messages (tweets) and to respond to tweets (mentions) or simply forward a tweet (retweet).



A growing body of research has begun to examine the influence that social networking sites have on political communication from multiple angles, yet few studies have analyzed the effects that Twitter could have on the functioning of parliaments and the relationships among its members. More precisely, I believe that the appropriation and use of social media by parties and politicians have arisen many questions about their effects on our parliaments, amongst which in Chapter III of this dissertation I will try to answer three: Who are the *political influentials* (Dubois & Gaffney, 2014) of the Catalan parliamentary Twitter network? What factors are behind their centrality position in the network? And in a broader sense, are social media challenging politics in parliaments?

The objective of Chapter III of this research is then to understand the characteristics and particularities of parliamentarians' Twitter networks and the factors triggering the appearance of new Internet-mediated forms of parliamentary political communication leadership. The time span of the analysis is not long (January-March 2014), but hopefully it will be sufficient to shed light on some of the present controversies surrounding parliaments, social media and the appearance of new *political influentials*.

### **3.2.-Previous studies on parliamentary networks and the use of Twitter by MPs**

Political communication among parties, their representatives and the general public have mutated with the appearance of new forms of communication technologies. In fact, the controversy regarding party organization changes due to new channels of

communication was given a boost with the upsurge of the Internet and Information and Communication technologies (ICTs). The Web and specifically the spread of social media are shaping the way parties, representatives, members and their electoral arena organize their relationships.

The effects of the Internet on political parties have been studied in depth by political scientists. Some authors pondered over the organizational rearrangements triggered by parties' adoption of ICTs in their relations with party members and the electorate (Gibson & Ward, 1999; Margetts, 2001; Heidar & Saglie, 2003; Vissers, 2009) while others studied factors facilitating and differentiating the appropriation and use of Internet-based technologies by parties (Römmele, 2003; Padró-Solanet & Cardenal 2008; Wall & Sudulich, 2010; Cardenal, 2011).

Relations between social media and parties have been analyzed from different points of view, spanning from the effect of party's centralization of decisions on the interaction found in Facebook pages (Esteve & Borge, 2013), to party hierarchies erosion produced by social media (Gustafsson, 2012; Skovsgaard & Van Dalen, 2013) and the political communication personalization effect of social media (Klinger, 2013).

Notwithstanding, there is a general lack of literature dealing with parliamentarians' online social networks and the implications that these new forms of communication have for party leadership and for relations between parties. I will review the literature focusing on two aspects: a) parliamentarian networks; b) parliamentarians' use of social media, specifically, Twitter.

### *3.2.1.-Parliamentarian networks*

Social networks are created whenever people interact, either directly or indirectly, with other people, institutions and bodies (Hansen et al., 2011). Simply put, a 'network is a set of nodes (such as people, organizations, web pages or nation states) and a set of relations (or ties) between these nodes' (Hogan, 2007, p. 2).

For several decades, before the upsurge of the Internet, social scientists from structuralist and relational perspectives have studied networks of political or social actors in order to detect the relationships of influence, power and dominance that pervaded among them (Laumann & Pappi, 1976; Freeman, 1979; Knoke, 1994; Diani, 2003; Knoke & Yang, 2008). In terms of parliaments, network-based research has been carried out in political science to analyze the parliamentarians' relationships in the legislation process. A fact that, to our research aims is extremely relevant for Twitter following-follower networks are relationship networks. Routh's study (1938) of the Illinois Senate throughout the 1937 session was the first to reveal that contacts among senators 'tended to centered on individuals who by other indices were shown to play important roles in the process of legislation' (Routh, 1938, p. 132). Following up on this line of research Patterson (1959; 1972) pointed out that geographical location, length of tenure, political leadership, earlier political alliances and seating arrangements on the floor of the Assembly were determinants for the parliamentarians' choice of friends. Along the same lines, the study conducted by Caldeira and Patterson on the interpersonal choices recorded by state legislators in Iowa, demonstrated that 'Partisanship, legislative activism, experience in government, and leadership role' (Caldeira & Patterson, 1987, p. 965) determined political friendship relations in the

legislature. Last but not least, Arnold et al., (2000) also provided evidence that in the Ohio House of Representatives friendship ties had an impact to which members vote together. In brief, as these authors pointed ‘because knowledge and information are dispersed through the social network, location within a network influences the information that a person receives and, as a result, may influence how the information is processed’ (Arnold et al, 2000). Thus friendship ties are important because they influence the kind of information a member might receive.

More recently, increasing computational capabilities and the dawn of the Internet have ushered in a major shift in network thinking which has triggered a proliferation of online political networks’ studies: massive datasets have been able to be gathered and analyzed in reasonable time frames (Hogan 2007, p. 1). Some researchers have highlighted the particular characteristics of the technical study of social network sites such as Twitter (Hansen et al., 2011) and Facebook (Hogan, 2011). In this vein, some have started to map Twitter conversations (Smith et al., 2014) and to analyze the structure of affiliation networks (Verweij, 2012; Smith et al., 2014). On the other hand, there was a group of authors that emphasized specific aspects of network analysis such as the role of social networks in information diffusion and contagion (Paranyushkin, 2012; Bakshy et al, 2012) or the effect of brokers in bridging or bounding (Putnam, 2000) social network clusters (Burt, 2005; González-Bailon & Wang, 2013). Yoon and Park (2014) found that politicians’ networks in Twitter are generally clustered with political affiliation groups of the ruling party and the opposition parties and that while the following-follower network was a social ritual network (with high

reciprocated vertex per ratio figures<sup>29</sup>), the mention network was a network of political support characterized by the fact that certain politicians received the majority of mentions.

It is in this new framework that the concept of *influentials and network centrality* become relevant to uncover the different dimensions of communication leaderships in the parliamentary online networks. Opinion leadership, or as Dubois and Gaffney point out, someone who can be defined as an 'influential' (Dubois & Gaffney, 2014, p. 3), is at the base of political leadership. Specifically, an opinion leader could be defined as someone able to 'influence his or her close personal ties by exerting social pressure and social support' (Dubois & Gaffney, 2014, p. 3). The concept comes from the two-step flow theory (Lazarsfeld et al., 1948). This theory states that the influence of mass media first reaches opinion leaders and then they transmit the information to the others (Katz, 1957). Therefore, as Xu et al., remark 'opinion leaders have better access to information and can turn the information into asymmetric influence on others' (Xu et al., 2014). Diffusion studies have identified some characteristics of opinion leaders which include high social status, innovative behavior, vast social connections and highly involvement (Rogers, 2003; Vishwanath & Barnett, 2011). According to Dubois and Gaffney this definition of an opinion leader reveals four core facets of influence in Twitter political networks: '*having a following, seen as an expert, knowledgeable/have expertise and in a position within their local community to exert social pressure and social support/social embeddedness*' (Dubois & Gaffney, 2014, p. 3).

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<sup>29</sup> In a directed graph the *Reciprocated Vertex pair Ratio* is the number of adjacent vertices that are connected to the vertex with edges in both directions divided by the number of adjacent vertices. In my case, the vertices are the parliamentarians' Twitter account.

But how can be measured the facets of influence in online political networks? In this regard, the cornerstone study provided by Freeman (1978/1979) pointed to measure centrality in networks by using the degree (indegree or number of followers) as an index of point centrality or by analyzing 'the frequency with which a point falls between pairs of other points on the shortest or geodesic paths connecting them' – betweenness centrality- (Freeman, 1978/1979, p. 221). More recently, Xu et al., study of Twitter based opinion leadership in the Wisconsin recall election operationalized the concept of social connectivity by using the betweenness centrality network measure (Xu et al., 2014); and Dubois and Gaffney (2014) analysis of the Twitter communities of the major Canadian parties (Conservative Party of Canada and New Democratic Party of Canada) discovered that indegree and eigenvector centrality are a similar measure and identified traditional political elites as influentials (Dubois & Gaffney, 2014).

In addition, some studies pinpoint that the brokerage position (Burt, 2005) of opinion leaderships in political networks on Twitter can also be measured by their betweenness centrality (Freeman, 1978/79; González-Bailon & Wang, 2013; Dubois & Gaffney, 2014; Xu et al., 2014). In that regard, González-Bailon and Wang (2013) pointed that 'users spanning structural holes form an elite: they have more followers and are mentioned and re-tweeted more often' (González-Bailon & Wang, 2013, p. 9). Also, Xu et al's., (2014) study of the recall elections in Wisconsin (2012) discovered that betweenness centrality was positively related to the number of retweets.

Nevertheless, very few studies have attempted to explain differences in network location. Dubois and Gaffney (2014) discovered that for the main parties' Twitter

communities in Canada, the highest indegrees were concentrated among the traditional political elite (media outlets, journalists and politicians). In the case of the environmental movement in Milan, Diani found that the distribution of indegree and brokerage scores differs remarkably (Diani, 2003, p. 112). Brokerage is extremely concentrated in few organizations, while a higher frequency of followings is much more spread out all across the nodes. Having a clear public profile and access to the national media, a long tradition of campaigning and access to political institutions were also related to a high indegree but not to a brokerage position (Diani, 2003, p. 113-115). On the contrary, the capacity to cover a variety of issues is a significant predictor of brokerage but not of a high number of followers. These results indicate that highly different functions are being performed by the nodes with some popularity and those with some brokerage capacity. The most important function of a broker is within the network itself: establishing of communication among different subgroups and facilitating the integration of the network as a whole (Diani, 2003, p. 113); whereas the following metrics use to identify traditionally important and highly visible political or social players (Dubois & Gaffney, 2014, p. 1269).

### *3.2.2.-Use of Twitter by members of parliament*

Since Barack Obama's presidential victory in 2008, most research has focused on comprehending the role of Twitter in electoral scenarios. Nevertheless, some studies have been conducted on the use of social media by members of parliament. First, some authors have studied the factors behind their adoption of Twitter. The majority of these studies have focused on the US Congress. In that respect, Lessen and Brown (2010) found that while socio-demographic factors did matter with regard to the

adoption of Twitter, Internet usage and the number of years the members had been in Congress had no influence. Contrarily, Chi and Yang (2010) found that socio-demographic factors had no effect on Twitter adoption by parliamentarians. In this same regard, Williams and Gulati (2010) stated that party pertinence and campaign resources were drivers of Twitter adoption. Second, other researchers analyzed the parliamentarians' different behavior on Twitter by studying the content of their tweets. Along these lines, Golbeck et al., (2010) pointed out that although Congressmen and women were primarily using Twitter to disseminate their own information, they also used it to contact citizens directly. Similarly, Margaretten and Gaber (2014) found that several Scottish parliamentarians were engaged in two-way conversations with constituents and, in that sense, Twitter could be a means of recovering lost trust in politicians. However, Small (2010) discovered that Canadian party leaders mainly used Twitter to broadcast official party information. Finally, another branch of research has focused on attempting to understand the characteristics of parliamentarians' Twitter interactions by studying their retweets and mentions. In this sense, Grant et al., (2010), in a study on Australian politicians pointed out that there are two factors influencing the number of times a politician would be likely to be retweeted: his or her number of followers (the more followers a politician has the more likely to be retweeted) and their Twitter behavior (politicians who themselves were more likely to engage in conversational tweeting were also more likely to be retweeted). In this same line of research, Conover et al., (2011), analyzed political hashtags some weeks before US congressional midterm elections and observed that retweet graphs reproduce the known partisan split in the online world,



while the mention graph shows that ideologically opposed individuals interact with each other. By studying the following relations on Twitter of the members of the German Federal Diet, Thamm and Bleier (2012) demonstrated that retweets have a professional use while mentions have a personal connotation.

In short, I will use all the theoretical and practical resources outlined above to uncover who the *political influentials* of the Catalan following-follower Twitter network are and what are their characteristics. I believe that this research could be very useful in providing empirical evidence to understand social media networks and how they are challenging party politics and parliamentarians' communication. Moreover, I think that the analytical tools used in this research could also be applied to analyze other parliamentarian and political networks. In addition, I will seek to explain the parliamentarians' centrality position through a set of individual factors already analyzed in studies on parliamentarians' Twitter usage, such as the socio-demographic profile, the use of Internet, and new variables related to parliamentary work and the electoral and political positions of parliamentarians. As far as I know, this is the first time that a work has aimed to explain parliamentarians' online networks by means of individual variables.

### **3.3.-Methods and hypotheses**

The main goal of Chapter III of this dissertation is to reveal the *political influentials* of the following-follower Twitter network of Catalan parliamentarians and to find out what factors lay behind the centrality position of some Catalan parliamentarians. I will measure centrality position in networks by using the indegree or number of followers,

and by analyzing the betweenness centrality, that is the frequency with which a node is a bridge along the shortest paths connecting two other nodes (Freeman, 1977). Two hypotheses will be tested taking the two measurements of network centrality as dependent variables and expecting different explanations for them:

*H3: The degree centrality (indegree) of Catalan MPs in the Catalan parliamentarians' following-follower Twitter network is mainly determined by political factors, such as the parliamentarian's official political position, belonging to the party in government and the length of tenure.* As it has been shown in the section of the theoretical background, the number of followers a Twitter account has seems to depend on traditional functions of leadership, popularity and prestige (Diani, 2003; Dubois & Gaffney, 2014, Yoon & Park, 2014). Therefore, I hypothesize that in the Catalan parliamentarians' Twitter network the probability of having followers increases when the member of the parliament is an official party leader (measured by their political position in the party), holds a political responsibility at the parliament or parliamentarian group, has a chief role at the parliament's commissions, is an incumbent and represents the party in power.

Other explanatory factors that have been studied in the literature on friendship ties among parliamentarians and on parliamentarians' adoption of Twitter, such as socio-demographic characteristics (age, gender and education level), the density of Internet use (having a Facebook account, a blog and a certain number of tweets per day) and the legislative involvement (number of commissions, number of interventions in the commissions and in the plenary) are included in the model as control variables

(Routts, 1938; Patterson, 1952, 1972; Caldeira & Patterson, 1987; Lessen & Brown, 2010; Chi & Yang, 2010; Williams & Gulatti, 2010) .

H4: *The brokerage position (betweenness centrality) of Catalan Mps in the following-follower Twitter network is not so much determined by their official political position but by the network activities carried out by the parliamentarians.* That is, I expect that the brokerage position of the Catalan parliamentarians will be explained mostly by their network behavior, as previous studies have shown social or political brokers are for the most part, not the official and more visible political elites or social organizations, but the more average actors performing a bridging function between the different communities and people within a network (Diani, 2003; Dubois & Gaffney, 2014). In that sense, I expect to find an important amount of brokers who are not official party leaders or holding relevant positions in parliament but who achieve a central location through their capacity to connect other parliamentarians. Therefore, the networking or relational variables (in-degree, out-degree and reciprocated vertex per ratio) are expected to be the most relevant among the rest of individual and political characteristics.

In order to test these hypotheses empirically, I will first compile a list containing the Twitter usernames of members of the Catalan Parliament. There are 115 Catalan parliamentarians with Twitter accounts (85% of the total number). I will use then the NodeXL program to collect the data of our Twitter network in a longitudinal perspective (13-01-2014; 24-02-2014; 24-03-2014) and to discover the degree

centrality (indegree) and the brokerage position (betweenness centrality<sup>30</sup>) of the Catalan parliamentarians' Twitter network. Lastly, I will visualize the network graphs using the Gephi program.

Once I know the networks' *political influentials*, and in concordance with the methods employed in Xu et al's study (Xu et al., 2014), I will carry out regression analyses to ascertain factors explaining the MPs' centrality position in the Catalan Parliament Twitter network. The model (based on an original data base) will be run on the 115 members of the Catalan Parliament with Twitter accounts. The independent variables in the model include 6 dimensions<sup>31</sup>: a - socio-demographic characteristics (age, gender, education); b - Internet behavior (having a blog or Facebook account) and Twitter activity (average tweets per day between 13 January and 24 March 2014); c - electoral characteristics such as the party they belong to and the number of legislatures during which they have sat in Parliament (up to three: 2006, 2010, 2012); d - parliament activity (number of legislative commissions in which they participate and number of interventions in these commissions and in the plenary sessions); e - political position in the parliament (role in the parliamentarian group and the parliament and role in parliamentary commissions), at the party (party president) or as mayors when that is the case; f - relational variables: In-Degree (number of followers a parliamentarian's Twitter holds), Out-Degree (number of parliamentarian's Twitters

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<sup>30</sup> The broker position will be measured by using the betweenness centrality indicator, which is a standard measure of a node's centrality based on the following-followers structure. Hansen, Shneiderman & Smith (2010, p. 40) define the betweenness centrality as 'a measure of how often a given vertex –or node- lies on the shortest path between two other vertices'.

<sup>31</sup> See appendix I for codification and description of the variables.

each parliamentarian is following) and the Reciprocated Vertex Pair Ratio (a type of ratio between following and followers of each Twitter account).

