Social networks, computational intelligence and electoral prediction: the case of the presidential primaries of Chile 2017

Redes sociales, inteligencia computacional y predicción electoral: el caso de las primarias presidenciales de Chile 2017

Redes sociais, inteligência computacional e previsão eleitoral: o caso das primárias presidenciais do Chile 2017

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ABSTRACT

This article shows the results of an interdisciplinary research applied to the predictive capacity of social networks, specifically Twitter, in the legal primaries in Chile in 2017. Through the incorporation of computational intelligence, we monitored the interaction of all Chilean users who mentioned at least once some of the five candidates competing to design a forecast model that considered the context of political communication, which delivered results under 2% in the mean absolute error (MAE), with more precision than the electoral polls.

RESUMEN

Este artículo muestra resultados de una investigación interdisciplinar aplicada a la capacidad predictiva de las redes sociales, específicamente Twitter, en las primarias legales en Chile de 2017. Mediante la incorporación de inteligencia computacional, se monitoreó la interacción de todos los usuarios chilenos que mencionaron al menos una vez a algunos de los cinco candidatos en competencia para diseñar un modelo de pronóstico que consideró el contexto propio de la comunicación política. Como resultado, se lograron modelos cuyos pronósticos estuvieron bajo 2% en el error absoluto medio (MAE), es decir, con mayor precisión que las encuestas electorales.

RESUMO

O seguinte artigo fornece os resultados de uma pesquisa interdisciplinar aplicada à capacidade preditiva das redes sociais, especificamente o Twitter, nas primárias legais constituídas no Chile durante o ano de 2017. Por meio da incorporação de inteligência computacional, monitorou-se a interação dos internautas chilenos que mencionaram pelo menos uma vez algum dos cinco candidatos na competição eleitoral para desenhar um modelo de previsão de resultados que considerasse contexto da comunicação política. Esse modelo apresentou resultados de menos de 2% na mediada do erro absoluto (MAE), gerando maior precisão do que as pesquisas eleitorais.

INTRODUCTION

The year 2016 will be remembered as the year in which two classic institutions that modern societies have created to try to understand and read the political processes failed: the media and public opinion polls. They failed in their capacity to probe important socio-political dynamics and, above all, in their predictive capacity regarding high-impact events.

This happened that year with situations of global relevance. The examples are of public knowledge: the opinion polls did not anticipate the Brexit's victory, the triumph of the No in the Colombian plebiscite or the triumph of Donald Trump in the United States; it also happened in the Netherlands, in the French primaries and in the municipal elections in Chile. Regarding the cases of Great Britain, Colombia and the Netherlands, the poll's forecasts were totally wrong, and as for the United States, although Hillary Clinton won in the popular vote, the polls and the analysts who relied on them were not able to unravel the electoral behavior of the states that were ultimately won by Trump and gave him enough representatives to be elected president in the electoral college. As for Chile, no survey managed to anticipate that the electoral abstention in the 2016 municipal elections would border 70%, making this the least participative election in the country's history.

The media were also not an adequate tool for social reading, and even worse to anticipate what could happen in the cases mentioned. As is also of public knowledge, the media was not impartial in these races: they supported mainly Clinton, the Yes in Colombia or the permanence of Great Britain in the European Union. The negative or contrast campaign in traditional media did not do the expected damage to Trump (which opens the possibility of scientifically reassessing the effects of the media on the audience). While Clinton was backed by 243 daily newspapers and 148 weeklies newspapers, Trump only received the support of 20 daily newspapers and a weekly newspaper. The ratio was 18 to 1 (Boczkowski, 2016).

However, the behavior of social network users (SN, hereafter) showed another reality: four days before the general elections in the United States, Trump's Facebook (FB) page accumulated 11.9 million Likes and his Twitter account had 12.9 million followers, while Clinton's numbers were 7.8 million Likes and 10.1 million followers. At that time, Clinton had 35% less Likes on Facebook and 27% fewer followers on Twitter than her opponent.

The above makes us think about the possibility – even hypothesis– that, in spite of the large technical and economic deployments, the human efforts and the professional capacities of the traditional media to cover electoral events, these will probably fulfill a secondary role from now on compared to the more central communication practices that will connect political leaders with citizens in and through SNs.

It seems that there is an intention to vote that remains hidden. The situations described show that voters do not answer truthfully or that they are leery of sharing their preferences in public and, apparently, traditional demographic studies have growing difficulties in making predictions of vote; in turn, the traditional media are those that disseminate those polls.

