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# Influence of media on the political conversation on Twitter: Activity, popularity, and authority in the digital debate in Spain

*La influencia de los medios en la conversación política en Twitter: actividad, popularidad y autoridad en el debate digital en España*

*Influência da mídia na conversa política no Twitter: atividade, popularidade e autoridade no debate digital na Espanha*

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## Abstract

*Traditionally media (newspapers, television stations, radio networks, and news agencies) have exerted a great influence on society, but their role is changing in the face of the emergence of the digital environment. Although we know a lot about how to measure digital influence, we still have little evidence on how it is exercised in social media. In order to reverse this deficit, big data techniques are used on a sample of 127.3 million tweets with the goal of learning which were the most influential in the political debate on Twitter in Spain. Through a methodology based on machine learning and social network analysis, the most influential media are identified based on their nature, type, perceived ideological position, and territorial coverage. For this, three indicators of digital influence are used: activity, popularity, and authority. The results indicate that the exercise of influence on Twitter inside the media system is being reconfigured in depth. Likewise, the data reveal the incidence of the perceived ideological position of the media –when it comes to having more or less centrality in the network and being able to influence the interactions on Twitter. Finally, although media register high values in activity and popularity, in general they obtain intermediate or low values in authority. This lack of authority calls into question the power of the media to effectively influence the political debate on Twitter.*

**Key Words:** *Political communication; Influence; Twitter; Media; Newspapers; Television; Radio stations; News agencies; Political conversation; Interactions; Big data*

## Resumen

*Los medios han sido, tradicionalmente, un actor clave en el ejercicio de la influencia en la sociedad. Su protagonismo en este sentido en la era de la comunicación de masas, se está alterando ante la emergencia del entorno digital. Aunque sabemos mucho sobre cómo medir la influencia digital, todavía tenemos pocas evidencias sobre cómo se ejerce en los medios sociales. Para contribuir a llenar este déficit, se recurre a técnicas de big data sobre una muestra de 127,3 millones de tuits. Nuestro objetivo es conocer cuáles son los medios más influyentes en la conversación política en Twitter en España. Mediante una metodología basada en machine learning y análisis de redes sociales, se identifican a los medios más influyentes tanto individualmente como según su naturaleza, tipología, posición ideológica percibida y cobertura territorial. Para ello, se usan*

*tres indicadores de influencia digital: actividad, popularidad y autoridad. Los resultados indican que se está reconfigurando en profundidad el ejercicio de la influencia en Twitter en el interior del sistema mediático. Asimismo, los datos revelan la incidencia de la posición ideológica percibida de los medios a la hora de tener mayor o menor centralidad en al red y poder condicionar las interacciones en esta plataforma digital. Finalmente, pese a que registran valores altos en actividad y popularidad, los medios, globalmente, obtienen unos valores intermedios o bajos en autoridad. Esto pone en cuestión el poder de los medios para condicionar la conversación política en Twitter de forma efectiva.*

**Palabras clave:** *Comunicación política; Influencia; Twitter; Medios; Diarios; Cadenas de televisión; Cadenas de radio; Agencias de noticias; Conversación política; Interacciones; Big data*

## **Resumo**

*Tradicionalmente, a mídia (jornais, emissoras de televisão, rádio e agências de notícias) exerce uma grande influência sobre a sociedade, mas seu papel está mudando diante do surgimento do ambiente digital. Embora saibamos muito sobre como medir a influência digital, ainda temos poucas evidências de como ela é exercida nas mídias sociais. Para reverter esse déficit, técnicas de big data são usadas em uma amostra de 127,3 milhões de tweets com o objetivo de aprender quais foram os mais influentes no debate político sobre o Twitter na Espanha. Por meio de uma metodologia baseada em aprendizado de máquina e análise de redes sociais, as mídias mais influentes são identificadas com base em sua natureza, tipo, posição ideológica percebida e cobertura territorial. Para isso, são utilizados três indicadores de influência digital: atividade, popularidade e autoridade. Os resultados indicam que o exercício de influência no Twitter dentro do sistema de mídia está sendo reconfigurado em profundidade. Da mesma forma, os dados revelam a incidência da posição ideológica percebida da mídia - quando se trata de ter mais ou menos centralidade na rede e poder influenciar as interações no Twitter. Finalmente, embora a mídia registre altos valores de inatividade e popularidade, em geral ela obtém valores intermediários ou baixos de autoridade. Essa falta de autoridade questiona o poder da mídia de influenciar efetivamente o debate político no Twitter.*

**Palavras chave:** *Comunicação política; Influência; Twitter; Meios de comunicação; Jornais; Televisão; Estações de radio; Novas agências; Conversa política; Interações; Big data*

# 1. Introduction

Traditionally, media (newspapers, television stations, radio stations, and news agencies) have been key actors in the exercise of social influence due to their public dimension and their central position in our society. In the era of mass communication, they have been protagonists in building the agenda, articulating the public debate, shaping public opinion, and even conditioning the political decision-making process (McCombs *et al.*, 2011; Casero-Ripollés & López-Rabadán, 2014). However, the digital environment, with the Internet first and social media later, is altering the conditions and dynamics through which media system exerts social influence (Casero-Ripollés, 2018).