### **3.4.-An example of affiliation network: The Catalan MPs' following-follower Twitter network**

The analysis of the three following-follower Twitter networks of the Catalan members of parliament with Twitter accounts permits to highlight different aspects: Firstly, in our case study, a selected group of 115 people created three Twitter networks of 4,447 (January 2014), 4,287 (February 2014) and 4,326 (March 2014) relationships. The maximum geodesic distance (diameter) of the three networks is three, which means that a maximum of three steps is needed to cross the network. The average distance of the three networks is 1.5, indicating that the average distance between the users is 1.5 steps. Moreover, the average density of the three networks is 0.32. This shows that 32% of the total possible relations actually occur. Although the density in all the networks is low, the short distances make it possible to connect easily to others.

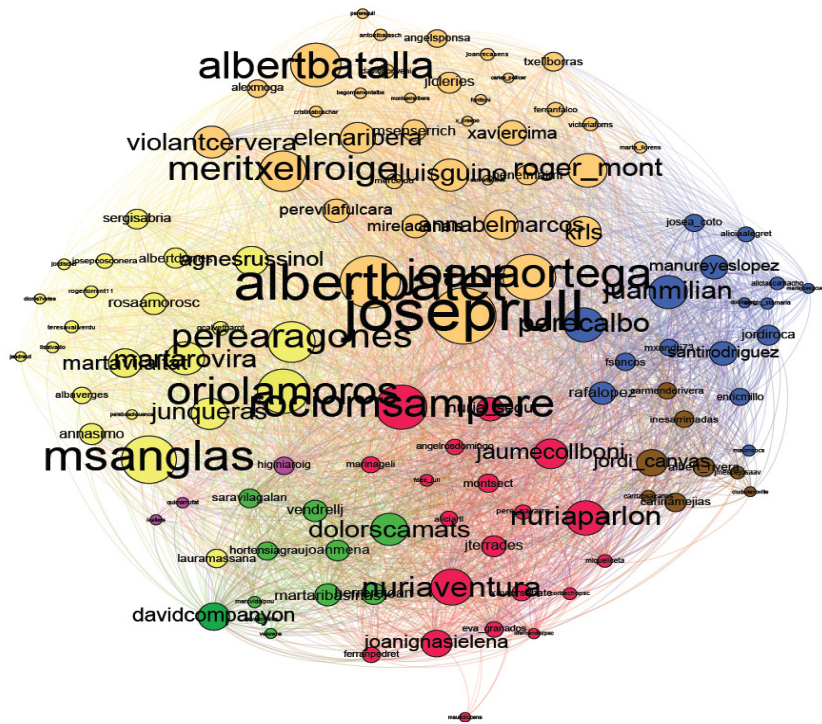
Secondly, as can be seen from Figures 7, 8 and 9, the three networks could be classified as being tight crowd and affiliation networks. In this context, they are Tight Crowd networks, as they contain between 2 and 6 groups, a high level of interconnectivity and few isolates (Smith et al., 2014, p. 8). These characteristics belong to the so-called affiliation<sup>32</sup> networks, the typical network type to be expected in the Catalan Parliament given its partisan structure, its particular working milieu and ideological and partisan groups. Furthermore, as some authors have stated (Burt,

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<sup>32</sup> Newman defines the affiliation network as a 'network of actors connected by a common membership in groups of some sort, such as clubs, teams or organizations' (Newman, 2001, p. 3).

2005), tight crowd networks facilitate the appearance of structural holes<sup>33</sup>, and therefore brokers who will bridge the different communities.

Figure 7: The Following-Follower Twitter network of Catalan deputies (January 2014)



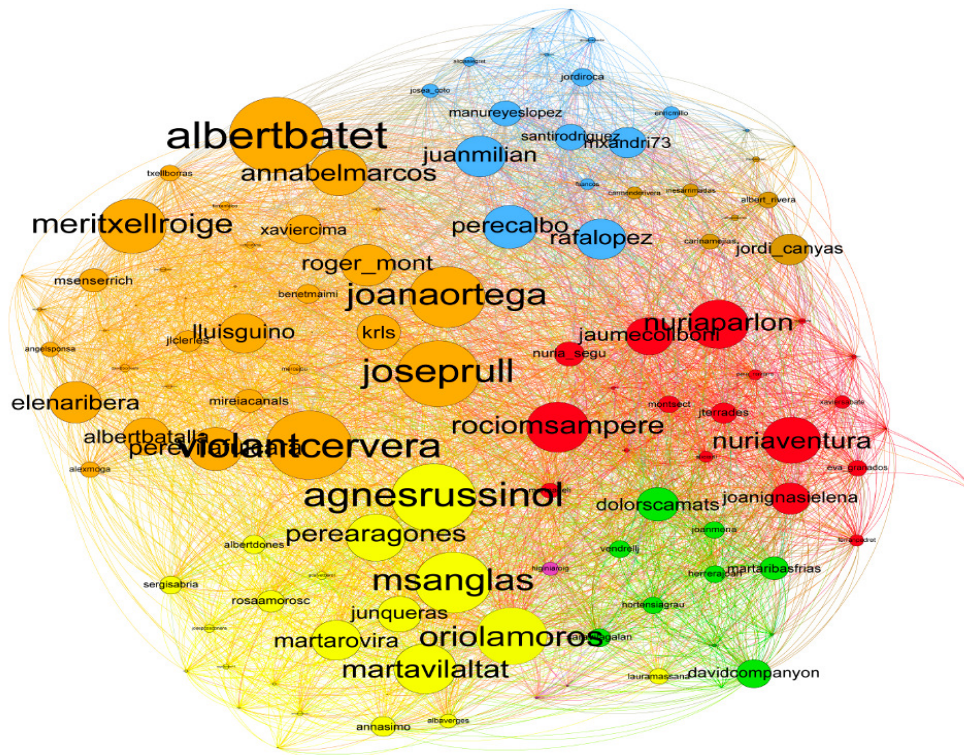
\*The nodes of the network are the 115 deputies with Twitter account

\*\*The size of the nodes is equivalent to their betweenness centrality in the network

\*\*\*The color of the nodes is equivalent to the political party that they pertain: orange (CIU), yellow (ERC), red (PSC), blue (PP), green (ICV), brown (C'S) and violet (CUP)

<sup>33</sup> According to Burt a structural hole is: 'A potentially valuable context for action, brokerage is the action of coordinating across the hole with bridges between people on opposite sides of the hole, and network entrepreneurs or brokers, are the people who build the bridges' (Burt, 2005, p. 18).

Figure 8: The Following-Follower Twitter network of Catalan deputies (February 2014)



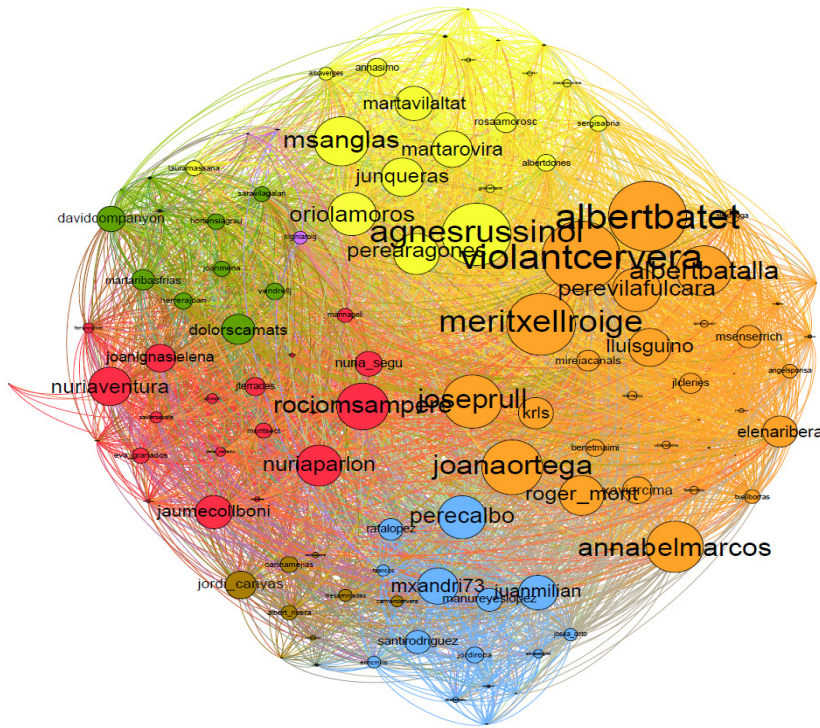
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\*\*\*\*The position of the clusters in the three networks is given by the Force Atlas 2 algorithm. That means that the variation of the clusters' position in the network (left-right or up-down) is arbitrary and must not be considered for the analysis.

Figure 9: The Following-Follower Twitter network of Catalan deputies (March 2014)



\*The nodes of the network are the 115 deputies with Twitter account

\*\*The Size of the nodes is equivalent to their betweenness centrality in the network

\*\*\*The color of the nodes is equivalent to the political party to which they pertain: Orange (CIU), Yellow (ERC), Red (PSC), Blue (PP), Green (ICV), Brown (C'S) and Violet (CUP)

Thirdly, with regard to the left-right and nationalist cleavage from Figures 7, 8 and 9, the existence of these two dimensions can be clearly observed. In the nationalist cleavage, it can be observed the parties that consider themselves Catalan nationalist parties (CIU, ERC and CUP) and those that are not Catalan nationalist (PSC, PP, ICV and C's). On the other hand, with respect to the left-right cleavage it can also be observed the dimension that brings together left wing parties (PSC, ERC, ICV and CUP) and right wing parties (CiU, PP and C's).



Fourthly, the reciprocated-vertex-pair-ratio of the nodes shows an average of 0.5 (January), 0.51 (February) and 0.51 (March), which means that the following demands were reciprocated in 50% of the cases (on average). These figures can be aligned with those found by Yoon and Park (2014) thereby corroborating that politicians' following-followers relations may be much more influenced by internal social pressure than the other type of politicians' networks (retweets and mentions). That is to say, a Member of Parliament could be under pressure to follow his or her official party leader or to follow other members of the party that are already following him or her.

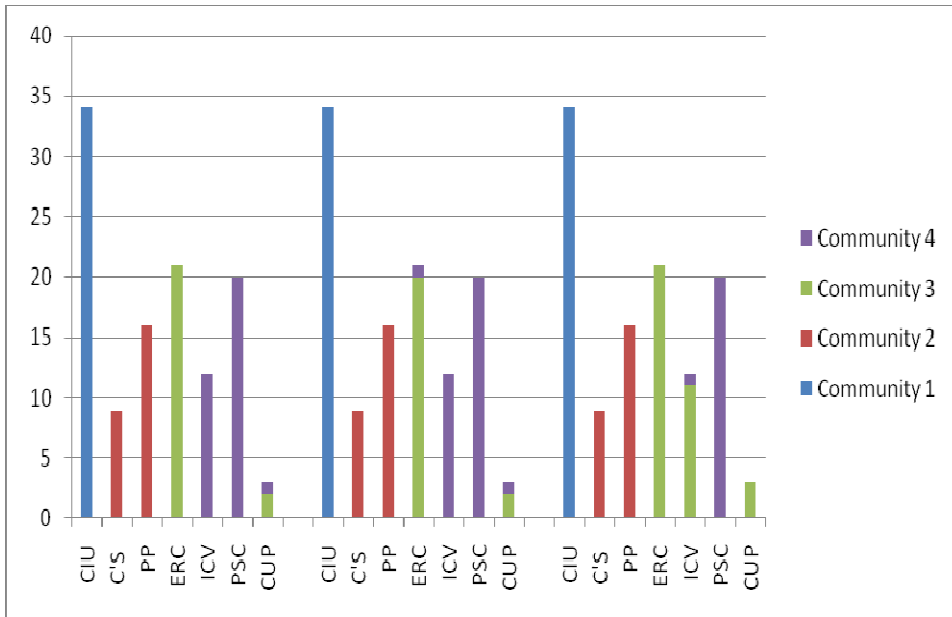
Last but not least, regarding the modularity<sup>34</sup> of the networks, the existence of 4 clusters can be observed (Figure 10). Cluster 1 (CiU) and cluster 2 (C's and PP) present a high cohesiveness and longitudinal stability in comparison to clusters 3 and 4 (which are a combination of ERC, PSC, ICV and CUP). More precisely, the highest variability between clusters comes with the isolation of PSC members, triggered by the modification of the stance of the ICV and CUP parliamentarians towards the PSC members and vice versa. In that regard, it should be mentioned that during the time period of the analysis, the Catalan Parliament adopted different resolutions regarding<sup>35</sup> Catalonia's pledge to hold a referendum about independence from Spain, over which the position of the majority of the PSC members has been different from that adopted by those belonging to ICV and CUP.

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<sup>34</sup> Modularity measures how well a network decomposes into modular communities or sub-networks. The Catalan deputies' Twitter network contains four clear communities.

<sup>35</sup> The most important is Resolution 479/X of the Parliament of Catalonia in January 2014, by which it was agreed to submit the organic act delegating to the Generalitat of Catalonia power to authorize, call and hold a referendum on the political future of Catalonia to the approval of the Spanish Congress.

Figure 10: Clusters of the Following-Follower networks of the Catalan deputies (January/February/March)



\*\*The Y axis represents the number of deputies and the X axis the different communities of the political parties for the three periods of analysis (From left to right: January/February/March)

\*\*\*The communities were founded using the modularity algorithm of Gephi program

In summary, the Catalan parliamentarian's following-follower Twitter network could be defined as a tight crowd network due to its high reciprocity and a clustering structure which results in the appearance of brokers that bridge parties and party clusters.

### 3.5.-Analyses and findings

Regression analyses have been carried out to test the explanatory power of the individual factors and characteristics that could influence who the *political influentials* of the Catalan parliamentarian Twitter network are. As I have mentioned, this centrality position has been measured through the indegree (ID) and through the betweenness centrality (BC).

In the third hypothesis, the dependent variable is the indegree and I have run a regression analysis to test which are the relational (network dimensions) or individual factors (official political position, parliamentarian involvement, socio-demographic characteristics, Internet use, length of tenure) affecting the number of parliamentarian followers a parliamentarian could have. The distribution of this dependent variable is a normal one with a mean of 36.93 and an average deviation of 15.69. I have run a multiple regression on this variable using the ordinary least square estimation.

As shown in Table 8, the model is statistically significant (Anova's F), and the adjusted R-Squared is around 0.44; therefore, 44% of the variance of the dependent variable is explained by our model in the three months. I have applied the usual multicollinearity tests (tolerance, VIF, eigenvalues and condition index) and there was no collinearity between the independent variables.

The variables with significant positive regression coefficients throughout the three months are: having a blog, the frequency of tweets per day, intervening in the Plenary, holding a relevant position in the Parliament and the number of parliamentarians followed. In other words, the Catalan parliamentarians who have a blog, send out more tweets, intervene more than the others in the plenary session of Parliament, have a relevant position in that institution, and follow more parliamentarians (OD) reach a higher indegree, that is, they are more followed than the others. Therefore, the likelihood of being followed is related to the position and level of interventions in Parliament, having a blog and active tweet posting. So it would seem that the official visibility of the MPs is important. We have to take into account that the interventions at the plenary session are frequently performed by party leaders with relevant

positions in Parliament<sup>36</sup> and that having a blog currently could be considered as a traditional social media behavior.

*Table 8: Multiple regression on In-Degree (ID) or number of followers.*

|                              | January           | February         | March            |
|------------------------------|-------------------|------------------|------------------|
| <b>Constant</b>              | 1.311 (11.011)    | -2.002 (10.967)  | -3.3034 (10.649) |
| <b>Gender</b>                | 1.154 (2.404)     | 1.664 (2.365)    | 1.384 (2.299)    |
| <b>Age</b>                   | .253 (.140)*      | .166 (.147)      | .134 (.142)      |
| <b>Education</b>             | -.360 (1.443)     | -1.749 (1.453)   | -1.729 (1.404)   |
| <b>Blog</b>                  | 8.039 (2.427) **  | 7.354 (2.388)**  | 6.174 (2.351)**  |
| <b>Facebook</b>              | -1.383 (2.530)    | 2.200 (2.350)    | 1.439 (2.455)    |
| <b>TweetsDay</b>             | .459 (.264)*      | .492 (.257)*     | .516 (.249)**    |
| <b>CIU_rest</b>              | 3.004 (2.955)     | 4.754 (2.951)    | 3.495 (2.891)    |
| <b>Incumbency</b>            | -2.199 (1.542)    | .754 (1.462)     | 3.832 (1.540)**  |
| <b>PComiss</b>               | -.423 (.532)      | -.551(.552)      | -.252 (.517)     |
| <b>IntervComiss</b>          | -.016 (.015)      | -.011 (.015)     | -.015 (.014)     |
| <b>IntervPlenary</b>         | .086 (0.034) **   | .101 (.033)**    | .090 (.032)**    |
| <b>PositionParliament</b>    | 11.991 (4.394) ** | 13.110 (4.400)** | 11.130 (4.328)** |
| <b>PositionParlComission</b> | -1.750 (2.770)    | -1.975 (2.750)   | -2.412 (2.681)   |
| <b>PoliticalPosition</b>     | -.679 (3.149)     | -1.497 (3.146)   | -.696 (3.068)    |
| <b>OutDegree</b>             | .371 (.058) ***   | .371 (.057)***   | .357 (.056)***   |
| <b>RVPR</b>                  | 10.179 (7.770)    | 10.600 (7.800)   | 12.394 (7.540)   |
| <b>F</b>                     | 6.570***          | 6.919***         | 7.701***         |
| <b>Adjusted R2</b>           | 0.439             | .454             | .485             |
| <b>N</b>                     | 115               | 115              | 115              |

\*p<0.10; \*\*p<0.05; \*\*\*p<0.001

(Standard deviation errors are in parentheses)

To sum up, the third hypothesis is partly corroborated because two of the political variables (number of interventions in plenary session and position in Parliament) have a clear impact, but the other two (belonging to the party in government and the length

<sup>36</sup> Pearson's correlation between number of interventions in the plenary sessions and the political position in Parliament (measured as an ordinal variable) is around 0.20 in the three months.

of tenure) do not. Moreover, the majority of the control variables are not significant and only having a blog, being active in tweet posting, and the number of accounts a parliamentarian is following (outdegree) come to be relevant.