Sometimes, voters hide their intention, either because they refuse to answer the survey, because they say they will vote for a different option than the one they finally choose or because –according to the criterion of social desirability– they say what they think is more accepted and socially correct. This seems to be more frequent in situations where candidates are not supported by the media, such as Donald Trump or the Brexit, options rejected by the elite. Likewise, when facing radically antagonistic definitions, it seems that the hidden vote increases and, therefore, those voices, even though they are majority, are silent, and are not detected in advance neither in opinion studies nor by reading the media agenda.

In this regard, the spiral of silence theory (Noëlle-Neuman, 1995) proposes the adaptation of people to what they consider the predominant climates of opinion, as a way to avoid isolation from opposing positions, which they assume are the majority/hegemonic. People would be permanently probing the relationship between their opinions and those of the public space, tending to be muted if they present different positions to the (supposed) majority, even making themselves invisible when they face the hard nuclei that, although may be integrated by few, pose insistently their opinions, for example, thanks to the media coverage they enjoy. The media is usually a fundamental source of information so that people know what the hegemonic opinions are. The phenomenon is described as a spiral of silence, because the more the media disseminates the dominant version, the more individual voices will remain silent in a spiral process (Noëlle-Neuman, 1995). Probably, the failure in the predictive capacity of the last polls in political processes of importance is linked to this phenomenon.

CONCEPTUAL DISCUSSION

In this context, the so-called digital environment (Jenkins, 2006) and SNs introduce additional complexity. SNs act with different speed and influence than the traditional media system (Campos, 2008), which may favor that the climates of opinion are more changing and difficult to measure, since there is a greater level of fragmentation and mobility (Feijóo, Maghiros, Abadie, & Gómez Barroso, 2009). In this environment, SNs generate dynamics that affect the way in which citizens relate to information, but also how information is generated by political actors and how it is channeled through the media (Van Dijck, 2016; Wescott, 2008). This means that we should consider SNs as a great source of data that, theoretically, can provide information about many users' preferences, opinions, tastes and moods, among others (Aguado & Navarro, 2013). In fact, SNs can be considered, nowadays, as one of the main channels for collecting and disseminating political and commercial information (Fábrega & Paredes, 2012; García, 2015), as well as for the elaboration of micro-segmented messages (Sánchez Medero, 2016).

This context in which the analogical is interrelated with the digital generates new concerns and questions, and opens unexplored fields, all of which motivates our research. We know that there is a dynamic scenario in which surveys based on statistical measurements and the media are affected (Harvey, 2013). Classically, it has been argued that surveys help to understand, guide and coordinate the actions of individuals in complex environments (Lippmann, 1922; McCombs & Shaw, 1972; McQuail, 1991; Thompson, 1998). In this framework, their effectiveness has been highlighted as a way of performing macrosocial readings and operating as a social thermometer. On the other hand, polls would offer the possibility of knowing opinions, electoral preferences, tastes, etc., that is, what many authors call public opinion (Habermas, 1986; Price, 1994). The media, in turn, would account for the audience and elite's concerns, as well as for the main issues being debated, and would therefore be a suitable social-discursive tool to guide specialists and broad segments of the population regarding topics of national and international importance (McCombs & Shaw, 1972). This explains, for example, the great academic interest and the variety of analytical procedures that exist the media discourse (discourse analysis, ideological analysis, semiotic analysis, media content analysis, etc.).

These premises, hypothesized and verified throughout the twentieth century, are being tested today and, to our knowledge, the certainties that the social sciences had regarding them are in a situation of instability. These postulates face a new context –the media-digital ecosystem (Guzmán & Sánchez Medero, 2016; Scolari, 2015)– and the development of artificial intelligence (AI). Changes in the communication environment in the digital context have strongly impacted the development of new forms of political expression. For Castells (2015), for example, the fundamental change in communications in recent years is the use of the Internet and wireless networks as digital communication platforms (Castells, 2009). For citizens, a scenario of greater interaction with others is possible thanks to platforms of micro-communicative contact and, in turn, massive. The meaning and experience of politics are also displayed online, in a mobile, multi-device environment, with unprecedented access to content and services (Scolari, 2013).