Although there have been numerous proposals for indicators to measure influence on Twitter, there have been few investigations that have gone further than proposals; when they have gone beyond proposals, they have not applied measures to specific case studies or social actors. Therefore, we know a lot about how to measure digital influence, but little about how this influence is exerted on social media, in the framework of political communication. The limited number of previous studies have analyzed interactions in political discussions on Twitter, in the context of the electoral campaign and, from a broader perspective, took into account the combination of political communication actors and not just the media (Baviera, 2018; Guerrero-Solé, 2018)

In order to contribute to filling this gap in research, we propose combining big data techniques with a large sample of 127.3 million tweets. Our goal is to know which are the most influential media (newspapers, television stations, radio stations, and news agencies) in the political discussion on Twitter in Spain. Through a methodology based on machine learning and social network analysis (SNA), our analysis will identify the most influential media, both individually and in aggregated form. Its nature, news media mode, perceived ideological position, and territorial coverage will be taken into account. The results obtained will offer relevant data that will help to understand how the exercise of influence on Twitter in the media system is being reconfigured, and what media and types of media have competitive advantages that increase their influential capacity in this scenario.

## 2. Social influence of traditional media in the digital environment

The digital environment has introduced new elements that affect the conditions under which the media exerts social influence in the context of mass communication (Williams & Delli Carpini, 2011). Thus, first, the digital scenario has led to an increase of competition in the production and dissemination of news. The low barriers to the information market have favored the emergence of numerous new media, mainly of a digital nature, such as pure players. In front of a market, that until recently was characterized by a restricted number of media players, digitalization has generated a dense communicative environment populated by a large number of news media. They compete with each other to capture the attention of the public, which has sharpened the dispute to influence the audience.

Additionally, linked to the above, informative content has multiplied. The increase in the number of news providers has generated a scenario characterized by information abundance (Keane, 2013). It has gone from a context characterized by the lack of news to an overabundance of news. Thus, high-choice communication environments emerge, where fragmentation and polarization of media content and media uses prevails (Van Aelsts *et al.*, 2017). The exercise of influence in the middle of this ocean of information becomes more difficult and, in parallel, assumes a growing strategic importance for the media.

Along with the diversification of the news market led by professional journalism, digital technologies have favored the emergence of new informative actors coming from outside conventional journalism. The possibility of producing and disseminating informative content autonomously means that a wide variety of subjects can be communicated directly with the public without the intervention of the media. Therefore, from parties and political leaders to citizens themselves, through social movements, activists, or alternative media social media can be used to create and distribute messages. This is the case, for example, of the witnessing citizens, which are a public service capable of reinvigorating both journalism and democracy (Allan, 2013).

Media are no longer the only gatekeepers that drive the attention of the public. Now, they are forced to coexist, sometimes cooperating and sometimes conflicting, with amateur forms of information production. As a result, conventional media and professional journalism have lost their monopoly on the information production in the digital era (Chadwick, 2017). The emergence of these new informative actors questions the influence of the media on public affairs. There has been a loss of trust in media when faced with the emergence of a participatory digital media culture, especially among young people (Bennett & Pfestch, 2018).

The communicative abundance, the multiplicity of actors capable of producing and disseminating information, and the loss of trust in the media contribute to reducing impact and social influence. In this sense, some authors affirm that we are moving towards a new era of minimal effects of the traditional media on political communication (Bennett & Iyengar, 2008). The fact that citizens do not depend on the provision of news by traditional journalism only, questions, in part, the power of that journalism when it comes to building the agenda and establishing the frame of public affairs. This capacity is based on the theory of mediatization that, from a mediacentric perspective, gives media a great deal of maneuver for the public representation of politics (Mazzoleni & Schulz, 1999; Strömbäck & Esser, 2014). Although the digital environment questions the bases of mediatization (Deacon & Stanyer, 2014), several studies show that mainstream media continue to play an important role strategically, although they are far from being almighty actors. All this because of the mainstream media's ability to combine online and offline presence, establishing an interrelation of a hybrid nature between these two domains (Chadwick, 2017). Social media moves traffic between conventional media and politics, news no longer travels just one-way, but instead responds to a multiplicity of roads based on reciprocal interactions (Blumler, 2015; Casero-Ripollés, Feenstra & Tormey, 2016).

This whole landscape leads to the need to rethink the dynamics of media influence in the digital scenario, both in the field of political communication and within the media system itself. In this context, it is highly interesting to know what types of media are taking advantage of these new opportunities to generate social influence and to condition public debate and political conversation on Twitter.

### 3. Social influence in the era of social media: activity, popularity, and authority

Currently, social media are a preferred space in which social influence is being reconfigured. On digital platforms, various social actors, including the media, negotiate and manage their capacity to influence others in the framework of strong changes in sociability and political socialization (Del-Fresno-García, Daly & Segado-Sánchez-Cabezudo, 2016; Van Dijck, 2013). Although these technologies facilitate access to the digital environment, not all users are the same. The attention economy imposes strong stratifications and distinguishes, unevenly, among users based on their influence capital, which determines their scope and impact in the digital debate (Fuchs, 2017). In this context, marked by a high communicative and connective density, influence has become a key value.

Social influence can be defined as intentional or unintentional communication that produces changes in the attitudes, beliefs, intentions, motivations, or behaviors of another person (Gass, 2015). Within the social media framework, this influence can be understood as the ability to control the information flow (Cha et al., 2010; Azaza *et al.*, 2016), and influence the interactions that occur among the actors that make up a network (Leavitt *et al.*, 2009)

Despite the vast amount of data produced by digital platforms, digital influence is a difficult concept to measure since it is complex and multidimensional and does not consist of a single variable. Therefore, the indicators and formulas proposed for their detection and measurement are diverse (Riquelme & González-Cantergiani, 2016; Razis, Anagnostopoulos & Zeadally, 2018) which allow, in addition, to identify the most relevant and influential users in a social network. The literature has identified three major types of indicators that can be useful in determining the influence of the actors present in social media, specifically on Twitter: activity, popularity, and authority (Riquelme & González-Cantergiani, 2016).