In order to test the fourth hypothesis, I also carried out a multiple regression with the same explanatory variables, but the dependent variable was the betweenness centrality or brokerage position in the network. The distribution of the dependent variable, betweenness centrality –BC–, is skewed towards the lowest limit following a similar distribution over the three months. That is, only 23% of the cases (26 parliamentarians in January and March and 27 in February) have a high betweenness centrality (above 100). Therefore, I have transformed the dependent variable into a normal one (SQRTBC) by performing a square root transformation.

As it can be seen in Table 9, in the three-month databases, the model is statistically significant (Anova's F), there is a high Adjusted R-Squared and 5 variables are statistically significant: having a blog, having Facebook, InDegree, OutDegree and Reciprocated Vertex Pair Ratio (RVPR). As before, I have also applied the multicollinearity tests (tolerance, VIF, eigenvalues and condition index) and there was no collinearity between the independent variables. The regression analysis shows that the brokerage position of the parliamentarians in the Catalan Parliament Twitter network is not influenced by their socio-demographic characteristics, their behavior in Parliament activities or their political positions but, by their behavior online (having a blog and Facebook) and their network activities on Twitter: number of parliamentarians following (outdegree), being followed (indegree) and the reciprocity between following and followers (RVPR).

Table 9: Multiple regressions on dependent variable Square Root of Betweenness Centrality (SQRTBC)

|                              | January          | February         | March            |
|------------------------------|------------------|------------------|------------------|
| <b>Constant</b>              | .926 (1.104)     | 2.536 (1.026)    | 2.414 (1.023)    |
| <b>Gender</b>                | .063 (.241)      | .049 (.222)      | 0.72 (.221)      |
| <b>Age</b>                   | .006 (.014)      | .002 (.014)      | .002 (.014)      |
| <b>Education</b>             | -.027 (.145)     | -.033 (.137)     | -.055 (.136)     |
| <b>Blog</b>                  | -.370 (.257)     | -.420 (.234)*    | -.405 (.234)*    |
| <b>Facebook</b>              | .622 (.254)**    | -.653 (.238)**   | -.637 (.236)**   |
| <b>TweetsDay</b>             | .042 (0.27)      | .023 (.024)      | .022 (.024)      |
| <b>CIU_rest</b>              | -.300            | -.366(.280)      | -.408 (.280)     |
| <b>Incumb</b>                | .070             | -.061 (.137)     | .019 (.153)      |
| <b>PComiss</b>               | -.080 (.054)     | -.070 (.049)     | -.072 (.050)     |
| <b>IntervComiss</b>          | -.001 (.001)     | -.001 (.001)     | -0.001 (.001)    |
| <b>InterPlenary</b>          | .004 (.003)      | .004 (.003)      | .004 (.003)      |
| <b>PositionParliament</b>    | .262 (.457)      | .132 (.430)      | .106 (.429)      |
| <b>PositionParlComission</b> | -.158 (.278)     | -.120(.258)      | -.088 (.259)     |
| <b>PoliticalPosition</b>     | -.170 (.316)     | -.283(.295)      | -.253 (.295)     |
| <b>InDegree</b>              | .072 (.010)***   | .077 (.009)***   | .074 (.010)***   |
| <b>OutDegree</b>             | .166 (.007)***   | .164 (.006)***   | .163 (.006)***   |
| <b>RVPR</b>                  | -6.317 (.786)*** | -6.616 (.738)*** | -6.072 (.734)*** |
| <b>F</b>                     | 80.903***        | 94.636***        | 93.966***        |
| <b>Adjusted R2</b>           | 0.923            | 0.933            | 0.933            |
| <b>N</b>                     | 115              | 115              | 115              |

\*p<0.10; \*\*p<0.05; \*\*\*p<0.001

(Standard deviation errors are in parentheses)

However, the sign of the coefficients of having a blog, having a Facebook account (in February and March) and the RVPR are negative. This means that having a blog, a Facebook account and being high in RVPR diminishes the probability of being a broker in the Parliament Twitter network. We have to take into account that more than half of the brokers (parliamentarians with a betweenness centrality of above 100) does not have a blog and Facebook is widely spread out among all parliamentarians, whether

brokers or not (more than 70% of the parliamentarians have a Facebook account). Therefore, the probability of being a broker decreases with having other social media with an apparently different logic from Twitter: a more traditional social media such as a blog which is not so extended, and a widely used social media such as Facebook. Furthermore, the negative coefficient of RVPR is due to the existence of 4 tight ideological clusters in the Catalan Parliament Twitter network, which makes those parliamentarian accounts with a high overall reciprocity more tied to their clusters and therefore not playing bridging functions.

In summary, these results indicate that Twitter is paving the way for the appearance of brokerage positions which seems to be significantly affected by any other behavior outside those rooted in relational and online network activities (blog, Facebook, In-Degree, Out-Degree and Reciprocated Vertex Pair Ratio). Therefore, our fourth hypothesis is corroborated: the brokerage position in the Catalan Parliament Twitter network does not depend on the official political position or the work done in Parliament, but on the networking or relational variables.

Consequently, it can be deduced that an important amount of brokers are not official party leaders or hold relevant positions in Parliament. In order to test this, I checked who the brokers are (parliamentarians with a betweenness centrality above 100 and  $SQRTBC > 10$ ) and who of them hold relevant official positions in Parliament or in the party. I compare this with the parliamentarians with a high number of followers or high indegree because, as I have found previously, this centrality position is determined by the relevant roles in Parliament. Appendix II shows the 26 or 27 parliamentarians with higher indegree and betweenness centrality in the Twitter

network of January, February and March. The Twitter accounts are sorted in descending order based on the indegree and the betweenness centrality of the parliamentarians. The most notable aspect of the data is that, while in the case of the indegree centrality it can be observed that half of the parliamentarians holds a parliamentary or a political position (13 parliamentarians in January and February and 11 parliamentarians in March), in the case of the betweenness centrality the vast majority of the parliamentarians do not have any of these two characteristics (only 6 parliamentarians in January and 7 parliamentarians in February and March hold a political or a parliamentary position). Another relevant aspect highlighted in Appendix II is the relevance of party leaders (@junqueras –ERC- @dolorscamats –ICV- @Herrerajuan –ICV- @perenavarro –PSC- @Albert\_Rivera –C’s- @HiginiaRoig –CUP) in the indegree centrality and their near absence (with the exception of @junqueras and @dolorscamats) in the betweenness centrality dimension. Specifically, 6 out of 7 Catalan party leaders with Twitter accounts (@Aliciacamacho does not appear in any of these two centrality dimensions) reach a high indegree centrality in January and February, and 5 out of 7 in March. However, it is also important to pinpoint the role played by @junqueras in the betweenness centrality dimension, as he is the only party leader reaching a high betweenness centrality degree in the three analysis periods.

To sum up, I have discovered that new *political influentials*, who are not official party leaders or hold relevant roles at the Parliament, are rising up within the Catalan Parliament Twitter Network. Although this Twitter network still maintains the leadership and influence of official party leaders by means of its following structure, other parliamentarians are deploying the function of bridging between different



parties and parliamentarians. And this brokerage role does not depend on individual or political characteristics but on networking or relational variables. These results are in line with the findings from authors such as Diani (2003), Dubois and Gaffney (2014) or Young and Park (2014) that showed that the number of followers in Twitter is related to traditional political or social leadership, while brokerage is performed by new actors skillful in networking activities.

### **3.6.-Discussion and conclusions**

The structure of the Catalan parliamentarian following-follower Twitter network, corresponding to January, February and March 2014, allows us to determine that Twitter relations among Catalan parliamentarians correspond to a typical affiliation network, due to the partisan structure and working milieu of the Parliament. The network analysis revealed high reciprocity between parliamentarians (Young & Park, 2014), short distances between them and a clustering structure of four communities and two cleavages (left-right and Catalan Nationalist-Spanish Nationalist), which brings about the appearance of brokers (Burt, 2005) who bridge the different political clusters.

Furthermore, the regression analyses on the centrality position of the parliamentarians in these three networks have shown that political relevance and position mainly explain the indegree centrality of the parliamentarians, while the networking activities that they carry out determine their brokerage position.

I have found evidence to argue that the degree centrality (indegree) of the Catalan MPs in the Catalan parliamentarians' following-follower Twitter network is mainly

determined by political factors (H3). Specifically, the results of the model show that Catalan parliamentarians who intervene more than the others in the plenary session of Parliament, have a relevant position in that institution, have a blog, send out more tweets, and follow more parliamentarians reach a higher indegree; that is, they are more followed than the others. These results are in line with those found by Patterson (1987) and Caldeira and Patterson (1952; 1972), who pointed out when dealing with the friendship networks in parliaments (which, in the case of Twitter, may be similar to the following-follower networks) that the leadership role was determined by political friendship. Indeed, similar to what has been revealed by Diani (2003) and Dubois and Gaffney (2014), our data corroborates that the traditional political elites who have a clear public profile and political responsibilities are related to high indegree figures. However, our third hypothesis can only be partially corroborated, because two of the political variables (belonging to the party in government and the length of tenure), which I expected to have an effect upon the indegree centrality of the parliamentarians, are of no significance, regardless of their importance in other studies.

In this network context, the research that I have carried out indicates that the brokerage position of the Catalan parliamentarians is not so much determined by their official political position as by the parliamentarians' network activities (H4). More precisely, the regression analyses show that the brokerage position of the parliamentarians in the Catalan Parliament Twitter network is not influenced by their socio-demographic characteristics, their behavior in Parliament activities or their political positions, but by their network activities (number of parliamentarians a

parliamentarian follows (outdegree); number of parliamentarians who are following a parliamentarian (indegree); and the following reciprocity between the parliamentarians (reciprocated vertex pair ratio) and their online behavior (having a blog and a Facebook account). These results are also in line with those found by Diani (2003), Dubois and Gaffney (2014) and Xu et al., (2014), which point to the very different functions being performed by nodes with popularity (indegree) and those with brokerage capacity. Moreover, the data also pinpoints the role played by an elite number of brokers in bridging the different clusters of the Catalan parliamentarian Twitter network, a factor that had been previously discovered by González-Bailon and Wang (2013).

Finally, regarding the analysis of the MPs with the highest indegree and betweenness centrality (26 or 27 parliamentarians), the data show that while in the case of indegree centrality it can be observed that half of the parliamentarians hold a parliamentarian or political position, in the case of betweenness centrality, the great majority of parliamentarians do not have either of these two characteristics (only 6 parliamentarians in January and 7 parliamentarians in February and March hold a political or parliamentarian position). Also, our results point to the relevance of party leaders in indegree centrality and their near absence (with the exception of two party leaders) in the betweenness centrality dimension.

In conclusion, I have discovered that new *political influentials*, who are not official party leaders and do not hold relevant roles in Parliament, are arising within the Catalan Parliament Twitter network. Although this Twitter network still maintains the leadership and influence of official party leaders by means of its following structure,

other parliamentarians are deploying a bridging function between different parties and parliamentarians. And this brokerage role does not depend on individual or political characteristics, but on networking or relational variables. These results are similar to the findings of Diani (2003), which showed that the number of followers on Twitter is related to traditional political or social leadership, while brokerage is performed by new actors, skillful in networking activities.

Would it be possible to apply our research to other cases? Although the current political climate of Catalonia is very particular, I believe that the methods and open software used in the research could be replicated in other studies. In fact, I expect this research to inspire more analysis of parliamentarians' online networks, as there is still a long way to go in comprehending the multiple and diverse facets of this particular research field.

Notwithstanding, a number of complementary hypotheses still remain to be tested. First, it could be interesting to study parliamentarians' behavior on Twitter by analyzing and comparing not only the following-follower network but also the retweet and mention network. Second, it is important to ascertain if the individual explanatory variables of the statistical model should be complemented with more relational dimensions that give a better account of the affinities in the following-follower Twitter network of parliaments. Third, further research is necessary to better understand why and how the majority of the parliamentarians who are bridges of Twitter communication in Parliament are not official party leaders and do not hold important positions in Parliament. It may be a question of opportunity costs and free time. Parliamentarians not so overloaded with party responsibilities could devote more time

to networking on Twitter. Fourth, it is reasonable to assume that the model needs more refinement when explaining the betweenness centrality in Twitter networks using other online tools (such as Facebook or blogs) as predictors, given the resulting negative coefficients. A possible solution to this problem in future research could be to apply multilayer network analysis to each online tool. Lastly, more studies going beyond the limited time span this research, carrying out comparative analysis between parliamentarians of different and similar political systems, could provide powerful insights into the way in which MPs deal with social media.

In conclusion, considering the broader debate on cyberpolitics, this research implies that social media are opening a new online political arena in parliaments which has its own communication logics and strategies. Twitter is opening a window for the appearance of new online *political influentials* whose informative power and centrality is based in many cases on their political status (leaders), but which in many others is rooted in their network friendship ties and their ability to connect opposing actors (brokers).

# CHAPTER IV: COMMUNICATION FLOWS, POLITICAL POLARIZATION AND OPINION LEADERS IN THE CATALAN PARLIAMENTARIANS' TWITTER NETWORK

## 4.1.-Introduction

Social Media are transforming political communications and consequently that of the members of parliaments, but in which direction? Are parliamentarians taking advantage of these new personalized, low cost and instantaneous forms of communication to broaden their political communication environment or on the contrary, they are mainly communicating with their peers? Are they empowering party leaders through social media or facilitating the appearance of new opinion leaders?

In Chapter IV of this dissertation I attempt to study some of the effects of Twitter on the directions (Bimber, 2014) of parliamentarians' online communication flows<sup>37</sup>. Important political communication progress in western parliaments has been historically intertwined with technological changes, and therefore, studying how MPs' communicate on Twitter becomes relevant to understand the techno-political changes that are shaping our popular sovereignty chambers. Indeed, this research is rooted in the belief that exposure to cross-ideological opinions (Arendt, 1968; Calhoun, 1988;

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<sup>37</sup> Manuel Castells defines these flows as 'streams of information between nodes circulating through the channels of connection between nodes' (Castells, 2009, p. 20)

Habermas, 1989) is an inherent factor of the democratic health of representative institutions and a legitimizing source of the political systems.

I will use statistical analysis and social network methods in order to offer plausible and refutable answers to the following questions: Is Twitter facilitating Catalan parliamentarians' exposure to cross-ideological opinions or is it confining them to like-minded clusters? Is Twitter empowering highly visible political leaders or paving the way for the appearance of new opinion leaders? To do this I have gathered all the Catalan parliamentarians' relations –following/follower- (4,516), retweets (6,045) and mentions (19,507) from the 1<sup>st</sup> January 2013 – 31 March 2014 period. The data covers an extraordinary and conflictive time in Catalonia in which demands for independence and a referendum as well as protests against austerity measures were widespread.

## **4.2.-Previous studies on political polarization and opinion leaders in Twitter networks**

The effects of Twitter on the online political realm have been analyzed from multiple points of view and some of them have already been introduced to the reader in previous chapters of this dissertation. However, due to the research goals that I expect to satisfy in Chapter IV I consider necessary to deeply analyze the literature dealing with the political polarization and the opinion leaders on Twitter.

### *4.2.1.-Political Polarization on Twitter*

The controversy regarding political polarization on Twitter touches an essential pillar of our modern democracies as is the necessity of a common public debate where one's

ideas and interests are confronted with those who think differently. Some authors, such as R. Sunstein, claimed that contemporary media and the Internet have abetted a culture of polarization, in which people primarily seek out points of view to which they already subscribe (Sunstein, 2001). Indeed, political polarization on social media could also be explained by the well-known sociological phenomenon called *homophily* (McPherson et al., 2001) by which interactions among similar people occur more often than among dissimilar people.