The new medial environment and the AI challenge traditional opinion polls, usually done face to face or by telephone with sample sizes, biases and procedures typical of an analogical context that involves measurement instruments that work with continuous variables and limited magnitudes in situations that are often not natural. The development of AI (Russell, Norvig, & Davis, 2016) and the high and continuous use that citizens make of information and communication technologies (ICTs) on a global scale allow us to postulate, as a conceptual assumption, the beginning of a new era in digital communication that begins to characterize the XXI century, in whose center is no longer the industrial, which is something specific to the economic development of the 20th century, but the generation of knowledge based on AI. The formats of political content are not an exception, since they are in a constant process of transformation, unstable result of the confluence between formats adapted from other media and the specific innovation of mobility, fusion between content and communication (Castells, 2015; Cotarelo, 2013). The loss of the privilege of information by traditional media has strong consequences for political communication, especially at times of elections (Rogers, 2004), so the loss of a central position of the traditional media leads to a new scenario in which the traditional political predictions lose strength (Gutiérrez-Rubí, 2011). In this context, there is a growing shift of the political activity towards digital campaigns worldwide (Issenberg, 2012). If political socialization and its expressivity change, the ways of

measuring those perceptions should also do so. In this area is that our research is inscribed.

READ THE NETWORKS, READ SOCIETY: USE AND STUDY OF SNS IN CAMPAIGNS

As often happens, scientific knowledge and the elaboration of theory do not advance at the same speed as extra-scientific facts. This is how SNs and, in general, ICTs have been used for more than a decade in the political field, especially in electoral campaigns. In that sense, the digital traceability of users who are also potential voters has become a powerful tool for political probing. The digital trace we leave is subjected to a real data mining that allows to obtain information about tastes, behaviors, relationships (Gutiérrez-Rubi, 2011, Issenberg, 2012). Today, we see environments that provide real data at unprecedented scales. This is known as Big Data, which implies that what we do leaves a trace that can be collected and processed thanks to AI (Provost & Fawcett, 2013).

Nowadays, there is the ability to access huge volumes of data that are often very personal, even intimate. They are often provided voluntarily by the users, which makes SNs tools with permanent polling potential and the ability to offer segmented messages to each user. Facebook (FB) is a good example of this.

Thus, SNs are increasingly becoming a tool to respond to the political campaign challenges, on the one hand due to the inaccuracies that traditional surveys show and, on the other, due to their hyper-segmentation ability. These potentialities, based on a computational monitoring of the users' behavior, lead to a growing confidence in the political and demonstrative capacity of SNs (Magnani, 2017).

The first to make a high-impact strategic use of digital tools and Big Data in an electoral campaign was Barack Obama, in 2008. From that moment, important universities and research centers began to explore the way in which SNs relate to voters, especially FB, Twitter and YouTube (Deltell, Claes, & Osteso, 2013). Four years later, in 2012, the Obama campaign worked with a database of 16 million undecided profiles that allowed to classify them individually, to then operate communicationally on them. In the elections of 2016, the technological sophistication increased and Trump's electoral team was able, during the third television debate that he had with Clinton, to take one of the arguments raised on television and, through the use of algorithms, his advisors created 175 thousand versions of that message, which were sent

with variations and nuances according to the profile of each user (Hilbert, 2017).

Today these filtering logics, based on algorithms, are being used regularly, with political intentionality, generating what some authors call a new "political economy of information control" (Ochigame & Holston, 2016, p. 94).

As a result, nowadays an electoral campaign cannot be conceived without the use of SNs. And while there are no doubts in the political-communicational field about the centrality of networks –for example, the bots for political communication (Gutiérrez-Rubi, 2011), the crucial relationship between nodes and spread influence (Riquelme & González-Cantergiani, 2016) or feeds and the algorithmic categorizations of millions of users in the network (Ceron, Curini, & Iacus, 2017)–, the knowledge regarding the predictive capacity of SNs in campaign situations it is in a more experimental and exploratory phase. According to Schoen, Gayo-Avello, Takis Metaxas, Mustafaraj, Strohmaier and Gloor (2013), this resides in the immense amount of data provided by SNs, the expansive factor of their behavior and the technological processing capacity; likewise, it resides in the fact that SNs allow an empirical non-intrusive approach to the behaviors, preferences and discourses of users, because in them opinions are manifested freely, with the desire to make them known. In addition, the data collection allows maintaining an adequate coding of responses thanks to technological development (Tumasjan, Sprenger, Sandner, & Welpe, 2010). Twitter, for example, acts as a probe, since it allows us to follow and measure opinions continuously over extended periods. Unlike traditional surveys, SNs are characterized by constituting voluntary opinion networks. In other words, among the respondents there may be no personal link or mutual knowledge; it is the researcher who constructs the group based on sociodemographic criteria. Whereas, the study of SNs allows to study to the citizen like an actor that adheres to certain figures and projects and that is willing to act like a reproductive agent in the process of dissemination. So, what is analyzed is not only the opinion of an individual, but the discursive flow of which it participates. This allows for a more dynamic and sophisticated view of citizenship and, in particular, its relationship with the political class (Wescott, 2008).