- Activity is related to the amount of content created and disseminated on Twitter by a user, regardless of the attention received from other users. To be relevant this activity must be frequent and constant over time. This in-

indicator is related to the production of information on Twitter understood in a broad sense. Therefore, it includes both the generation of original tweets and retweets, mentions and replies. The most active users are able to generate a high volume of information and disseminate it through their network of contacts. The influence here is linked with the ability to create messages and content that can potentially have an impact on both the public agenda and the framing processes of political events. Among the measures related to the activity, the signal strength (SS) stands out (Pal & Counts, 2011). SS measures the original tweet production of a user, so that the more the value is closer to 1 the more influence in terms of activity a specific user will have. Its calculation is based on the following formula:  $\text{Number of original tweets posted by the user} / \text{Number of original tweets posted by the user} + \text{Number of retweets accomplished by the user}$ .

- Popularity is related to the notoriety of the user or how well they are known. A user is popular when they are recognized by many other users on the network. Thus, the number of followers is one of the main elements of this indicator. The higher the number of followers, the greater the incidence of a user in the circulation of information flow. Popularity associates their influence with a potentially large audience on which they can have an impact. The greater the number of followers, the greater the influence of the user. However, some previous research indicates that users with a high degree of popularity are not necessarily influential on Twitter (Cha *et al.*, 2010). The measure of popularity applied in this research is the Follower Rank which is the standardized version of the traditional in-degree measure (Probst, Grosswiele & Pflieger, 2013). The closer the value is to 1, the more influence a particular user will have in terms of popularity. The calculation is based on the following formula:  $\text{Number of followers of the user} / \text{Number of followers of the user} + \text{Number of followed by the user}$ .
- Finally, digital authority arises when a user has connections with other users highly connected in the network. It is a concept closely linked to the interaction between actors in a network. The influence depends on the strength of social interactions among users. Consequently, the key to providing a user with digital authority is their ability to connect actively or passively to the digital

debate (Lamirón-Palomares *et al.*, 2019). Therefore, the influence in this indicator refers to the centrality in the network that a user has and their ability to condition the public discussion on Twitter. The measure capable of capturing this characteristic is the Eigenvector centrality (Bonacich, 2007), also called Eigencentrality. It assigns relative scores to all the nodes in a network, that is to say to all its users, based on the fact that connections to high-score nodes contribute more to the score of the node in question than connections to the nodes of low score. As a result, it favors users who are well connected with other users well connected within the network. It measures the centrality of a user within a given social network. Users with high values receive the highest degree of support from the members in a network, generating the highest level of interaction and authority. Therefore, they have the ability to influence the conversation that takes place on Twitter. The closer the value is to 1, the greater the influence a given user will have in terms of authority.

## 4. Methodology

This research analyzes the media's political influence on Twitter in Spain, as well as their characteristics. Specifically, the objectives are as follows:

1. Identify the most influential media based on activity, popularity, and authority indicators in the political conversation on Twitter in Spain.
2. Determine the existing differences between media according to their nature, news media mode, perceived ideological position, and territorial coverage in terms of influence in the political talk on Twitter in Spain.

This case study collected data from Twitter on the negotiation process for the formation of Government in Spain that took place between the 2015 and 2016 elections. The analyzed period includes December 20, 2015, the day of the general elections, until the dissolution of Parliament and the call for new elections on May 2, 2016. This is a total of 133 days. Therefore, the sample compiles the political talk on Twitter about a highly relevant political process for political life: the negotiations to form Government.

To obtain the data, 50 profiles of Twitter users were initially identified from three Spanish cities, Madrid, Barcelona, and Valencia. The choice of these cities was justified because they have the highest number of inhabitants in Spain, and also stand out in relevance and prominence in the politics of the country. Users were selected as representative profiles on Twitter in the political sphere (leaders and parties), and media (journalists and opinion talk-show participants or political commentators). Using criteria to identify a strategic sample, selection was made based on the number of followers of each account and their ability to create opinion in the political field. After removing duplicate profiles, 145 Twitter profiles were analyzed. From these, their followers were automatically incorporated into the analysis. Overall, a total of 24 million profiles were obtained.

Due to the large size of the data obtained, it was necessary to limit the analysis to 10,000 profiles for each of the three cities studied. For this purpose, the most influential profiles in each of the respective cities were determined, according to a calculation by Pagerank (Page *et al.*, 1999), which indicates the relevance of a node in a group based on the importance of its followers. After eliminating duplication, the number of Twitter accounts analyzed was 24,389. The total sample of tweets generated by the accounts analyzed was 127.3 million.

The analysis procedure focused on locating the media, both newspapers and television and radio stations, and news agencies. Those selected were chosen because of their presence in the analyzed network communities and also their relevance. Finally, 29 Spanish media were selected. It should be noted that some radio stations (such as *COPE*, *Onda Cero* and *RNE*) or digital media (*OkDiario* and *Libertad Digital*, among others) were not included in the analysis because none of them appeared in any of the network communities of the three cities studied. For this reason, these were not considered.