Studies regarding political polarization on Twitter can be traced back to the Adamic and Glance's analysis of political blogs in which they found that there was a political correlation between some American newspapers and the links from right or left wing leaning blogs (Adamic & Glance, 2005). A similar tendency was found on Facebook by Gilbert and Karahalios (2009) revealing the connection between individuals' political views and the probability that two people were connected on Facebook or by Gaines and Mondak (2009) who observed that some Facebook users had a marginal tendency to cluster together ideologically.

More recently, some authors have approached the phenomena of online political polarization specifically on Twitter. Yardi and Boyd (2010) study of peoples' tweets on the shooting of George Tiller revealed that "people are more likely to reply to people who share the same view" (Yardi & Boyd, 2010, p. 13). In this same light, Conover et al's., (2011) study of more than 250,000 tweets from the six weeks leading to the 2010 U.S congressional midterm elections proved that while "retweet networks exhibited a highly modular structure segregating users into two homogenous communities



corresponding to the political left and right, the mention network did not show this kind of political segregation, resulting in users being exposed to individuals and information they would not have been likely to choose in advance” (Conover et al., 2011, p. 89). Gruzd (2012) added a Canadian perspective to this field of research and his network analysis of 5,918 tweets on the 2011 Canadian Federal election concluded that ‘On the one hand, there was a clustering effect around shared political views among supporters of the same party in the communication network of Twitter. On the other hand, there was also evidence of cross-ideological connections’ (Gruzd, 2012, p. 8). In this same line of research Hsu and Park (2012) study of the communication relationships among members of the Korean National Assembly pointed to the fact that intraparty connections were stronger than inter-party connections on Twitter (Hsu & Park, 2012, p. 5) and Himelboim et al.’s social network and content analysis of 10 controversial U.S political topics on Twitter showed that “political content was overall confined to like-minded clusters of users” (Himelboim et al., 2013, p. 18). Lastly, Yoon and Park (2014) noticed that while retweet and following networks reproduced the known partisan split in the online world, the mention network showed that ideologically opposed individuals interacted with each other. In brief, as Himelboim et al., (2013) said, birds of a feather tweet together.

#### *4.2.2.-Opinion leaders in Twitter networks*

The traditional view of influence argues that a minority of individuals who have some particular characteristics are extremely compelling in spreading ideas to others. These individuals are defined as opinion leaders in the two-step flow theory (Katz & Lazarsfeld), innovators in the diffusion of innovations theory (Rogers, 1962), and

mavens or gatekeepers in other work (Gladwell, 2002; Nahon & Hemsley, 2013). The rationale of the theory is that the influence of mass media first reaches opinion leaders and then they transmit the information to others (Katz, 1957). Diffusion studies have identified some characteristics of opinion leaders which include high social status, innovative behaviour, vast social connections and highly involvement (Rogers, 2003; Vishwanath & Barnett, 2011).

In Twitter some research has been conducted on revealing who the opinion leaders of the network are and which are their characteristics. Some authors have employed network measures to find out the influencers in Twitter; Yoon and Park's (2011) study of the Korean politicians on Twitter showed that while the following-follower network was a social ritual network (therefore with high reciprocated-vertex-per-ratio figures), the mention network was a network of political support characterized by the fact that some politicians received the majority of mentions. Research carried by Hsu and Park on communication relationships among members of the Korean National Assembly also revealed that their following-follower network followed a preferential power law which is the same as saying that 'several politicians in the network were far more popular than the others' (Hsu & Park, 2012). González-Bailon and Wang (2013) studied the effects of brokers in bridging or bonding (Putnam, 2000) social network clusters and pointed out that 'users spanning structural holes form an elite: they have more followers and are mentioned and re-tweeted more often' (González-Bailon & Wang, 2013, p. 9). Dubois and Gaffney (2014) analysis of the Twitter communities of the major Canadian parties (Conservative Party of Canada and New Democratic Party of Canada) discovered that indegree and eigenvector are a similar measure and identified

traditional political elites as influentials. Lastly, Xu et al., (2014) study of Twitter based opinion leadership in the Wisconsin recall election found that users' high connectivity (betweenness centrality) was positively related to the number of retweets ( $\beta=.26$ ).

On the other hand, some authors have tried to uncover the influencers of the Twitter network by focusing on individual network characteristics of Twitter users', that is, their number of followers, retweets and mentions; Kwak et al. (2010) compared these three different measures of influence and showed that these measures ranked influentials differently. Cha et al., (2010) also compared these measures and reported that users who have a high indegree are not necessarily successful in terms of spawning retweets or being mentioned. Also, their study revealed a strong correlation ( $\beta= 0.5$ ) between users' mentions and retweets. Suh et al., (2010) hypothesized that the larger the audience, the more likely the tweets get retweeted and found that the number of followees and followers are strongly predictive of retweet probability. However, contrarily to the findings revealed by Cha et al., (2010), they found a negative association between retweets and mentions. Bakshy et al., (2011) study demonstrated that 'it is more influential to have an active audience who retweets or mentions the user' (Bakshy et al., 2011, p. 8) than to have a million followers.

Last but not least, regarding Twitter parliamentary networks, the majority of the research has been conducted on the adoption of Twitter by members of parliament. In this light, Lassen and Brown (2010) found that while socio-demographic factors did matter, Internet usage and the number of years the members had been in the U.S. Congress had no influence. On the contrary, Chi and Yang (2010) found that socio-demographic factors had no effect on Twitter adoption by U.S. parliamentarians. In

this same regard, Williams and Gulati (2010) stated that party pertinence and campaign resources are drivers of Twitter adoption. Also, Larsson and Kalsnes' (2014) study of the activity of Norway and Sweden parliamentarians on Twitter concluded that the most active users on Twitter tended to be 'younger, non-incumbents and outside the political hotspots' (Larsson & Kalsnes, 2014, p. 654). However, there has been another branch of research focused on attempting to understand the characteristics of parliamentarians' Twitter interactions by studying their retweets and mentions; Grant et al., (2010) pointed out that there are two factors influencing the number of times a politician would be likely to be retweeted, his/her number of followers (the more followers a politician has, the more likely they are to be retweeted) and their Twitter behavior (politicians who themselves were more likely to engage in conversational tweeting –mentioning- were also more likely to be retweeted) and Thamm and Bleier (2012) study of the Bundestag MPs proved that retweets have a professional use while mentions have a personal connotation.

### **4.3.-Methods and hypotheses**

My intention in Chapter IV of the dissertation is to test if communication flows in the Twitter network of Catalan parliamentarians are party and ideological polarized or if, on the contrary, they facilitate communication between parliamentarians of different parties. I also wish to ascertain if communication flows of Catalan parliamentarians' Twitter network are empowering highly visible party leaders or paving the way for the appearance of new opinion leaders. More precisely, I will test the following specific hypotheses:

H5: Communication flows of Catalan parliamentarians' following-follower and retweet Twitter networks are party and ideological polarized while those of the mention network reveal some cross-ideological and cross-party connections. Specifically, the findings in the literature show that even if Twitter political communications are reproducing the *homophily* concept (Yardi & Bold, 2010; Conover et al., 2011; Himelboim 2012, Hsu & Park, 2012) they are also facilitating cross-party and cross-ideological discourse (Conover et al., 2011; Gruzd, 2012). In that regard, Conover et al., noticed that while retweet and following networks reproduced the known partisan split in the online world, the mention networks showed that ideologically opposed individuals interacted with each other (Conover et al., 2011; Yoon & Park, 2014).

H6: Communication flows of the Catalan parliamentarians' following-follower, and mention Twitter networks are empowering highly visible political leaders, that is, party leaders and MPs with relevant parliamentarian and political positions, but the communication flows of the retweet network are paving the way for the appearance of new opinion leaders. More precisely, literature points out that Twitter following-follower and mention networks follow a preferential attachment power law skewed toward the relevant politicians or the party leaders (Yoon & Park, 2011; Hsu & Park, 2012; Dubois & Gaffney, 2014) but that in the case of retweet networks the retweets received by a parliamentarian are associated with their network activities, specifically, their dialectical (mentioning) behavior (Cha et al, 2011; Grant et al., 2011).

In order to test these hypotheses empirically, first I manually compiled a list containing usernames of members of the Catalan Parliament on Twitter. There are 116 Catalan Parliamentarians with Twitter accounts (85% of the total number). Then Twitter API

was query to gather all the relations, retweets and mentions of the Catalan parliamentarians from 1<sup>st</sup> January 2013 to 31 March 2014 permitting us to quantitatively determine the direction of Twitter communication flows among Catalan representatives.

Once the directions of the communication flows were known, I determined which parliamentarians were occupying a centrality position in the three types of Twitter networks. The centrality position was measured by collecting the total number of parliamentarians following another parliamentarian and the total number of retweets and mentions a parliamentarian received from the other MPs. Then, regression analyses were carried out (based on our own database) to ascertain the individual attributes of the Catalan parliamentarians triggering a centrality position in the following–follower, retweet and mention Twitter networks. The regressions were run on the 116 Catalan Parliament members with Twitter accounts. The independent variables in the model include 7 dimensions<sup>38</sup> and are withdrawn from the literature shown in previous sections: 1 - Socio-demographic characteristics (age, gender, education); 2 - Internet behavior (having a blog or Facebook account) and Twitter activity (total number of tweets; total number of retweets sent; total number of retweets received; total number of mentions sent; total number of mentions received). I also introduced an estimation of the favorites of the Catalan representatives' based on their favorites' per day average from 1 January to 31 March 2014; 3 - Electoral characteristics such as the party they belong to and the number of legislatures they have attended Parliament (up to three: 2006, 2010, 2012); 4 -

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<sup>38</sup> See Appendix III for codification and description of the variables. The data was withdrawn on January 2014. Most of the values of the parliamentarians' individual characteristics did not vary along the year.

Parliamentary activity (number of legislative commissions in which they participate and number of interventions in these commissions and in the plenary sessions); 5 – Political visibility (role in the parliamentarian group and Parliament and role in Parliament commissions), at the party (party president) or as mayors when that is the case; 6.- Relational variables: In-Degree (Number of parliamentarian followers a parliamentarian Twitter holds), Out-Degree (Number of parliamentarians each parliamentarian is following on Twitter); 7.- Cleavages: Left (ERC, PSC, ICV-EUiA and CUP)- Right (CiU, PP and C's) and Catalan nationalists (CiU, ERC, ICV-EUiA and CUP) and Spanish nationalists (PSC, PP and C's).

Lastly, I carried out a network analysis in order to find the centrality position of Catalan parliamentarians' in the following-follower, retweet and mention networks but in a different way that I previously did. This time, I measured the centrality position of the Catalan parliamentarians by using the total number of parliamentarians that were following, retweeting or mentioning a particular parliamentarian. By doing so, what I wanted to find it was not the centrality position of the Catalan parliamentarians based on the quantity of retweets and mentions that they received<sup>39</sup> (which will be shown in the regression model) but to ascertain the distribution of the mentions and retweets that a particular parliamentarian received. More precisely, this network twist gives more weight to the distribution of the mentions and retweets than to the quantity of retweets and mentions that a parliamentarian received. Consequently, the Catalan

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<sup>39</sup> Evidently, in the case of the following-follower network the centrality position of the Catalan parliamentarians will be always measured by the number of parliamentarians following a precise parliamentarian.

parliamentarians with a higher centrality position will be those who receive more mentions and retweets from the total number of deputies (and vice versa).

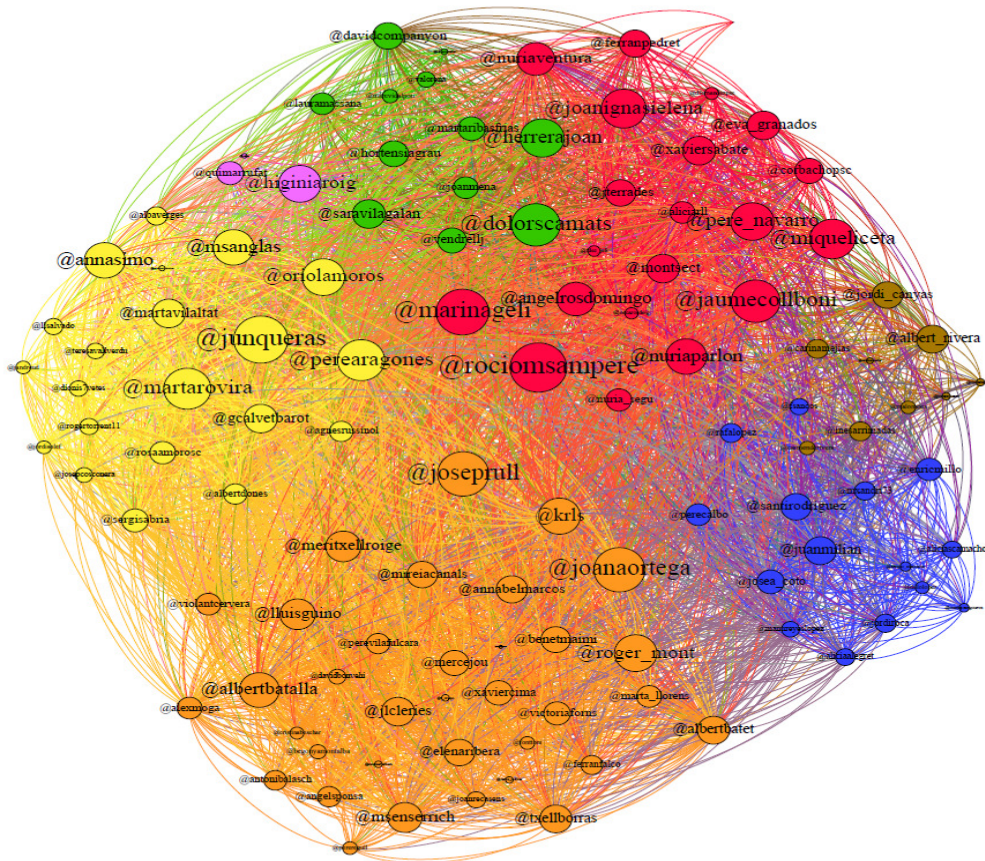
#### **4.4.-Findings**

##### *4.4.1.-Political Polarization*

Communication flows in the Catalan parliamentarians' Twitter networks show both party and ideological polarization. However, the intensity of this political polarization is deeper in the following-follower and retweet networks than in the mention. More precisely, members of the Catalan parliament Twitter network follow parliamentarians of their respective political groups more than those of other groups and they also follow more the MPs who share their position on the Left-Right and Catalan Nationalist axes (see Figure 11). In that regard, the average percentage of the total possible following relations reached by the 116 parliamentarians in 7 parliamentary groups with respect to the representatives of their political groups is 91.05% while that of the MPs towards the other political groups is 21.97% in the following-follower network. Moreover, the data provided in Table 10 shows that with the exception of CIU, ERC (that provably can be explained by the fact that presently CIU is ruling the Catalan government with the support of ERC) and the PSC (former ruling party of Catalonia) on the Left-Right axis, Catalan MPs follow the Catalan representatives who share their same ideological stances, that is, who are placed in the same axes of the Catalan party system.



Figure 11: The following centrality of the Catalan parliamentarians' Twitter Network (January 1st 2013- March 31 2014)



\*The nodes of the network are the 116 deputies with Twitter account

\*\*The size of the nodes is equivalent to their In-degree centrality in the network

\*\*\*The color of the nodes indicates the political party they belong to: orange (CIU), yellow (ERC), red (PSC), blue (PP), green (ICV), brown (C'S) and violet (CUP)

*Table 10: Percentage of the Following relations among Catalan MPs grouped by parties and ideological cleavages (1 January 2013- 31 March 2014)*

| Parties | Catalan axis | Spanish axis | Cat-Span difference | Left        | Right       | Left-Right difference | Total Relations |
|---------|--------------|--------------|---------------------|-------------|-------------|-----------------------|-----------------|
| CIU     | 0.784 (1050) | 0.215 (288)  | 0.569               | 0.679 (361) | 0.320 (170) | 0.359                 | 1338            |
| C'S     | 0.338 (85)   | 0.661 (166)  | -0.322              | 0.391 (70)  | 0.608 (109) | -0.217                | 251             |
| CUP     | 0.772 (85)   | 0.227 (25)   | 0.545               | 0.673 (70)  | 0.326 (34)  | 0.346                 | 110             |
| ERC     | 0.821 (730)  | 0.178 (159)  | 0.642               | 0.390 (199) | 0.609 (310) | -0.218                | 889             |
| ICV     | 0.665 (298)  | 0.334 (150)  | 0.330               | 0.591 (203) | 0.408 (140) | 0.183                 | 448             |
| PP      | 0.411 (197)  | 0.588 (282)  | -0.177              | 0.405 (113) | 0.594 (166) | -0.189                | 479             |
| PSC     | 0.488 (481)  | 0.511 (503)  | -0.022              | 0.441 (278) | 0.558 (352) | -0.117                | 984             |

Also, this polarization tendency can be observed in the data of the retweet network. More precisely, the average percentage of the total possible retweets reached by the 116 parliamentarians in 7 parliamentarian groups with respect to the representatives of their political groups is 88.84% while that of the MPs towards the other political groups is 2.2% in the retweet network. However, when analyzing the ideological polarization of the retweets (see Table 11) it can be observed that while the majority of MPs (CIU, PSC, ICV, PP) retweet more the parliamentarians positioned in their same axes of the Catalan party system, some Catalan-Nationalist and Left parties (CUP and ERC) and a Spanish-Right nationalist party (C'S) retweet more the MPs who are positioned in their opposite cleavages.