In that vein, we can observe that, especially in countries of Central Europe and the United States, the predictive capacity of SNs has begun to be tested scientifically, especially in electoral contexts and also in

market studies (Taylor & Lethman, 2016). It is now not only about the use of AI for political communication; the network is explored to predict electoral results (Schoen et al., 2013). The latter is based on the correspondence hypothesis, which assumes coincident tendencies between positive statements made by network users regarding parties or candidates and the votes effectively obtained by them (Aparaschivei, 2010; Deltell, 2012; Tumasjan et al., 2010).

Under the context of this hypothesis, the relationship between SNs and elections has begun to be explored. For example, in the 2009 German elections (Tumasjan et al., 2010), in the Catalan elections (Congosto, Fernández, & Moro, 2011), in the Swedish elections (Larson & Moe, 2011), in the 2012 Andalusian elections (Deltell, Claes, & Osteso, 2013) or the Romanian (Momoc, 2012). These investigations are mainly focused on the use of Twitter by users, correlating said behavior with effective data of the elections.

This field study is recent; the first attempts began in 2007 (Cerón et al., 2017), that is, it is a very research dimension. It is also a very original area, since it requires a cross between computer science, political communication and linguistic. There is still much to be explored regarding the potential and predictive power of SNs, as well as their limitations and their general applicability in areas such as political communication and electoral campaigns. In that sense, there is still a wide field of study that in Chile remains little explored.

METHODOLOGICAL DISCUSSION

With the aforementioned conceptual base, our research wanted to explore the predictive capacity of SNs regarding the primaries, which are the second official ones –that is, supervised by the Electoral Service–held in Chile. They took place on Sunday July 2, 2017 and there were five candidates, three belonging to *Chile Vamos*, of the right coalition (Sebastián Piñera, Manuel José Ossandón and Felipe Kast) and two of the left coalition *Frente Amplio* (Beatriz Sánchez and Alberto Mayol).

Given the exploratory nature already mentioned, we do not opt for a hypothesis, but for a research question and a general objective, developed collectively by an interdisciplinary group of academics belonging to linguistics, computer engineering and journalism. The guiding question was: Which computer intelligence algorithms that monitor the interaction of Twitter users make it possible to predict more accurately the electoral

results of the Chilean presidential primaries? Based on this question, the we agreed on the following general objective: to evaluate the predictive capacity of various metrics applied to the SN Twitter to predict, as accurately as possible, the electoral results of the primaries, by constructing a forecast model that considers elements of the interaction between users and the social context, using computational intelligence techniques.

This work was addressed in an interdisciplinary way by the team of researchers, which was joined by a team of three support professionals (two computer engineers and a journalist specialized in SNs), and five assistants who classified the data manually.

As of May 14, 2017, we worked with a well-known social media monitoring company to extract the tweets from that SN and we designed a database with the messages and metadata of all Chilean users that mentioned one of the five candidates at least one time. Metadata are, for example:

- Name of the user that post the tweet.

- Date of publication of the message.

- Number of follower of the user.

- Number of people followed by the user.

- Application used to generate the tweet (Android, Facebook, HootSuite, etc.).

- Total number of messages posted by the user on the date on which he/she posted the tweet.

These messages were stored in the company's databases and the team of researchers compiled them through a data collection algorithm; then the messages and metadata were backed-up in our servers (Image 1).

This information was processed and analyzed by our team from May 14 to July 1, one day before the elections, and a large number of figures and tables were prepared based on it, in a site of our property.