The methodology applied is based on Social Network Analysis (SNA). Signal Strength was used to determine the activity, while Follower Rank was used to determine the popularity. In both cases, the data to calculate both indicators (Signal Strength and Follower Rank) were obtained from the API (Application Program Interface) of Twitter using the Twittonomy application. For the study of the digital

authority, the Eigenvector centrality of each of the analyzed media was calculated, taking as a reference the three cities or communities analyzed, and then calculating the average of the three over the total sample of 127.3 million tweets.

## 5. Results by individual media

### 5.1. Digital activity

The results related to the activity, measured by the Signal Strength (table 1), show that *El País*, representative of the elite press in Spain, occupies the first position with the highest value of this indicator (SS=0.99579871). Among the top ten positions there are four printed newspapers representing the legacy media. These are *La Vanguardia* (SS=0.99504482; position 4), also linked to the elite press model but located in Catalonia, *El Periódico* (SS=0.99450936; position 6), associated with the popular press model, and *La Razón* (SS=0.99291129; position 9), a conservative wing newspaper. These data show the prominence of the legacy media in relation to the activity on Twitter.

However, pure players also obtain relevant values (table 1). Within the top 10, there are three such media: *HuffPost* (SS=0.99548887; position 2), *Voz Populi* (SS=0.999543255; position 3) and *Público* (SS=0.99268227; position 10). Finally, within the first ten positions there are two public television networks, *TV3* (SS=0.99493109; position 5) and *RTVE* (SS=0.99366044; position 7), and one news agency, *Europa Press* (SS=0.999313342; position 8).

In the last positions of activity on Twitter, a large number of television networks and pure players stand out; four television media are below position 16. However, this trend is even more pronounced in the case of digital media since five of these are among the last seven positions (table 1).

### 5.2. Digital popularity

In relation to popularity, measured with the Follower Rank (table 1), the news agency *EFE* occupies the first position (FR=0.99995835), followed by the newspaper *El País*

in second place (FR=0.99989303). The analysis of the top ten positions of this indicator allows us to see the prominence of audiovisual media, especially television networks. Four of these media are in the top 10 (*La Sexta*, *RTVE*, *Antena 3* and *SER*). But, in addition, the rest of this type of media occupy the positions eleven and twelve. This fact highlights the predominance of audiovisual media in terms of popularity on Twitter.

Within the first ten positions there are three legacy media (*El País*, *El Mundo* and *La Vanguardia*) and two pure players (*El Confidencial* and *El diario.es*). However, a significant number of the latter digital media occupy intermediate and low positions in the popularity ranking (table 1). This trend also affects the legacy media, although to a lesser extent. Finally, it should be noted that, with the exception of one case (*La Vanguardia*), the most popular media are state coverage.

### 5.3. Digital authority

The media actor that obtains a higher level of digital authority, measured by Eigencentality (table 1), is *Europa Press* news agency (EC=0.6518584920). The second position is occupied by *Público* (EC=0.622736169) and the third is *El País* (EC=0.621643508). This result is significant since a digital media, *Público*, which became a pure player in 2012 (previously between 2007 and 2012 was a print version) achieves a greater impact on the political conversation on Twitter during the negotiation process for the Government formation than *El País* (founded in 1976), the reference newspaper that during the last four decades has been decisive in the Spanish political life and in the interactions among its elites (Vidal-Beneyto; Imbert, 1986; Hallin; Mancini, 2004). The fourth position is also occupied by another pure player, *Eldiario.es* (EC=0.601095483), created in September 2012.

The analysis of the top10 media based on digital authority allows us to observe the role of pure players (table 1). These digital newspapers are 40% of the first ten media of this indicator. In addition, *Público*, *Eldiario.es*, *HuffPost*, and *Vilaweb* are also on this list. The latter is the only media of local coverage that manages to access the top positions. News agencies also assume a prominent dominance, since both (*Europa Press* and *EFE Noticias*) manage to place themselves in the leading group in terms of digital authority.

By contrast, the audiovisual media, with the exception of *SER* radio station and *La Sexta* television network, occupy the last positions of the digital authority ranking (table 1). The values of Eigenvector centrality obtained by the audiovisual media are low, showing that televisions have a low degree of incidence when determining the debate and political conversation on Twitter.

Finally, the legacy media obtain diverse results in digital authority (table 1). The only ones who manage to access the top 10 are *El País* and *20m*. The rest are placed in intermediate positions (*El Mundo*, *Ara*, and *La Vanguardia*) or low (*ABC*, *El Periódico*, *La Razón*, *Levante-EMV* EMV, and *Las Provincias*).