*Table 11: Percentage of the Retweet relations among Catalan MPs grouped by parties and ideological cleavages (1 January 2013- 31 March 2014)*

| Parties | Catalan axis | Spanish axis | Cat-Span difference | Left         | Right       | Left-Right difference | Total retweets |
|---------|--------------|--------------|---------------------|--------------|-------------|-----------------------|----------------|
| CIU     | 0.986 (879)  | 0.013 (12)   | 0.973               | 0.054 (49)   | 0.945 (842) | -0.890                | 891            |
| C'S     | 0.991 (1924) | 0.008 (16)   | 0.983               | 0.946 (1837) | 0.053 (103) | 0.893                 | 1940           |
| CUP     | 0.128 (103)  | 0.871 (698)  | -0.742              | 0.945 (757)  | 0.054 (44)  | 0.890                 | 801            |
| ERC     | 0.015 (9)    | 0.984 (578)  | -0.969              | 0.018 (11)   | 0.981 (576) | -0.962                | 587            |
| ICV     | 0.964 (961)  | 0.035 (35)   | 0.929               | 0.990 (987)  | 0.009 (9)   | 0.981                 | 996            |
| PP      | 0.005 (4)    | 0.994 (685)  | -0.988              | 0.002 (2)    | 0.997 (687) | -0.994                | 689            |
| PSC     | 0.966 (145)  | 0.033 (5)    | 0.933               | 0.986 (148)  | 0.013 (2)   | 0.973                 | 150            |

Lastly, regarding the mention network of Catalan parliamentarians on Twitter, the average percentage of total mentions reached by the 116 parliamentarians of the 7 parliamentarian groups with respect to the representatives of their political groups is 66.12% (far lower than 91.05% and 88.48% in the following-follower and retweet networks) while that of the MPs toward the other political groups is 5.64%. Also, Table 12 shows that with the exception of CIU and ICV, the MPs of the other political parties (ERC, PSC, C'S, CUP and PP) mention more the parliamentarians who are positioned on the opposite axes of the Catalan party system.

*Table 12: Percentage of mentions among Catalan MPs grouped by parties and ideological cleavages (1<sup>st</sup> January 2013- 31 March 2014)*

| Parties | Catalan axis | Spanish axis | Cat-Span difference | Left         | Right        | Left-Right difference | Total Mentions |
|---------|--------------|--------------|---------------------|--------------|--------------|-----------------------|----------------|
| CIU     | 0.832 (1523) | 0.167 (306)  | 0.665               | 0.225 (412)  | 0.774 (1417) | -0.549                | 1829           |
| C'S     | 0.883 (4749) | 0.116 (628)  | 0.766               | 0.886 (4598) | 0.113 (589)  | 0.772                 | 5187           |
| CUP     | 0.314 (910)  | 0.685 (1988) | -0.371              | 0.880 (2552) | 0.119 (346)  | 0.761                 | 2898           |
| ERC     | 0.176 (356)  | 0.685 (1666) | -0.647              | 0.178 (385)  | 0.821 (1770) | -0.642                | 2155           |
| ICV     | 0.896 (3081) | 0.103 (355)  | 0.793               | 0.926 (3185) | 0.073 (251)  | 0.853                 | 3436           |
| PP      | 0.772 (439)  | 0.227 (129)  | 0.545               | 0.147 (421)  | 0.852 (2430) | -0.704                | 2851           |
| PSC     | 0.634 (838)  | 0.365 (483)  | 0.268               | 0.934 (888)  | 0.065( 62)   | 0.869                 | 950            |

In short, the results observed in Figure 11, Table 10, Table 11 and Table 12 show that communication flows between Catalan parliamentarians' Twitter network are party and ideological polarized. However, the degree of that political polarization is higher, firstly, in the following-follower and secondly, in the retweet network than it is in the mention, similar to what has been found in other studies (Connover et al, 2011; Yoon & Park, 2012). More precisely, Yoon & Park (2012) discovered that "following" other

politicians is a social ritual based on dyadic reciprocity but the strategy of “mentioning” other politicians is based on achieving more popularity, regardless the ideology of the mentioned politician. In fact, it is in the mention network where it can be observed in higher proportion that Catalan members of parliament not only mention parliamentarians with their same ideological (Left/Right wing or Catalan nationalist/Spanish nationalist) stances but also MPs holding politically opposite points of view. Therefore H5 can be accepted.

#### *4.4.2.-Opinion Leaders*

As mentioned in previous sections, the opinion leaders of the Catalan parliamentarians’ following-follower, retweet and mention Twitter networks will be analyzed from a double perspective: On the one hand, I will ascertain the individual characteristics of the most followed, retweeted and mentioned Catalan parliamentarians by carrying out regression analysis. On the other, I will unfold the distribution of the communication flows of Catalan parliamentarians’ at a unit level (parliamentarian) to check if differences arise among the quantity and the distribution of these flows.

I carried out multiple regression analyses in order to reveal the individual characteristics of the opinion leaders of the Catalan parliamentarians’ Twitter networks, that is, the most followed, retweeted and mentioned Catalan MPs. While the distribution of the In-Degree variable was normal, the distribution of the other two dependent variables, Mentions received ( $Mt\_received$ ) and Retweets received ( $Rt\_received$ ) were skewed towards the lowest limit, as it is usual among Internet

users (Hogan, 2008). This means that few parliamentarians have a high centrality in these two networks. I transformed therefore these two dependent variables into two normal distributions (Mentions\_LN10 and Retweet\_Rec\_SQRT) by performing square root and logarithmic transformations. Then I carried out three multiple regression analyses to find the parliamentarian's characteristics triggering a centrality position in the following-follower, retweet and mention networks<sup>40</sup>.

The results of the three regression analyses are statistically significant with an Adjusted R-Square of 0.494 in the case of the following-follower network, 0.560 in the retweet network and 0.488 in the mention network. Specifically, the results shown in Table 13 point to factors explaining the centrality of the Catalan parliamentarians in the following network, such as their age (having more followers increases with age), out-degree (number of parliamentarians someone is following), total number of tweets and their parliamentary position (having a parliamentary position highly increases the number of followers). Moreover, as shown in Table 13, the characteristics explaining the centrality position of Catalan parliamentarians in the retweet network are: gender (being a woman diminishes the probability of being central), mentions sent, number of followers and mentions received. Lastly, regarding the centrality position in the mention network, Table 13 shows that age (the number of mentions lowers with age), political position (mentions notably increases if a parliamentarian holds a political position), retweets received and followers are explanatory factors of the dependent variable.

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<sup>40</sup> In the models the multicollinearity tests do not show the existence of any collinearity between the independent variables.

*Table 13: Multiple Regressions on the centrality variables (In-Degree; Retweets\_Recieved\_SQRT and Mention\_Received\_LN10) in the Catalan parliamentarians' Twitter network*

|   | DV=<br>In-Degree | DV=<br>Retweets_Received_SQRT | DV=<br>Mentions_Received_LN10 |
|---|------------------|-------------------------------|-------------------------------|
| Constant                                      | 6.003 (10.617)   | 3.352 (2.451)                 | 1.891 (.370)                  |
| Gender  | 3.256 (2.378)    | -1.102** (.543)               | 0.49 (.083)                   |
| Age   | .275** (.138)    | -.009 (.033)                  | -.011** (.005)                |
| Education Level                               | -1.284 (2.041)   | -.113 (.468)                  | -.039 (.071)                  |
| Blog  | 3.732 (2.525)    | -.216 (.588)                  | -.055 (.089)                  |
| Facebook                                      | -.484 (2.503)    | -.292 (.571)                  | .054 (.087)                   |
| Total Tweets                                  | .004*** (.001)   | .000 (.000)                   | -2.435E-005 (.000)            |
| Total Mentions Sent                           | -0.10 (-.010)    | .010*** (.002)                | .000 (.000)                   |
| Total Mentions Received                       | .000 (.000)      | .007*** (.001)                |                               |
| Total Retweets Sent                           | -0.22 (-.022)    | -.002 (.007)                  | .001 (.001)                   |
| Total Retweets Received                       | .017 (.017)      |                               | .004*** (.001)                |
| Favorites per day                             | .471 (.542)      | -.022 (.125)                  | -.017 (.019)                  |
| Incumbency                                    | 2.172 (2.311)    | .361 (.531)                   | -.105 (.081)                  |
| Participation in Commissions                  | -.523 (.531)     | .027 (.123)                   | .008 (.019)                   |
| Intervention in the Commissions               | -.017 (.014)     | -.001 (.003)                  | .001 (.000)                   |
| Intervention in the Plenary                   | .039 (.032)      | -.006 (.007)                  | .000 (.001)                   |
| Parliamentarian Position (0-1)                | 9.142** (4.351)  | -.462 (1.025)                 | .214 (.150)                   |
| Position at the Legislative Commissions (0-1) | .405 (2.702)     | -.620 (.621)                  | -.104 (.094)                  |
| Political position (0-1)                      | -.325 (3.253)    | -.889 (.743)                  | .199* (.108)                  |
| In-Degree                                     |                  | .043* (.024)                  | .009** (.004)                 |
| Out-Degree                                    | .353*** (.054)   | .008 (.015)                   | -.002 (.002)                  |

|   |                |             |              |
|---|----------------|-------------|--------------|
| Left-Right_0_1                                    | -4.035 (2.546) | .499 (.595) | -.095 (.089) |
| Catalan Nationalist/Non-Catalan Nationalist (0-1) | .553 (2.344)   | .384 (.540) | -.001 (.082) |
| Adjusted R2                                       | 0.494          | 0.560       | 0.488        |
| N   | 116            | 116         | 116          |

\*p<0.10; \*\*p<0.05; \*\*\*p<0.001

The results regarding the influence of political leadership in being an opinion leader of the Catalan parliamentary Twitter networks observed in the regression analysis can also be corroborated by the descriptive results shown in Table 14 according to which the parliamentarians holding a political position in their parties are only receiving 26.22% of the total retweets (1,585 retweets) but taking the lead in the following and mention networks. More precisely, parliamentarians holding a political position are most followed (average of followers= 41.86) and mentioned (45.29% of the total mentions) than all the others. Furthermore, among these parliamentarians it is important to note the dominant position reached by the 6 party leaders in the followers (average of 55,14), retweet (1,107) and mention (6,333) networks.

*Table 14: Followers, retweets and mentions in the Catalan parliamentarians' Twitter network*

| Type of Network                           | All<br>Parliamentarians<br>(116) | Political Position*<br>(22) | Party Leaders<br>(6) |
|---|----------------------------------|-----------------------------|----------------------|
| Following-Follower<br>(Followers average) | 38.93                            | 41.86                       | 55.14                |
| Retweets (total)                          | 6,045                            | 1,585                       | 1,107                |
| Mentions (total)                          | 19,507                           | 8,309                       | 6,333                |

\*Political Position: Parliamentarians holding a relevant political position (party leaders or mayors)

The data presented above show that highly visible political leaders (with relevant political or parliamentary positions) are the opinion leaders of the following and mention networks but not of the retweet network. These results are in line with those previously found by Yoon and Park (2011), Hsu and Park (2012) and Dubois and Gaffney (2014) regarding the concentration of followers in a reduced number of politicians in Twitter networks. Also, the results reveal that high social status –partisan leadership- and vast social connections –parliamentarian leadership- (Rogers, 2003; Vishwanath & Barnett, 2011) seem to be determinants of the parliamentarians' opinion leadership role in the following-follower and mention networks. However, the data also show that the party or the parliamentary position of deputies do not seem to determine the centrality position of MPs in the retweet network. In that regard, Yoon and Park (2012) pointed that while the following-follower networks are subjected to partisan pressures, the retweet networks could be more ruled by information exchanges and personal interest. Also, the data contradict the results found by Suh et al., (2010) for it shows a strong association between retweets and mentions. Lastly, the results corroborate those found by Grant et al., (2010) for it seems that Catalan MPs who engage in conversational tweeting are more likely to be retweeted.

Nevertheless, for a deeper understanding of the centrality position of the Catalan parliamentarians and the direction of the communication flows among Catalan MPs Twitter networks based not only on the quantity of followers, retweets and mentions that they have or receive but on the number of the parliamentarians following,



retweeting or mentioning a particular deputy, I analyzed the centrality position of the Catalan parliamentarians in the following-follower, retweet and mention Twitter networks by using the total number of parliamentarians following, retweeting and mentioning a specific representative. The results obtained by doing that network twist (shown in Table 15) are different in comparison with those observed in the regression analysis and in Table 14. More precisely, Table 15 shows that among the 21 representatives<sup>41</sup> with a higher followers average, 47.61 % hold a political position (4 are party leaders) while the other 52.39 % do not. Also, regarding the mention network (see Figure 11 and Table 16), among the 21 parliamentarians with a higher mention centrality degree, 33.33 % hold a political position (6 are party leaders) while the other 66.67 % do not. But the most surprising figure comes when analyzing the retweet network (see Figure 12 and Table 17); among the 21 representatives with a highest retweet centrality degree, only one holds a political position (a party leader).

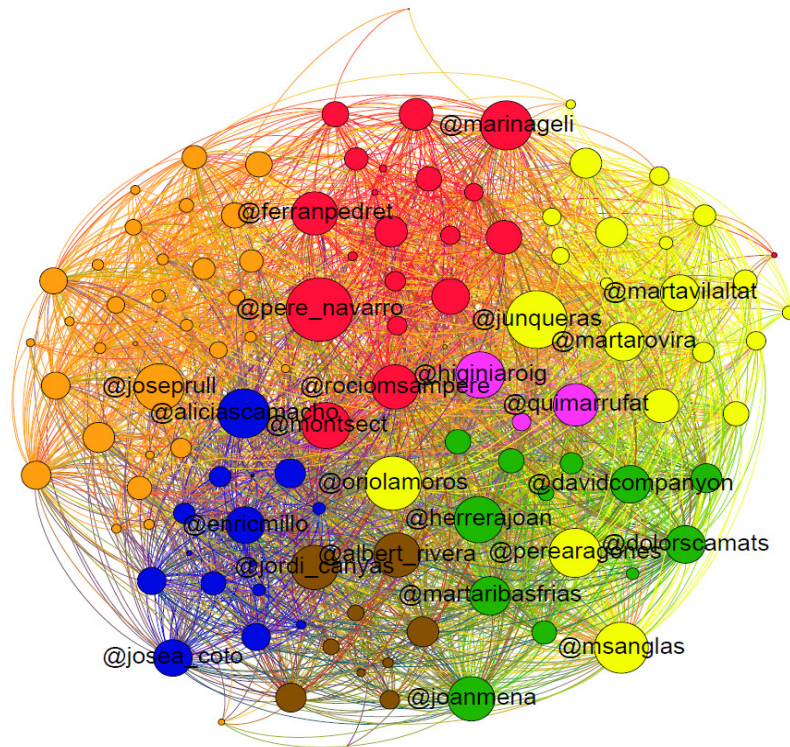
*Table 15: Political position characteristics of the 21 Catalan parliamentarians with highest followers average, retweets and mentions network centrality in the Catalan parliamentarians' Twitter network*

| Type of Network                           | Parliamentarians<br>% | Political Position*<br>% | Party leaders<br>(6) |
|---|-----------------------|--------------------------|----------------------|
| Following-Follower<br>(Followers average) | 52.39                 | 47.61                    | 4                    |
| Retweets (total)                          | 95.24                 | 4.76                     | 1                    |
| Mentions (total)                          | 66.67                 | 33.33                    | 6                    |

\*Political Position: the parliamentarians holding a relevant political position (party leaders or mayors)

<sup>41</sup> This number of representatives has been chosen as it approaches 20% of the total of the nodes of the network and I believe that it helps to show the centrality position of some parliamentarians in the Following, Retweet and Mention networks.