	Media	Signal strength	Media	Follower rank	Media	Eigencentrality
1	<i>El País</i>	0.99579871	<i>EFE Noticias</i>	0.99995835	<i>Europa Press</i>	0.651858492
2	<i>HuffPost</i>	0.99548887	<i>El País</i>	0.99989303	<i>Publico</i>	0.622736169
3	<i>Voz Populi</i>	0.99543255	<i>Sexta Noticias</i>	0.99975134	<i>El País</i>	0.621643508
4	<i>La Vanguardia</i>	0.99504482	<i>El Confidencial</i>	0.99973876	<i>Eldiario.es</i>	0.601095483
5	<i>TV3</i>	0.99493109	<i>RTVE</i>	0.99962179	<i>SER</i>	0.592934826
6	<i>El Periódico</i>	0.99450936	<i>El Mundo</i>	0.99959847	<i>HuffPost</i>	0.552359586
7	<i>RTVE</i>	0.99366044	<i>Eldiario.es</i>	0.99953865	<i>VilaWeb</i>	0.532392950
8	<i>Europa Press</i>	0.99313342	<i>La Vanguardia</i>	0.99950005	<i>EFE Noticias</i>	0.527059663
9	<i>La Razón</i>	0.99291129	<i>Antena 3</i>	0.99934053	<i>20M</i>	0.502605298
10	<i>Publico</i>	0.99268227	<i>SER</i>	0.99928699	<i>Plural</i>	0.493045737
11	<i>Nació Digital</i>	0.99237501	<i>Noticias Cuatro</i>	0.99928651	<i>El Confidencial</i>	0.484067762
12	<i>ABC</i>	0.99217306	<i>TV3</i>	0.99926729	<i>Sexta Noticias</i>	0.455385918
13	<i>20M</i>	0.99187042	<i>Europa Press</i>	0.99902262	<i>El Mundo</i>	0.411985594
14	<i>Mon Diari</i>	0.99186799	<i>Las Provincias</i>	0.99899622	<i>Infolibre</i>	0.376253889
15	<i>Ara</i>	0.99181392	<i>Publico</i>	0.99845960	<i>Ara</i>	0.332718200
16	<i>Antena 3</i>	0.99144327	<i>Mon Diari</i>	0.99845447	<i>Español</i>	0.314215628
17	<i>Levante-EMV</i>	0.99044438	<i>El Español</i>	0.99797036	<i>La Vanguardia</i>	0.300870688
18	<i>El Mundo</i>	0.99033636	<i>Infolibre</i>	0.99722492	<i>Nació Digital</i>	0.281495836
19	<i>Las Provincias</i>	0.99025842	<i>HuffPost</i>	0.99625706	<i>Voz Populi</i>	0.279387570
20	<i>VilaWeb</i>	0.98970802	<i>La Razón</i>	0.99398333	<i>ABC</i>	0.272743326
21	<i>SER</i>	0.98900507	<i>Ara</i>	0.99267214	<i>Periódico</i>	0.272358332
22	<i>Sexta Noticias</i>	0.98848220	<i>Levante-EMV</i>	0.99153873	<i>La Razón</i>	0.263364275

	Media	Signal strength	Media	Follower rank	Media	Eigencentrality
23	<i>El Confidencial</i>	0.98701567	<i>ABC</i>	0.99132357	<i>Mon Diari</i>	0.260782164
24	<i>Eldiario.es</i>	0.98612290	<i>Nació Digital</i>	0.98723779	<i>Noticias Cuatro</i>	0.201695644
25	<i>El Español</i>	0.98529294	<i>Voz Populi</i>	0.98623602	<i>RTVE</i>	0.187579270
26	<i>EFE Noticias</i>	0.98426317	<i>VilaWeb</i>	0.98151262	<i>TV3</i>	0.187568351
27	<i>Plural</i>	0.98329375	<i>Plural</i>	0.97846738	<i>Levante-EMV</i>	0.152430396
28	<i>Infolibre</i>	0.98269122	<i>Periódico</i>	0.97204102	<i>Las Provincias</i>	0.108553341
29	<i>Noticias Cuatro</i>	0.97743195	<i>20M</i>	0.96399540	<i>Antena 3</i>	0.097959422

*Table 1: Media ranking by activity, popularity, and authority on Twitter*

## 6. Results by type of media

To analyze the influence of media actors in the political talk on Twitter, they have been grouped according to four criteria:

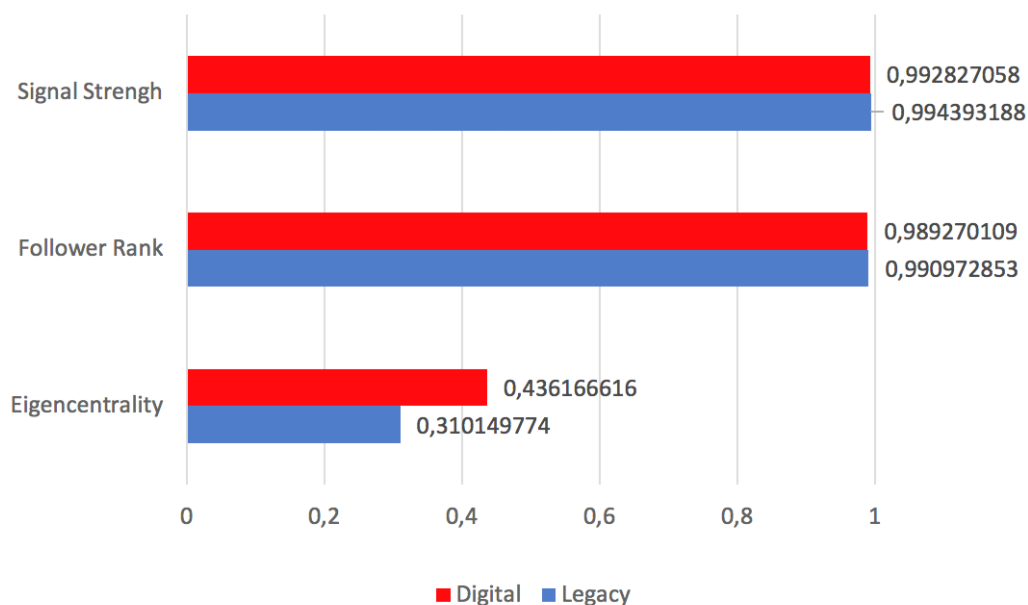
- Nature, distinguishing between legacy media and digital media.
- News media mode, distinguishing between newspapers, audiovisual media, and news agencies.
- Ideological position perceived by the public, distinguishing between left-wing media, center media, right-wing media, and pro-independence media.
- Territorial coverage, distinguishing between national and local media.

To make comparisons, the average for each of the three indicators (activity, popularity, and authority) has been calculated in each of the four criteria mentioned.

### 6.1. Legacy media vs digital media

Taking into account its nature, a distinction is made between legacy media (those media that had a trajectory previous to the appearance of the Internet or that had a printed version) and digital media (those media that are pure players and have had no presence outside the Internet). The sample consists of 18 legacy media and 11 digital media.

The analysis allows us to verify that the legacy media obtain higher values in activity (Signal Strength) and popularity (Follower Rank) (Figure 1). On the contrary, pure players reach a higher value in digital authority (Eigenvector centrality). These data show that the new digital media have strengthened their position on Twitter when it comes to generating connections and interactions within the network. Thus, they obtain a greater centrality than the mainstream media who manage to overcome in this field.



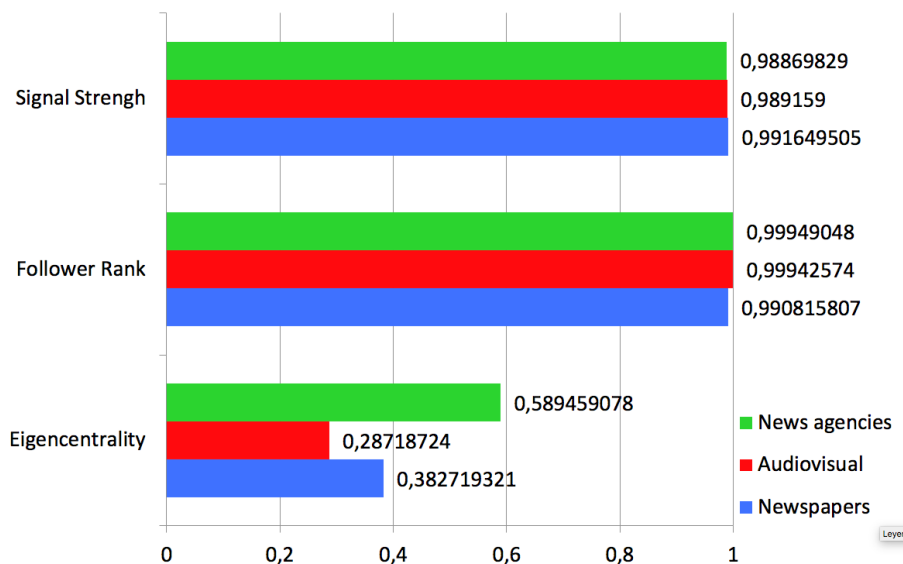
**Figure 1:** Activity, popularity and authority on Twitter according to the nature of the media (legacy vs digital).

## 6.2. News media mode

The analysis by news media mode distinguishes between three categories. The first one consists of newspapers (n=21), which includes both legacy media and pure players. The second one is that of audiovisual media (n=6), which includes television and radio stations. Finally, the third one groups news agencies (n=2).

The results show that newspapers ( $SS=0.991649505$ ) are the type of medium that obtains a higher value in terms of activity on Twitter, taking the Signal Strength as an indicator (Figure 2). In contrast, the analysis of popularity, measured with the Follower Rank, allows us to observe the preeminence of news agencies ( $FR=0.99949048$ ). This type of media also reaches the highest value in authority, measured by the Eigenvector centrality ( $EC=0.589459078$ ). These data bring to light the prominence of news agencies in the political conversation on Twitter by leading two of the three indicators of digital influence.

Also, the newspapers occupy the first position in activity, the second one in authority and the third one in popularity (Figure 2). The audiovisual media do not manage to lead any of the three indicators, although these achieve a second position (Figure 2). In two of them (activity and popularity). It should be noted that this type of media reaches a very low level of authority ( $EC=0.28718724$ ) that is very far from that obtained by news agencies and newspapers. This demonstrates that television and radio networks have a low centrality in interactions on Twitter and that these do not play a prominent role in the connections established in this digital platform.



**Figure 2:** Activity, popularity and authority on Twitter by news media mode (newspapers, audiovisual, and news agencies).

### 6.3. Perceived ideological position

In a highly polarized media system, such as the one in Spain (Hallin & Macini, 2004), it is relevant to analyze the digital influence capacity of the media based on their ideology. For the analysis of this matter, the perception that citizens have of the ideological position of the media has been taken as a reference. For this purpose, the values comprised in the survey conducted by the team led by Pavía, done in Spain on the occasion of the 2015 general elections, have been used (Pavía *et al.*, 2019; [https://www.uv.es/pavia/Informe\\_Encuesta\\_Medios.pdf](https://www.uv.es/pavia/Informe_Encuesta_Medios.pdf)). Based on these data, the following categories have been established:

- left-wing media (those that get a value between 0 and 4.5, n=9),
- centrist media (those that obtain a value between 4.6 and 6.5, n=5), and
- right-wing media (those that obtain a value between 6.6 and 10, n=5).

Likewise, these categories have been complemented with a fourth one that has grouped those media related to the independence process of Catalonia (n=5), based on the approaches of Micó and Carbonell (2017).

The media that was not clear about their alleged ideological position have not been incorporated into the analysis, not to distort the data. Therefore, the total sample in this section includes 24 media and not 29 as in the other criteria analyzed.