Figure 12: The Mention centrality of the Catalan parliamentarians' Twitter Network (January 1<sup>st</sup> 2013- March 31 2014)

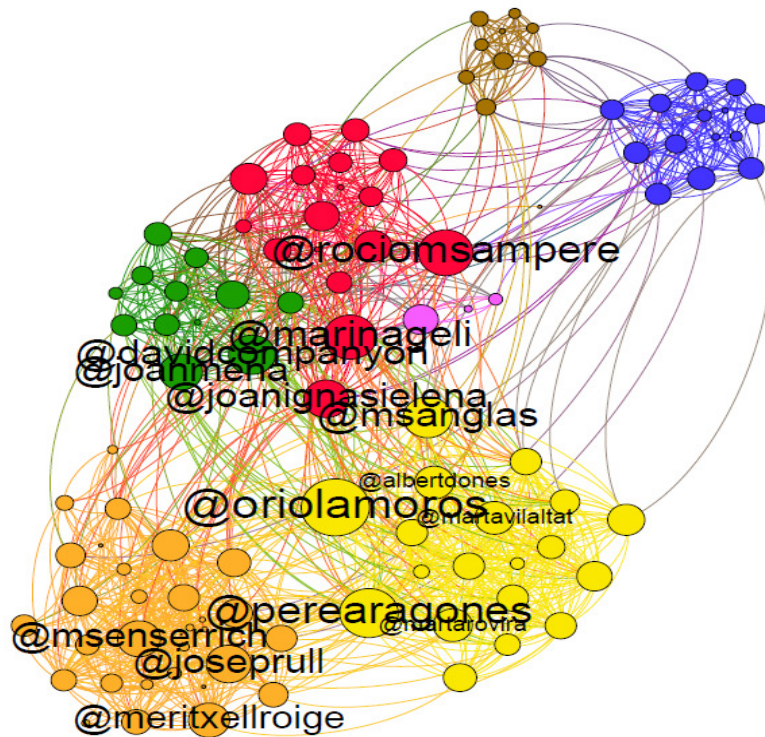


\*The nodes of the network are the 116 deputies with Twitter account and those with labels are the 20% of parliamentarians with a higher Mention degree among whom 8 representatives out of 24 hold a relevant political position (@alber\_rivera; @dolorscamats; @herrerajoan; @pere\_navarro; @higinarioig; @aliciascamacho; @junqueras; @martarovira).

\*\*The size of the nodes is equivalent to their Mention centrality in the network

\*\*\*The color of the nodes is equivalent to the political party that they belong to: orange (CIU), yellow (ERC), red (PSC), blue (PP), green (ICV), brown (C'S) and violet (CUP)

Figure 13: The retweet centrality position of the Catalan parliamentarians' Twitter Network (January 1<sup>st</sup> 2013- March 31 2014)



\*The nodes of the network are the 116 deputies with Twitter account and those with labels the 10% of parliamentarians with higher Retweet centrality among whom there is only one with a relevant political position, @martarovira (Secretary General of ERC).

\*\*The size of the nodes is equivalent to their Retweet centrality in the network

\*\*\*The color of the nodes is equivalent to the political party they belong to: orange (CIU), yellow (ERC), red (PSC), blue (PP), green (ICV), brown (C'S) and violet (CUP)

In fact, the data showed above points to the appearance of new opinion leaders who do not need to hold relevant political positions or being a party leader to be central in the Twitter networks of the Catalan parliament, a fact that is also corroborated when the parliamentary position of the Catalan representatives is analyzed. In this vein, Table 16 shows that among the 21 representatives with a higher In-degree, 42.85 % hold a parliamentary position (5 are party leaders) while the other 57.15 % are not. Also, with respect to the mention network, among the 21 parliamentarians with a highest mention centrality degree, 14.78 % hold a parliamentary position (1 is a party leader) while the other 85.72 % do not. But again, the most surprising case is that of

the retweet network, where only 1 parliamentarian holds a parliamentarian position (and is also a party leader).

*Table 16: Parliamentarian position characteristics of the 21 Catalan parliamentarians with highest in-degree (following), retweet and mentions network centrality in the Catalan parliamentarians' Twitter network*

| Type of Network          | Parliamentarians<br>% | Parliamentarian<br>position*<br>% | Party leaders<br>(6) |
|--------------------------|-----------------------|-----------------------------------|----------------------|
| In Degree<br>(following) |                       |                                   |                      |
| (average)                | 57.15                 | 42.85                             | 5                    |
| Retweets (total)         | 95.24                 | 4.76                              | 1                    |
| Mentions (total)         | 85.72                 | 14.28                             | 1                    |

\* Parliamentarian Position: the parliamentarians holding a relevant political position in the Catalan Parliament (Spokesperson or President of the parliamentarian group, Secretary, Vice-President or President of the Parliament).

To sum up, the data and the network analysis presented below seem to show that communication flows of Catalan parliamentarians' Twitter networks are empowering official party leaders holding parliamentarian or political positions in the following-follower and mention network but that the factors behind opinion leadership in the retweet network are not rooted in the political visibility of MPs. Therefore, H6 can be corroborated.

## **4.5.-Discussion and conclusions**

The research carried out in Chapter IV of this dissertation has shown that Twitter plays a double game, it encloses communication flows among party representatives and empowers party leaders but it also facilitates dialogue between MPs from different political groups and paves the way for the appearance of new opinion leaders.

From a political communication perspective, in line with the results found by Yardi and Bold (2010), Conover et al.,(2011), Himelboim et al., (2012) and Hsu and Park (2012), the research points some evidence for the argument that communication flows among the Twitter network of Catalan parliamentarians' are party and ideologically polarized. However, as has already been corroborated by Conover et al., (2011), Gruzd (2012) and Yoon & Park (2014), the results also confirm that the degree of political polarization is higher in the following-follower and the retweet networks than in the mention. More precisely, the data sustain that in the mention network, Catalan parliamentarians not only communicate with parliamentarians sharing their same ideological stances (Left/Right wing or Catalan nationalist/Spanish nationalist cleavages) but also with the MPs holding politically opposite points of view.

On the other hand, regarding the analysis of the opinion leaders, the results related to the volume of the communication flows among the parliamentarians (number of parliamentarians following another parliamentarian, total number of retweets received and total number of mentions received) and those linked to the distribution

of the communication flows (number of parliamentarians following another parliamentarian and total number of parliamentarians retweeting and mentioning other parliamentarians) reveal different dimensions of the Catalan parliamentarians' Twitter network leaderships. Specifically, the statistical model shows that highly visible political leaders (party leaders and MPs with parliamentarian and political positions) are the most followed and mentioned, yet they are not the most retweeted. These results are in line with those found in previous studies (Hsu & Park, 2012; Dubois & Gaffney, 2014) which pointed to the role played by political leadership as a factor behind opinion leadership in Twitter networks, yet they also reveal that political visibility is not a key factor of the retweets that the MPs receive. Also, the data show a clear association between the retweets that MPs receive with their mentions received and sent, thereby showing that the rationale behind MPs retweeting activity is not influenced by the political visibility of parliamentarians but by other factors among which my model, in line with the results shown by Grant et al., (2010), points that Catalan MPs who engage in conversational tweeting are more likely to be retweeted.

Moreover, the network analysis of the centrality position of the parliamentarians based on the total number of parliamentarians following, mentioning or retweeting the other nodes (representatives) of the three networks has revealed that new opinion leaders (who do not hold a political or a parliamentarian position) are concentrating the majority of retweets and taking the lead in the following and mention networks. This last result is more relevant since is taking into account the number of different parliamentarians retweeting and mentioning another parliamentarian and not the

gross volume of retweets and mentions that frequently is affected by few parliamentarians giving heavy support to their own party leaders and peers.

Notwithstanding, a number of complementary issues remain to be tested; 1- It would be necessary to explain exactly why the networks of following, retweets and mentions are different in terms of ideological polarization and leadership. It seems that the parliamentarians strategically decide to behave differently in each of these layers of the twitter-based communication. 2- It is reasonable to assume that other characteristics shaping the parliamentarians' communication flows play a role in explaining their directions. For instance, the electoral district of the parliamentarians since relationships could rise up among representatives of the same constituency (Lassen & Brown, 2010), the core goals sought by parties (Römmele, 2003) or the predominant issues on the Catalan political agenda (Esteve & Borge, 2013). 3- It may be useful to identify not only the directions of the communication flows among Catalan parliamentarians, but also the content of the information transmitted through Twitter interactions (Yoon & Park, 2012). Finally, more studies extending the time span of the present research and carrying out comparative analysis between parliamentarians of different and similar political systems could add powerful insights to how MPs deal with Social Media.

In a nutshell, the research shows that Catalan parliamentarians' Twitter networks are ideological and political polarized and empower party leaders, yet they also facilitate cross-party and cross-ideological contacts among MPs and trigger the appearance of new opinion leaders who do not hold relevant party or parliamentary positions.

## CONCLUSIONS

This thesis has presented empirical evidences of the fact that social media are challenging Politics. The dissertation has investigated the behavior of political parties and their representatives on Facebook and Twitter. The results of the research show that social media have triggered the appearance of a new internet-mediated political arena which its own particularities and characteristics.

Chapter I of the dissertation has introduced the theoretical background, the research questions and the methods of the research. It has ended up with some explanations regarding why Catalonia was chosen as a case study. In this vein, Chapter I has shown that the fragmentation and ideological divisions of the Catalan political context and the high social media usage rates among Catalan citizenry and MPs (technological context) permitted me to test hypotheses related to online interaction and communication among and between Catalan parties and their MPs.

Chapter II has studied the interaction of all the Catalan parties (with parliamentary representation) -CIU, ERC, PSC, PP, ICV-Euia, C's and CUP- on their Facebook pages. It has examined how parties' characteristics affect the way in which they use Facebook and the responses of their Facebook followers to the parties' posting activity. To do so, it has studied the relation between parties' characteristics (party size, institutionalization, centralization of decisions, and position on the national and left-



right cleavages), their posting behavior and the particularities of the responses (comments, likes and shares) given by their Facebook followers to these posts.

In Chapter III the research has attempted to ascertain if social media were challenging party politics and leadership in communication flows in Parliament. For doing so, the analysis has drawn on data collected from the Twitter accounts of Catalan parliamentarians (115 out of 135) between 13 January and 24 March 2014. Then, regression analyses were done to uncover the factors behind the influencers' centrality position in the network. The research has contributed to previous studies on the field by mixing social network methods and regression analysis to approach the particularities of the parliamentarians' relations on Twitter in a specific political context, the Parliament of Catalonia.

Chapter IV has followed up with the analysis started in Chapter III yet it has broadened its time span and the number of Twitter networks studied. Specifically, the research has drawn on an own research engine which has collected all the relations, retweets and mentions done by the Catalan parliamentarians between 1 January 2013 and 31 March 2014. Then it has used network methods and regression analyses to seek if Twitter was opening communication flows between parties and paving the way for the appearance of new opinion leaders or if it was reducing them to representatives of the same party or ideology and empowering MPs with relevant parliamentarian and party positions.

Altogether, this dissertation has studied parties and their representatives' adaptation and usage of Facebook and Twitter by complementing previous research on the field

with the analysis of parties' characteristics, political contextual factors, and opinion leadership through mixing individual-centered methods with network approaches.

According to its results, Chapter II shows that Catalan political parties' (CIU, ERC, PSC, PP, ICV-EUIA, C's and CUP) size, institutionalization, centralization of decisions, and position on the national and left-right cleavages have an influence over their Facebook posting behavior and the subsequent responses made by their Facebook followers. The analysis sustains that in the case of parties posting activity (H1), parties' decisional centralization degree, institutionalization levels and size do not trigger more interactive online attitudes thereby corroborating the previous results found by Wall and Sudulich (2010) and Cardenal (2011). Also, the research showed that institutionalized right-wing parties (PP and CIU) delete far more comments than the other parties (ERC, PSC, ICV-EUIA and C's). Moreover, the analysis reveals that the content of the parties' posts (left-right issues, nationalism, corruption and others) is very much connected to parties' position on the left-right and national cleavages which at the same time correspond to the issues shaping the Catalan political agenda. With regard to followers' reactions to parties' posts (H2), the five parties' characteristics (party size, institutionalization, centralization degree, and position on the left-right and nationalism axes) are strongly associated to the level of engagement. In Catalonia, small and less institutionalized parties (CUP, C's) have the most active and committed Facebook followers, jointly with ERC that is an institutionalized but semi-big party. Lastly, the results of the analysis of variance point that visual posts (posts with videos or photos) raise more engagement (comments, likes and shares) of parties' Facebook followers than parties' textual posts (posts with links or status).

Chapter III tackles the relations of Catalan parliamentarians in a particular network, the following-follower Twitter network. The results show that Twitter relations among Catalan parliamentarians correspond to a typical affiliation network due to the partisan structure and working milieu of the Parliament (Smith et al, 2014). In this light, the analysis of the three (January/February/March) following-follower networks of the Catalan parliamentarians reveal high reciprocity between parliamentarians, short distances between them and a clustering structure of four communities and two cleavages (left-right and Catalan nationalist-Spanish nationalist). That structure permits the appearance of brokers who bridge the different political clusters and connect separate representatives within the same party (Burt, 2005). On the other hand, the network analysis and the regression models provide clear results regarding who the opinion leaders of the network are and which are their characteristics. Specifically, when the centrality position of the MPs is measured by the number of followers a parliamentarian has (In-Degree) as dependent variable, it can be observed that the number of followers rises with the number of interventions at Plenary session and when the parliamentarian holds a political position in Parliament. Therefore, holding a relevant political or parliamentary position seems to be a determinant of MPs' opinion leadership in the following-follower Twitter network (H3). However, if the network centrality of the deputies is measured by the *betweenness centrality*, the model shows that only the network activities carried out by the parliamentarians (In-degree, Out-degree and Reciprocated Vertex per Ratio) have an influence over the fact of being an opinion leader or, in other words, a broker (H4). In brief, the research implies that opinion leadership in the Catalan MPs' following-follower Twitter network

is rooted in the political visibility of the parliamentarians but also in their network activities, which means that Twitter is opening a window for the appearance of new online *political influentials*.

Chapter IV further extends the analysis started in Chapter III but it reaches all the Catalan parliamentarians' following-follower relations, mentions and retweets done between 1 January 2013 and 31 March 2014. The research shows evidence supporting the argument that communication flows among the Twitter networks of Catalan parliamentarians' are party and ideologically polarized (H5). However, the data also confirm that the degree of political polarization is higher in the following-follower and the retweet networks than in the mention (Conover et al., 2011; Gruzd 2012; Yoon & Park 2014). Specifically, the results points that in the mention network, Catalan MPs not only communicate with parliamentarians sharing their same ideological stance (left-right or Catalan nationalist/Spanish nationalist cleavages) but also with the MPs holding opposite points of view.

On the other hand, regarding the analysis of the opinion leaders, the research implies that highly visible political leaders are still at the center of communication flows in the Catalan Twitter networks, yet new opinion leaders who do not hold relevant political or parliamentarian positions are taking the lead in the retweet network (H6). The statistical analysis shows that highly visible political leaders (party leaders and MPs with parliamentarian and political positions) are the most followed and mentioned, yet they are not the most retweeted. These results are in line with those found in previous studies (Hsu & Park, 2012; Dubois & Gaffney, 2014) which pointed to the role played

by political leadership as a factor behind opinion leadership in Twitter networks, yet they also reveal that political visibility is not a key factor of the retweets that the MPs receive. Also, the data show a clear association between the retweets that MPs receive with their mentions received and sent, thereby showing that the rationale behind MPs retweeting activity is not influenced by the political visibility of parliamentarians but by other factors among which the model, in line with the results shown by Grant et al., (2010), points that Catalan MPs who engage in conversational tweeting are more likely to be retweeted. Lastly, the network analysis of the centrality position of the parliamentarians based on the total number of parliamentarians following, mentioning or retweeting the other nodes (representatives) of the three networks has revealed that new opinion leaders (who do not hold a political or a parliamentary position) are concentrating the majority of retweets and taking the lead in the following and mention networks.

In sum, the findings of this dissertation provide clear and refutable evidences of the appearance of a new online political arena in which parties and their representatives are maneuvering to guarantee their political survival.

Nevertheless, there are multiple and diverse aspects linked to parties and their representatives' interaction in Facebook and Twitter that still remain to be tested. Specifically, regarding the interaction in parties' Facebook pages (Chapter II), a more in-depth analysis of the parties' primary goals and the corresponding online communication strategy (Römmele, 2003) should be carried out. Indeed, it might be interesting to further analyze the relation between Catalan parties' appropriation of the issues framing the Catalan agenda and the topics of their Facebook posts. Also, it

may be revealing for research purposes to identify the socio-demographic characteristics of parties' Facebook followers and to study the relation between these characteristics and the interaction levels reached by parties in their Facebook pages. Lastly, more studies could go beyond the time span of the present research and carry out comparative analyses of parties' Facebook and their Facebook followers' behavior.

Chapter III approaches the relations of Catalan parliamentarians in their following-follower Twitter network from a network and statistical point of view. The study shows that the characteristics of the Catalan parliamentarians who are the opinion leaders in the following-follower Twitter network differ a lot when their centrality position in the network is measured through the *betweeness centrality* or their *In-degree*. Specifically, the data sustain that while de deputies' brokerage position is only explained by the parliamentarians' network behavior, the following relations among the parliamentarians are indeed determined by their political position. However, further research is necessary for better understanding of why and how the majority of the parliamentarians that are bridges of Twitter communication in the Parliament are not official party leaders and do not hold important positions in Parliament. In addition, it is important to ascertain if the individual explanatory variables of our model should be complemented with more relational dimensions that give a better account of the affinities in the following-follower Twitter network of Parliaments.

Last but not least, Chapter IV broadens the research started in Chapter III by increasing its time span (from three months to 15 months) and the number of networks (from the following-follower network to the following-follower, the mention and the retweet networks) studied. The results provided in Chapter IV show relevant findings regarding

Catalan parliamentarians' polarization in Twitter and the appearance of new opinion leaders. However, a number of complementary issues remain to be tested: first, it might be interesting to further analyze the reasons behind the different behavior of the Catalan parliamentarians in the following-follower, retweet and mention networks; second, it may be useful to not only analyze the direction of the communication flows in the Twitter networks but also the content of these communications (Yoon and Park, 2012); third, it is reasonable to assume that other characteristics shaping the parliamentarians' communication flows play a role in explaining their directions, such as the electoral district of the parliamentarians (Lassen & Brown, 2010) or the predominant issues of the political agenda (Esteve and Borge, 2013).

To sum up, considering the broader debate on cyberpolitics this dissertation has provided clear and refutable evidences of parties and their representatives' interaction in Facebook and Twitter. It has shown that in the age of Web 2.0, parties and their representatives' behavior seem to be affected by their organizational traits, the political and technological contextual factors in which they are embedded, and their representatives' political visibility and network activities. New opinion leaders are appearing in online social networks but highly visible political leaders retain their influence, thereby corroborating that in the constant in-between techno-political social media arena the past and the new are two sides of the same coin, the network.

## Bibliography

Adamic, L., & Glance, N. (2005). *The political blogosphere and the 2004 U.S. election:*

*Divided they blog.* Retrieved from:

<http://www2.scedu.unibo.it/roversi/SocioNet/AdamicGlanceBlogWWW.pdf>

Ammann, S. L. (2010). *A political campaign message in 140 characters or less: The use*

*of Twitter by U.S. Senate candidates in 2010.* Retrieved from:

<http://ssrn.com/abstract=1725477>

Aragón P., Kappler K., Kaltenbrunner A., Laniado D., & Volkovich Y. (2013).

Communication dynamics in Twitter during political campaigns: The case of the 2011 Spanish National Election. *Policy & Internet*, 5, 9-69.

Arendt, H. (1968). *Between past and future: Eight exercises in political thought.* New

York, NY: Viking Press.

Arnold, L., Deen, R., & Patterson, S. (2000). Friendship and votes: The impact of

interpersonal ties on legislative decision making. *State and Local Government Review*, 32 (2), 142-147.

Bakshy, E., Rosenn, I., Marlow, C., & Adamic, L. (2012, April). *The role of social*

*networks in information diffusion.* Paper presented at the World Wide Web Conference Committee (IW3C2), IW3C2, Lyon, France.



- Bakshy, E., Hofman, J. M., Watts, D. J., & Mason, W. A. (2011, February). *Identifying influencers on Twitter*. Paper presented at the Fourth ACM International Conference on Web Search and Data Mining (WSDM), Hong Kong, China.
- Balcells, J., & Cardenal, Ana S. (2013). Internet and electoral competition: The Case of Esquerra Republicana de Catalunya. *Revista Española de Investigaciones Sociológicas*, 141, 3-28.
- Bartomeus, O., & Medina, L. (2010). La competencia entre los partidos: ¿síntomas de cambio? [The competence between parties: Symptoms of change?]. In J. Marcet & X. Casals (Eds), *Partidos y elecciones en la Cataluña del siglo XXI [Parties and elections in the Catalonia of the 21<sup>st</sup> century]* (pp. 153-191). Barcelona: Institut de Ciències Polítiques i Socials.
- Bechmann, A., & Lomborg, S. (2012). Mapping actor roles in social media: Different perspectives on value creation in theories of user participation. *New Media and Society*, 15 (5), 765–81.
- Benach, E. (2010). *Política 2.0*, Barcelona: Bromera.
- Bennett, L., & Segerberg, A. (2012). The logic of connective action: Digital media and the personalization of contentious Politics. *Information, Communication & Society*, 15, 739-768.
- Bimber, B. (2014). Digital media in the Obama campaigns of 2008 and 2012: Adaptation to the personalized political communication environment. [Special issue], *Journal of Information Technology & Politics*, 11 (2), 130-150.

- Bimber, B., Flanagin, A.J., & Stohl, C. (2012). *Collective action in organizations. Interaction and engagement in an era of technological change*. New York, NY : Cambridge University Press.
- Bimber, B., Flanagin, A.J., & Stohl, C. (2005). Reconceptualizing collective action in the contemporary media environment. *Communication Theory, 15*, 365-388.
- Bimber, B., & Davis, R. (2003). *Campaigning online: The Internet in U.S. elections*. Oxford: Oxford University Press.
- Bluemarket. (2013). *Facebook en España: informe 2012* [Facebook in Spain: 2012 report]. Retrieved from:  
<http://www.bluemarkets.es/tag/informe-facebook/>
- Boyd, D., & Nicole, E. (2008). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication, 13* (1), 210–30.
- Briones, R., Kuch, B., Brooke, Liu., & Yan, J. (2011). Keeping up with the digital age: How the American Red Cross uses social media to build relationships. *Public Relations Review, 37* (1), 37–43.
- Burt, R. (2005). *Brokerage & closure: An introduction to social capital*. New York, NY: Oxford University Press.
- Caldeira, G., & Patterson, S. (1984). Political friendship in the legislature. *The Journal of Politics, 49* (4), 953-975.

- Calhoun, C. (1988). Populist politics, communication media and large scale societal integration. *Sociological Theory*, 6, 219–241.
- Cardenal, A. S. (2011). Why mobilize support online? The paradox of party behaviour online. *Party Politics*, 19 (1), 83–103.
- Castells, M. (2012). *Networks of outrage and hope : Social movements in the Internet age*. Malden, MA : Polity Press.
- Castells, M. (2009). *Communication power*. New York, NY: Oxford University Press.
- Castells, M. (2000). *The rise of the network society: The information age: Economy, society and culture*. New York, NY: Wiley.
- Centre d'Estudis d'Opinió. (2013). *Baròmetre d'opinió política (BOP). 1a onada 2013* [Barometer of political opinión. 1<sup>st</sup> wave 2013]. Retrieved from <http://www.ceo.gencat.cat/ceop/AppJava/pages>
- Centre d'Estudis d'Opinió. (2012). *Baròmetre d'opinió política (BOP). 3a onada 2012* [Barometer of political opinion. 3<sup>rd</sup> wave 2012]. Retrieved from <http://www.ceo.gencat.cat/ceop/AppJava/pages>
- Centre d'Estudis d'Opinió. (2012). *Baròmetre d'opinió política (BOP). 2a onada 2012* [Barometer of political opinion. 2<sup>nd</sup> wave 2012]. Retrieved from <http://www.ceo.gencat.cat/ceop/AppJava/pages>
- Cha, M., Haddadi, H., Benevenuto, F., & Gummadi, K. P. (2010). Measuring user influence in Twitter: The million follower fallacy. In W. W. Cohen & S. Gosling

- (Eds.), *Artificial Intelligence* (pp. 10-17). Fourth International AAI Conference on Weblogs and Social Media.
- Chadwick, A., & Anstead, N. (2009). Parties, election campaigning, and the Internet: Toward a comparative institutional approach. In A. Chadwick & P. Howard (Eds), *Routledge Handbook of Internet Politics* (pp. 56-71). New York, NY: Routledge.
- Chi, F., & Yang, N. (2010). Twitter adoption in Congress. *Review of Network Economics*, 10 (1), 1-49.
- Conover, M., Ratkiewicz, J., Francisco, M., Gonçalves, B., & Flammini, F. (2011). *Political polarization on Twitter*. In Proceedings of the Fifth International AAI Conference on Weblogs and Social Media, AAI, Barcelona.
- Deschouwer, K. (1992, June). *The survival of the fittest: Measuring and explaining adaptation and change of political parties*. Paper presented at the ECPR workshop in Limerick, Ireland.
- Diani, M. (2003). *Social movements and networks: Relational approaches to collective action*. Oxford: Comparative Politics.
- Dubois, E., & Gaffney, D. (2014). The Multiple facets of influence: Identifying political influentials and opinion leaders on Twitter. *American Behavioral Scientist*, 58 (10) 1-18.
- Duverger, M. (1964). *Introduction à la politique*. Paris: Gallimard.
- Esteve, M. (2015). El movimiento YoSoy132: tuits y votos en la elección presidencial mexicana de 2012 [The Movement YoSoy132 : Tweets and votes in the 2012

Mexican presidential campaign]. *Revista de Estudios Latinoamericanos*, 35, 105-128.

Esteve, M., & Borge, R. (2014). Are social media changing party politics? Brokers among the members of the Catalan parliament Twitter network. In: Balcells, J., Cerrillo, A., Peguera, M., Peña-López, I., Pifarré, M.J & Vilasau, M. *Internet, Law and Politics. A Decade of Transformations*. Paper presented at the 10<sup>th</sup> International Conference on Internet, Law and Politics, Universitat Oberta de Catalunya, Barcelona, 3-4 July (pp. 745-766). Barcelona, BCN, SPAIN: Huygens. Retrieved from:

<http://edcp.uoc.edu/symposia/idp2014/proceedings/>

Esteve, M., & Borge, R. (2013). Abriendo brechas: Centralización de las decisiones e interacción online en CIU, ERC y el PSC [Opening up divides: Centralization of the decisions and online interaction in CIU, ERC and PSC]. *Revista de Internet, Derecho y Política*, 17. Retrieved from:

<http://journals.uoc.edu/index.php/idp/>

Freeman, C. (1978-79). Centrality in social networks: Conceptual clarification. *Social Networks*, 1, 215-239.

Garrett, R. K., Carnahan, D., & Lynch, E. K. (2011). A turn toward avoidance? Selective exposure to online political information, 2004–2008. *Political Behavior*, 35 (5), 113-134.

Gibson, R., & Römmele, A. (2003, August). *Regional web campaigning in the 2002 German Federal Election*. Paper presented at the American Political Science Association (APSA) annual conference, Philadelphia, United States of America.

Gibson, R., & Ward, S. (1999). Party democracy on-line: UK parties and new ICTs. *Information, Communication & Society*, 2 (3), 340–67.

Gibson, R. (2013). Party change, social media and the rise of 'citizen-initiated campaigning'. *Party Politics*, Published online before print, doi: 10.1177/1354068812472575

Gilbert, E., & Karahalios, K. (2009). *Predicting tie strength with social media*. Proceedings of the 27th international conference on Human Factors in Computing systems (CHI '09). ACM, New York, United States of America.

Gladwell, M. (2002). *The tipping point : How little things can make a big difference*. New York, NY : Back Bay Books.

Goldbeck, J., Grimes, J. M., & Rogers, A. (2010). Twitter use by the U.S. Congress. *Journal of the American Society for Information Science and Technology*, 61 (8), 1612–1621.

Gonzalez-Bailon, S., & Wang, N. (2013). The bridges and brokers of protest campaigns using social media. Retrieved from:

SSRN: [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2268165](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2268165)

- Grant, W., Moon, B., & Grant, J. (2010). Digital Dialogue? Australian politicians' use of the social network tool Twitter. *Australian Journal of Political Science*, 45 (4), 579-604.
- Gruzd, A. (2012, September). Investigating a political polarization on Twitter: A Canadian perspective. Paper presented at the *Internet, Politics and Policy 2012: Big Data, Big Challenges?* Oxford, United Kingdom.
- Gustafsson, N. (2012). The subtle nature of Facebook politics: Swedish social network site users and political participation. *New Media and Society*, 14 (7), 1,111–1,127.
- Habermas, J. (1989). *The structural transformation of the public sphere*. Cambridge, MA: MIT Press.
- Hansen, D., Shneiderman, B., & Smith, M. (2011). *Analysing social media networks with NodeXL*. Burlington: Elsevier.
- Harmel, R., & Janda, K. (1994). An integrated theory of party goals and party change. *Journal of Theoretical Politics*, 6, 259-287.
- Heidar, K., & Saglie, J. (2003). Predestined parties?: Organizational change in Norwegian political parties. *Party Politics*, 9 (2), 219–39.
- Hendricks, J.A., & Denton, R.E. (2010). *Communicator-in-chief: How Barack Obama used new media technology to win the White House*. Lanham: Lexington Books.

Himmelboim, I., Mc Creery, S., & Smith, M. (2013). Birds of a feather tweet together: Integrating network and content analysis to examine cross-ideology exposure on Twitter. *Journal of Computer-Mediated Communication*, 18 (2), 154-174.

Hogan, B. (2007). Analysing social networks via the Internet. Draft article retrieved from:

[http://individual.utoronto.ca/berniehogan/Hogan\\_SAGE\\_Internetworks\\_RC1.pdf](http://individual.utoronto.ca/berniehogan/Hogan_SAGE_Internetworks_RC1.pdf)

Hogan, B. (2011). Visualizing and interpreting Facebook networks. In Hansen, D., Shneiderman, B., & Smith, M. (ed.) *Analysing social media networks with NodeXL*. Burlington: Elsevier pp. 165-179.

Hsu, H. L., & Park, H. W. (2012). Mapping online social networks of Korean politicians. *Government Information Quartely*, 29, 169-181.

Institut de Ciències Polítiques i Socials. (2013). *Anuari polític de Catalunya 2012* [2012 Political Yearbook of Catalonia]. Retrieved from:

<http://www.icps.cat/publicacions>

Izquierdo, L. (2012). Las redes sociales en la política española: Twitter en las elecciones de 2011 [Social networks in Spanish Politics: Twitter in the 2011 elections], *Estudos em Comunicação*, 11, 149-164.

Janda, K. (1980). *Political parties: a cross-national survey*. London: Free Press.



- Katz, E. (1957). The two-step flow of communication: An up-to-date report on a hypothesis. *Public Opinion Quarterly*, 21 (1), 61-78.
- Katz, R., & Mair, P. (1995). Changing models of party organization and party democracy: The emergence of the cartel party. *Party Politics*, 1, 5–28.
- Kirchheimer, O. (1966). The transformation of the Western European party systems. In J. La Palombara & M. Weiner (Eds), *Political Parties and Political Development* (pp.117-121). Princeton, NJ: Princeton University Press.
- Klinger, U. (2013). Mastering the art of social media. *Information, Communication & Society*, 16 (5), 717–736.
- Knoke, D. (1994). *Political networks: The structural perspective*. New York, NY: Cambridge University Press.
- Knoke, D., & Yang, S. (2008). *Social network analysis. Quantitative Application in the Social Science*. New York, NY: Sage Publications.
- Kwak, H., Lee, C., Park, H., & Moon, S. (2010, April). *What is Twitter a social network or a news media?* Paper presented at the International World Wide Web Conference, Raleigh, North Carolina, United States of America.
- Lassen, D., & Brown, A. (2010). Twitter: The electoral connection?. *Social Science Computer*, 000(00), 1-18.
- Laumann, E., & Pappi, F. (1976). *Networks of collective action: A perspective on community influence*. New York, NY: Academic Press.

- Lazarsfeld, P., Berelson, B., & Gaudet, H. (1948). *The people's choice*. New York, NY: Columbia University Press.
- Löfgren, K. (2003, April). *Intra-party use of new ICTs - Bringing memberships back in?*. Paper prepared for ECPR Joint Sessions of Workshops, Edinburgh, Scotland.
- Lotan, G., Graeff, E., Ananny, M., Gaffney, D., & Pearce, I. (2011). The Arab Spring| the revolutions were tweeted: Information flows during the 2011 Tunisian and Egyptian revolutions. *International Journal of Communication*, 5, 1375-1405.
- Lundell, K. (2004). Determinants of candidate selection: The degree of centralization in comparative perspective. *Party Politics*, 10 (1), 25–47.
- Lynch, K., & Hogan, J. (2012). How Irish political parties are using social networking sites to reach generation Z: An insight into a new online social network in a small democracy. *Communication*, 13, 83–98.
- Mackay, J.B. (2010). Gadgets, gismos, and the web 2.0 election. In J.A. Hendricks & R.E. Denton (Eds), *Communicator-in-Chief: How Barack Obama used new media technology to win the White House* (pp. 19-36). Lanham: Lexington Books.
- Margaretten, M. & Gaber, I. (2014). The crisis in public communication and the pursuit of authenticity: An analysis of the Twitter feeds of Scottish MPs 2008-2010. *Parliamentary Affairs*, 67 (3), 328-350.
- Margetts, H. (2001, April). *Cyber parties*. Paper prepared for ECPR Joint Sessions of Workshops, Grenoble, France.

- McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology*, 27, 415–444.
- Missingham, R. (2010). The Australian Parliament in the twitterverse. *Australian Parliamentary Review*, 25 (1), 3-16.
- Michels, R. (1962 [1911]). *Political parties: a sociological study of the oligarchic tendencies of modern democracy*. New York, NY: Free Press.
- Molas, I., & Bartomeus, O. (1999). Els espais de frontera entre els electorats [The spaces of borders between the electorate]. *Working Paper 165*, Institut de Ciències Polítiques i Socials.
- Nahon, K., & Hemsley, J. (2013). *Going Viral*. Malden, MA : Polity Press.
- Negroponete, N. (1995). *Being digital*. New York, NY: Knopf.
- O'Reilly, T. (2005). What is Web 2.0? Design patterns and business models for the next generation of software. *Journal of Digital Economics*, 65, 17-37
- Padró-Solanet, A., & Cardenal, A.S. (2008). Partidos y política en internet: Un análisis de los websites de los partidos políticos catalanes [Parties and policy in the Internet: An analysis of the Catalan parties webpages]. *IDP Revista de Internet, Derecho y Política*, 6, UOC. Online journal. Retrieved from [http://www.uoc.edu/idp/6/dt/esp/padro-solanet\\_cardenal.pdf](http://www.uoc.edu/idp/6/dt/esp/padro-solanet_cardenal.pdf)
- Padró-Solanet, A. (2009, April). *The strategic adaptation of party organizations to the new information and communication technologies: a study of Catalan and Spanish parties*. Paper prepared for ECPR Joint Sessions of Workshops, Lisbon, Portugal.

Pallarès, F., & Verge, T. (2010). Continuidad y cambio en los partidos políticos en Cataluña (1977-2010) [Continuity and change in the political parties of Catalonia (1977-2010)]. In J. Marcet & X. Casals (Eds), *Partidos y elecciones en la Cataluña del siglo XXI [Parties and elections in the Catalonia of the 21<sup>st</sup> century]* (pp. 49-99). Barcelona: Institut de Ciències Polítiques i Socials.

Paranyushkin, D. (2012). Informational epidemics and synchronized viral contagion in social networks. Retrieved from:

<http://noduslabs.com/publications/Synchronized-Contagion-Viral-Social-Networks.pdf>

Patterson, S. (1952). Patterns of interpersonal relationships in a state legislative group: The Wisconsin Assembly. *Public Opinion Quarterly*, 23 (1), 101-109.

Patterson, S. (1972). Party opposition in the legislature: The ecology of legislative institutionalization. *Polity*, 4 (3), 344-366.

Pedersen, K., & Saglie, J. (2005). New technology in ageing parties: Internet use in Danish and Norwegian parties. *Party Politics*, 11 (3), 359–77.

Pew Research Center. (2014). *Mapping Twitter topics networks. From polarized crowds to community clusters*. Washington DC: Smith, A.M., Rainie, L., Shneiderman, B., & Himelboim, I.

Putnam, R. (2000). *Bowling alone: The collapse and revival of American community*. New York, NY: Simon & Schuster.

Rheingold, H. (1993). *The Virtual Community*. Reading, MA: Addison-Wesley.

Rogers, M. (2010). *Diffusion of innovations*. New York, NY: Free Press.

Rommele, A., & Copeland, L. (2009). *Beyond the base? Political parties, citizen activists, and digital media use in the 2009 German federal election campaign*. Center for the Study of Democracy. Retrieved from :

[file:///C:/Documents%20and%20Settings/Propietario/Mis%20documentos/Downloads/eScholarship%20UC%20item%205jq790f8%20\(1\).pdf](file:///C:/Documents%20and%20Settings/Propietario/Mis%20documentos/Downloads/eScholarship%20UC%20item%205jq790f8%20(1).pdf)

Rommele, A. (2003). Political parties, party communication and new information and communication technologies. *Party Politics, Special Issue Party Politics on the Net*, 9 (1), 7–20.

Routt, C. (1938). Interpersonal relationships and the legislative process. *Annals of the American Academy of Political and Social Science*, 195 (1), 129-136.

Saebo, O. (2011). Understanding Twitter use among Parliament representatives: A genre analysis. *Lecture Notes in Computer Science*, 6847, 1-12.

Serrano, I. (2007, July). *Catalonia: Political parties and nationalism online*. International conference: Catalan culture and identity in the digital era. Center for Catalan Studies: Queen Mary College-University of London, London, United Kingdom.

Small, T. (2010). Canadian politics in 140 characters: Party politics in the Twitterverse. *Canadian Parliamentary Review*, (Fall 2010), 39-45.

Smith, M., Rainie, L., Himelboim, I., & Shneiderman, B. (2014). *Mapping Twitter topics networks: From polarized crowds to community clusters*. Retrieved from:

<http://ars-uns.blogspot.com.es/2014/04/smith-et-al-2014-mapeando-comunidades.html>

Skovsgaard, M., & Arjen, V.D. (2013). Dodging the gatekeepers: Social media in the campaign mix during the 2011 Danish elections. *Information, Communication & Society*, 16 (5), 737–56.

Ström, K. (1990). A behavioural theory of competitive political parties. *American Journal of Political Science*, 34 (2), 565-598.

Sudulich, L. (2009, April). *Do ethos, ideology, country and electoral strength make a difference in cyberspace? Testing an explanatory model for parties*. Paper presented at the European Consortium of Political Research (ECPR) Joint Sessions, Lisbon, Portugal.

Suh, B., Hong, L., Pirolli, P., & Chi, E. (2010, August). Want to be retweeted? Large scale analytics on factors impacting retweet in Twitter network. Paper presented at the Social Computing (SocialCom), 2010 IEEE Second International Conference, Minneapolis, United States of America.

Sunstein, C. (2001). *Republic 2.0*. Princeton, NJ: Princeton University Press.

Thamm, M., & Bleier, A. (2013). *When politicians tweet: A study on the members of the German Federal Diet*. In ACM Web of Science, Paris. Retrieved from: <http://arxiv.org/ftp/arxiv/papers/1305/1305.1734.pdf>

Tumasjan, A., Sprenger, T. O., Sandner, P. G., & Welpe, I. M. (2010). *Predicting elections with Twitter: What 140 characters reveal about political sentiment*. In Proceedings of the Fourth AAAI Conference on Weblogs and Social Media, Retrieved from:

<https://www.aaai.org/ocs/index.php/ICWSM/ICWSM10/paper/viewFile/1441/1852>

Vergeer, M., Liesbeth, H., & Steven, S. (2011). Online social networks and micro-blogging in political campaigning: The exploration of a new campaign tool and a new campaign style. *Party Politics*, 19 (3), 477–501.

Verweij, P. (2012). Twitter links between politicians and journalists. *Journalism Practice*, 6 (5-6), 680-691.

Vishwanath, A., & Barnett, A. (Eds). (2011). *The diffusion of innovations: A communication science perspective*. New York, NY: Peter Lang.

Vissers, S. (2009, April). *From preaching to the converted to preaching through the converted*. Paper presented at the ECPR Joint Sessions of Workshops, Lisbon.

Wall, M., & Sudulich, L. (2010). Matrix revolutions?. *Information, Communication & Society*, 13 (4), 574–91.

Ward, S., & Gibson, R. (2000). A proposed methodology for studying the function and effectiveness of party and candidate websites. *Social Science Computer Review*, 18 (3), 301-319.

Ward, S., & Gibson, Rachel. (2009). European political organizations and the internet. Mobilization, participation, and change. In A. Chadwick & P. Howard (Eds.) *Routledge Handbook of Internet Politics* (pp. 25–39). Oxford: Abingdon, Oxford.

Ward, S., Gibson, R., & Werner, L. (2003). Online participation and mobilisation in Britain: Hype, hope and reality. *Parliamentary Affairs*, 56 (4), 652-68.

Williams, C.B., & Gulati, G.J. (2010). Communicating with constituents in 140 characters or less. *Working Papers*, 43, Retrieved from:

[http://opensiuc.lib.siu.edu/pn\\_wp/43](http://opensiuc.lib.siu.edu/pn_wp/43)

Xu, W., Sang, Y., Blasiola, S., & Park, H. (2014). Predicting opinion leader in Twitter activism networks: The case of Wisconsin recall elections. *American Behavioral Scientist*, 58 (10), 1-16.

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

Yoon, H.Y., & Park, H. (2014). Strategies affecting Twitter based networking pattern of South Korean politicians: Social network analysis and exponential random graph model. *Quality and Quantity*, 48 (1), 409-423.



## Appendices

### Appendix I: Description of variables and codification

| Variable   | Codification   |
|--|--|
| Gender   | 0= Male 1=Female   |
| Age  | 28 to 66 years old   |
| Level of education (EdL2)  | 1=Less than bachelor<br>2= Bachelor<br>3= Master's Degree or PhD                               |
| Blog   | 1= yes<br>0= no  |
| Facebook   | 1= yes<br>0= no  |
| Tweets per day (TxD)   | From 0 to 37.8 per day.  |
| Political party (CIU_rest)   | Dummy variable:<br>1=CIU (reference)<br>0=Rest of the parties                                  |
| Incumbency<br>(2006, 2010 or 2012 Legislatures)                              | 1= One Legislature<br>2= Two Legislatures<br>3= Three Legislatures                             |
| Number of commissions in which the<br>parliamentarian participates (PComiss) | From 0 to 16 commissions   |
| Number of interventions in commissions<br>(IComiss)                          | From 0 to 445  |
| Number of interventions in the Plenary<br>(IPlenary)                         | From 0 to 262  |
| Political position in Parliament and the<br>parliamentarian group (PARP_O_1) | 1 - Spokesperson of the parliamentarian<br>group<br>2 - President of the parliamentarian group |

|   |  |
|---|--|
|   | <p>3- Parliament Secretary or Vice-President of the Parliament</p> <p>4 - President of the Parliament</p> <p>Recoded 0-1 (0= no position; 1= 1 to 4)</p>   |
| Political position in Parliament commissions (PLC_O_1)            | <p>1 – Secretary</p> <p>2 - Vice-President</p> <p>3 - President</p> <p>Recoded 0-1 (0= no position; 1= 1 to 3)</p>   |
| Political position in the political party (POLPOS_O_1)            | <p>1 - Local mayor</p> <p>2 - President of the party</p> <p>Recoded 0-1 (0= no position; 1= 1 to 2)</p>  |
| In-Degree   | Number of followers a parliamentarian's Twitter holds. Ranges from 5 to 75.  |
| Out-Degree  | Number of parliamentarian Twitter accounts each parliamentarian is following. Ranges from 0 to 109.  |
| Reciprocated Vertex Pair Ratio (RVPR)                             | The Reciprocated vertex per ratio is the number of adjacent Twitter accounts that are connected to the Twitter account with edges in both directions (following and followers) divided by the number of adjacent Twitter accounts. Ranges from 0 to 0.376147 |
| Square Root Transformation of the Betweenness Centrality (SQRBTC) | Betweenness centrality is a standard measure of a node's centrality in the network. Ranges from 0 to 23.79.  |

Appendix II: The 26 or 27 parliamentarians with higher in-degree and betweenness centrality

| January 2014      |                  | February 2014    |                   | March 2014      |                   |
|-------------------|------------------|------------------|-------------------|-----------------|-------------------|
| ID                | BC               | ID               | BC                | ID              | BC                |
| @rociosampere     | @albertbatet     | @rociosampere    | @albertbatet      | @rociosampere   | @albertbatet      |
| @junqueras **     | @ViolantCervera  | @junqueras**     | @ViolantCervera   | @junqueras**    | @ViolantCervera   |
| @joanaortega **   | @agnesrussinol   | @joanaortega**   | @agnesrussinol    | @joanaortega**  | @agnesrussinol    |
| @joseprull*       | @meritxelloige   | @marinageli      | @meritxelloige    | @marinageli     | @meritxelloige    |
| @jaumecollboni    | @joseprull *     | @joseprull*      | @annabelmarcos    | @joseprull*     | @annabelmarcos    |
| @dolorscamats **  | @annabelmarcos   | @perearagones    | @joseprull*       | @perearagones   | @joseprull*       |
| @marinageli       | @oriolamoros     | @jaumecollboni   | @msanglas         | @jaumecollboni  | @msanglas         |
| @oriolamoros      | @perecalbo       | @dolorscamats**  | @perecalbo        | @dolorscamats** | @perecalbo        |
| @perearagones     | @perevilafulcar  | @martarovira*    | @rociosampere     | @herrerajohan** | @perecalbo        |
| @martarovira *    | @junqueras**     | @miqueliceta*    | @oriolamoros      | @martarovira*   | @rociosampere     |
| @herrerajohan**   | @rociosampere    | @oriolamoros     | @perevilafulcar   | @miqueliceta*   | @oriolamoros      |
| @miqueliceta *    | @msanglas        | @joanignasielen  | @perearagones     | @oriolamoros    | @perearagones     |
| @joanignasielen   | @roger_mont      | @herrerajohan**  | @junqueras**      | @joanignasielen | @junqueras**      |
| @roger_mont       | @joanaortega**   | @roger_mont      | @mxandri73        | @roger_mont     | @mxandri73        |
| @albertbatalla    | @martarovira *   | @KRLS            | @NuriaVentura     | @HiginiaRoig**  | @NuriaVentura     |
| @HiginiaRoig **   | @NuriaVentura    | @albertbatalla   | @roger_mont       | @msanglas       | @roger_mont       |
| @msanglas         | @xaviercima      | @HiginiaRoig**   | @rafalopez        | @KRLS           | @rafalopez        |
| @KRLS             | @perearagones    | @msanglas        | @joanignasielen   | @albertbatalla  | @joanignasielen   |
| @Annasimo *       | @joanignasielen  | @Annasimo*       | @xaviercima       | @Annasimo*      | @xaviercima       |
| @Pere_Navarro **  | @rafalopez       | @Pere_Navarro**  | @joanaortega**    | @Pere_Navarro** | @joanaortega**    |
| @angelrosdoming** | @dolorscamats**  | @nuriaparlou**   | @martarovira*     | @nuriaparlou**  | @martarovira*     |
| @meritxelloige    | @rosaamorosc     | @meritxelloige   | @rosaamorosc      | @meritxelloige  | @lluisguino       |
| @nuriaparlou**    | @lluisguino      | @NuriaVentura    | @lluisguino       | @NuriaVentura   | @rosaamorosc      |
| @NuriaVentura     | @elenaribera     | @jlcleries       | @manureyeslopez** | @msenserrich    | @manureyeslopez** |
| @lluisguino       | @JuanMilian      | @lluisguino      | @JuanMilian       | @lluisguino     | @JuanMilian       |
| @Albert_Rivera**  | @manureyeslopez* | @Albert_Rivera** | @elenaribera      | @jlcleries      | @elenaribera      |
|                   | *                |                  | @dolorscamats **  |                 |                   |

ID= In-Degree ; BC= Betweenness Centrality ; Parliament Position= \* ; Political Position=\*\*

Appendix III: Description of variables and codification

| <b>Variable</b>   | <b>Codification</b>  |
|---|--|
| Gender  | 0= Male 1=Female   |
| Age   | 28 to 66 years old   |
| Level of education (EdLBR)  | 1=Less than bachelor<br>2= Bachelor<br>3= Master's Degree or PhD   |
| Blog  | 1= yes<br>0= no  |
| Facebook  | 1= yes<br>0= no  |
| Total Tweets  | From 0 to 3244.  |
| Total Mentions Sent   | From 0 to 773.   |
| Total Mentions Received   | From 0 to 1274.  |
| Total Retweets Sent   | From 0 to 227.   |
| Total Retweets Received   | From 0 to 361.   |
| Favorites per day   | Average of the Parliamentarians' favorites per day. Ranges from 0 to 26.07.  |
| Incumbency<br>(2006, 2010 or 2012 Legislatures)                           | 1= One Legislature<br>2= Two Legislatures<br>3= Three Legislatures   |
| Number of commissions in which the parliamentarian participates (PComiss) | From 0 to 16 commissions   |
| Number of interventions in commissions (IComiss)                          | From 0 to 445  |
| Number of interventions in the Plenary (IPlenary)                         | From 0 to 262  |
| Political position in Parliament and the parliamentarian group (PARP_O_1) | 1 - Spokesperson of the parliamentarian group<br>2 - President of the parliamentarian group<br>3- Parliament Secretary or Vice-President of the Parliament |

|  |   |
|--|---|
|  | 4 - President of the Parliament<br>Recorded 0-1 (0= no position; 1= 1 to 4)                         |
| Political position in Parliament commissions (PLC_O_1) | 1 – Secretary<br>2 - Vice-President<br>3 - President<br>Recorded 0-1 (0= no position; 1= 1 to 3)    |
| Political position in the political party (POLPOS_O_1) | 1 - Local mayor<br>2 - President of the party<br>Recorded 0-1 (0= no position; 1= 1 to 2)           |
| In-Degree  | Number of followers a parliamentarian's Twitter holds. Ranges from 6 to 77.                         |
| Out-Degree   | Number of parliamentarian Twitter accounts each parliamentarian is following. Ranges from 0 to 115. |
| Left-Right   | 1= Right<br><br>0= Left   |
| Catalan nationalist and non-nationalist                | 1= Yes<br><br>0= No   |