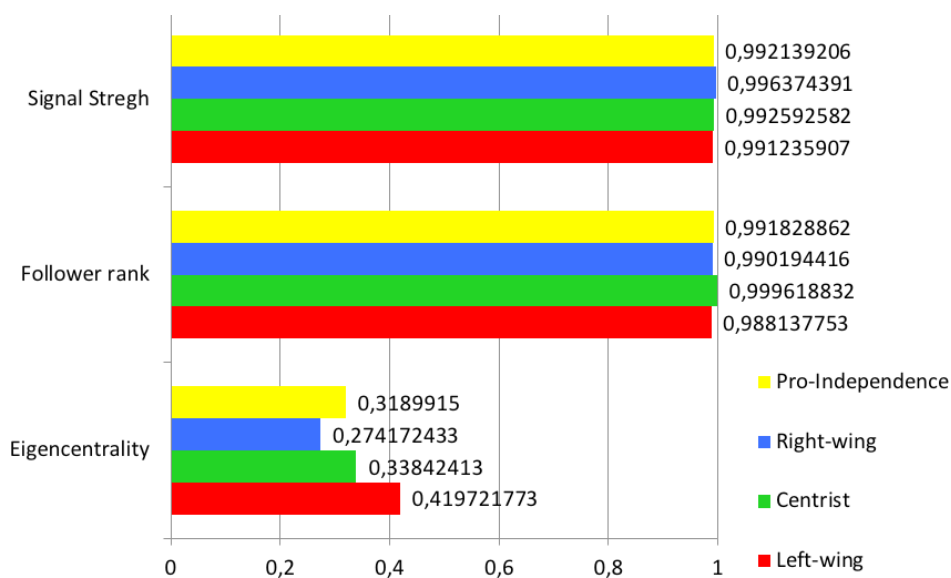
The results obtained highlight the importance of the center media in the political conversation on Twitter. These, in the case analyzed, reach the first position in the popularity category and the second position in activity and authority (EC=0.33842413) (Figure 3). Therefore, these media play a highly significant role in the interactions and exchanges that take place on Twitter on the occasion of the negotiation for the formation of Government.

However, the first position in digital authority corresponds to the left-wing media (EC=0.419721773), which obtain a clear advantage over the rest of the media in this

indicator (Figure 3). They are positioned in the maximum prominence place in the connections and interactions that are generated on Twitter in the political process analyzed here. However, these media occupy the last place in both activity and popularity.

The right-wing media reach the first position in activity and the third in popularity (Figure 3). However, they occupy the last one in authority (EC=0.274172433). This shows its low capacity to condition the political debate on Twitter since its centrality in the network is less than the rest of the media of other ideological positions.

In contrast, the pro-independence media are in second place in the popularity indicator and third place in activity and authority, respectively (Figure 3). These data reveal that these media have a limited capacity to influence the political conversation on Twitter. However, despite playing mainly in the network community that is generated around Barcelona, they manage to overcome the right-wing media, and their Eigencentrality (EC=0.3189915) is not far from that obtained by the centrist media. As a result, we must not underestimate its potential to condition the political debate on Twitter on the occasion of the negotiation to form a Government in Spain.

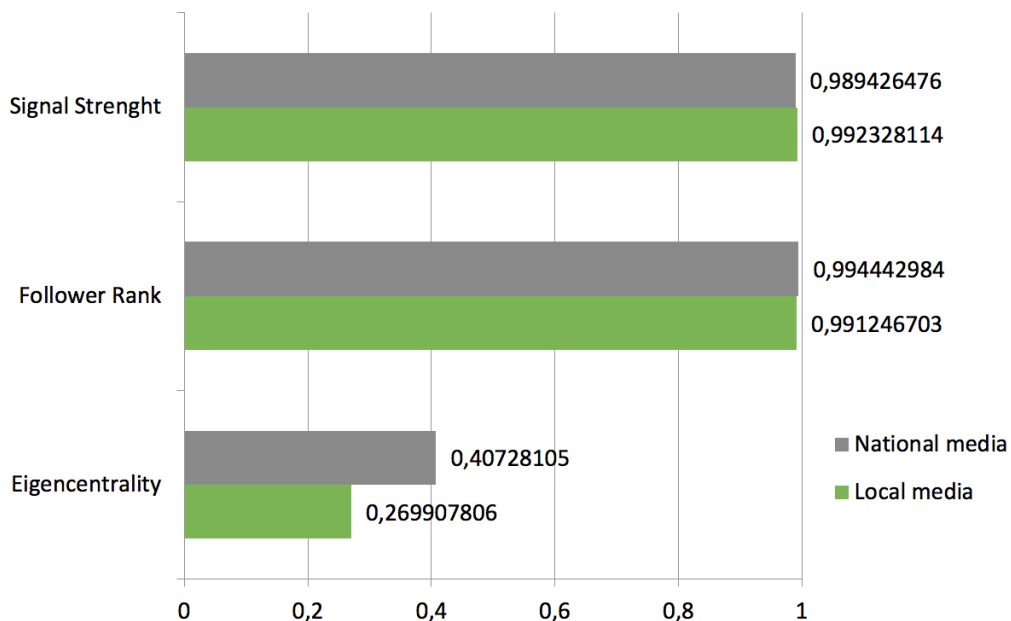


**Figure 3:** Activity, popularity and authority on Twitter by perceived ideological position of the media (left-wing, centrist, right-wing, and pro-independence).

## 6.4. Territorial coverage of the media

The media analysis according to its territorial coverage differentiates between the national and local media. The national media (n=20) are those with a coverage throughout Spain. The local media's (n=9) coverage is centered only in a part of the country.

The results show that the geographical scope of the media is a determining criterion for digital influence indicators. Thus, the national media obtain higher values both in popularity (Follower Rank) and especially in authority (Eigencentrality) (Figure 4). These data show that the media that cover the information of the whole country have greater recognition and greater centrality in the network. Therefore, these enjoy a significantly greater capacity to condition the political conversation on Twitter. For their part, local media only outperform the national media in activity (Signal Strength).



**Figure 4:** Activity, popularity and authority on Twitter by territorial coverage of the media (national vs. local).

## 7. Discussion and Conclusions

Numerous studies have focused on identifying indicators to measure influence on Twitter (Riquelme & González-Cantergiani, 2016; Razis, Anagnostopoulos & Zeadally, 2018). However, there is a lack of research on the application of these indicators to the media system. Thus, this research aims to fill a gap in the literature, providing data about the influence of the Spanish media in the political conversation on Twitter. In addition, it does so by utilizing big data and identifying a sample of 127.3 million tweets about the negotiation process for the formation of Government in Spain between 2015 and 2016. Therefore, the results obtained are of high significance and representativeness.

The results obtained show three original contributions to the field of digital political communication. First, the data about the influence of the media on Twitter, measured in terms of activity, popularity, and authority, generate a clearly differentiated scenario with respect to the classic parameters typical of the traditional media system and mass communication. Among the changes detected, it stands out that news agencies, a type of media with an auxiliary role in the classical environment as a silent partner (Johnston & Forde, 2011), start to play a key role in the digital context. They get the highest values in popularity and, most importantly, in authority on Twitter. Two reasons can explain this importance. On the one hand, the role of news agencies as primary news producers, broadly and massively (Sánchez-Marín & Micó-Sanz, 2014; Boumans *et al.*, 2018), places them in a preeminent position when it comes to influence information flows by volume of production. Also, on the other hand, the neutrality of their news, based only on facts and lacking journalistic interpretation provide information to media with different ideological tendencies, and this favors their centrality in the network, since they are followed by diverse and numerous users (increasing its popularity) and this places them as privileged generators of connections with other relevant users in the network (authority). With this, their position in the political conversation on Twitter is reinforced and increases its value. News agencies thus move from an auxiliary role to being highly relevant protagonists.

Another substantive change is related to the alteration of the role of audiovisual media, which has gone from leading the consumption of news in the mass

communication system, especially television, to remarkably losing ground in the political discussion on Twitter. In popularity they are surpassed by news agencies and are heavily besieged by newspapers, who in the traditional environment clearly used to exceed the ratings. In fact, some relevant radio networks (*COPE*, *Onda Cero*, and *RNE*) do not manage to have a presence in the analyzed network communities. In addition, its average authority index is the lowest of the group and four of its media occupy the last places in this criterion. These data reveal the weakening influence of television and radio in the political conversation on Twitter and their limited ability to affect the digital discussion.

Likewise, digital media or pure players clearly outperform legacy media in digital authority. The data show that 50% of the media that make up the top10 of this indicator are pure players. Even one of them (*Público*) manages to surpass the representative par excellence of the elite press in Spain (*El País*). This demonstrates that, globally, digital media have a greater capacity to influence interactions on the Web and affect the political conversation on Twitter. Now legacy newspapers must cope with the push of pure players in the battle for influence within the digital communication system. An element that does not change in relation to the scenario of mass communication is the major role in the processes of influence acquired by national media over local ones. In any case, the results obtained show that the digital environment is leading to a reorganization of the news market from the point of view of the influence of media actors (Williams & Delli Carpini, 2011).

The second contribution of this research is that the perceived ideological position establishes differences between the media and plays an important role in terms of influence on Twitter in Spain. The data reveal the prominence, in general terms, of the centrist media and, in terms of authority, of the left-wing media. Additionally, these also demonstrate the marginal role in terms of digital authority of the right-wing media, especially those with a seemingly more extreme ideological position. This type of media has a reduced capacity to influence the interactions that shape the political conversation on Twitter in Spain. Finally, it is observed that pro-independence media have a limited, but not irrelevant, role in terms of digital influence. Despite acting as a priority in only one of the three communities analyzed, they obtain a non-insignificant value in authority.

Finally, the third contribution is regarding the level of media influence in the political conversation on Twitter. Globally, high values close to 1 are recorded in the activity and popularity indicators in all media, regardless of their nature, news media mode, perceived ideological position, or territorial coverage. However, the values related to the digital authority of the media are intermediate or low in general terms. In fact, the highest value recorded is around 0.65. These data show the limited power of the media, understood as institutions, to assume a centrality in the network capable of affecting the political discussion on Twitter. The digital environment is configured as a more open scenario in which the media have to compete with other social actors, such as journalists, parties, candidates, political leaders or citizens, when determining the flow of information and the development of the political conversation on Twitter. The digital environment not only breaks the monopoly of the media in the production of information (Chadwick, 2017), but also breaks the monopoly of those media in the exercise of influence over the public debate.

These findings are in tune with the criticisms that question mediacentric theories (Deacon & Stanyer, 2014) and it aligns with the hypothesis of minimum impact of the media (Bennett & Iyengar, 2008) or, in any case, with the weakening of the media effects on the digital political discussion. In this line, our results suggest that the exercise of influence in the digital environment is multi-action, multidirectional, and highly complex. This opens the need to reconsider the role of the media, and its ability to influence the landscape of digital political communication.

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