Once the data was collected, we began the classification process. We entered the stage called automatic sentiment analysis, a task that –through the computational processing of natural language– allows us to classify the users' comments (Bakliwal, Foster, van der Puil, O'Brien, Tounsi, & Hughes, 2013). Initially, the assistants were instructed to manually sort the thousands of tweets that were generated during peak
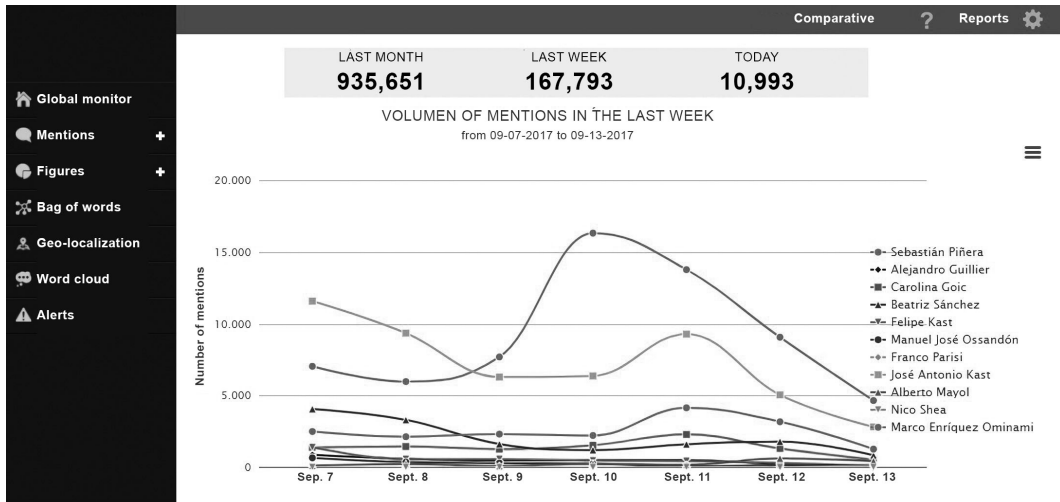
Image 1. Platform with Twitter and research project databases

Source: Own elaboration.

moments, that is, of greater activity in SNs. The manual classification followed the positive/negative/neutral criteria, i.e., cataloging the opinions in polarities, guided by the aforementioned correspondence hypothesis (Aparaschivei, 2010; Deltell, Claes, & Osteso, 2013; Tumasjan et al., 2010). To this end, we prepared a codebook to guide the assistants; for example, we defined that a post expresses an intention to vote in favor of a candidate only if at least one of the following three conditions is met:

1. The post includes an explicit statement related to the willingness to vote for a candidate/party. Example: In the primaries, I will vote for @mjossandon #PrimariasPresidenciales #Chile2017.

2. The post includes a statement in favor of a candidate/party, along with a message or a hashtag related to the electoral campaign of that candidate/party. Example: Beatriz Sánchez is a new face that will clean up politics #ConfianzaQueCambiaChile.

3. The post includes a negative statement that opposes a candidate/party with a message or a hashtag related to the electoral campaign of a rival candidate/party. Example: I hate how scoundrel @sebastianpinera is. Let's all vote by @fkast #FueraPiñera.

With these criteria, the assistants manually tagged 158,000 tweets (9.7% of the total). This work was the basis for the machine learning techniques needed to generate predictive models (Sebastiani, 2002). That is, the criteria of human labeling must be incorporated by machines (Pang, Lee, & Vaithyanathan, 2002) thanks to the use of supervised machine learning algorithms, as these are programs that, with the provided input (the data of the human classification), manage to understand, through statistical-mathematical criteria, the existing patterns between data (messages, text) and labels (positive/negative/neutral) and then discriminate them automatically. The purpose is to imitate human behavior when classifying. This is why the manual classification was very important, both because of the large amount of data that was classified (158,000 tweets that were the basis for training the machine learning algorithms), and due to the possibility of reducing the qualifying bias.

To train the algorithms with the manually classified tweets, we transformed said data, using natural language processing techniques, into a vector representation. This representation, called Bag of Words (Zhang, Jin, & Zhou, 2010) translates the tweets into a language that the machines understand, and that translation is used as data entry, so that they can interpret them (in polarities) and use them (predictively). With the algorithms already parameterized and trained, we generated our own

classifiers for the predictive exercise (which we called C1 and C2, see figure 5). It should be noted that we understand a classifier as an algorithm already trained with the data relevant to the exercise.

With all the aforementioned methodological and conceptual base, we conducted predictive exercises from June 18 to July 1. It is important to note that, for these measurements, we tested different windows, that is, time ranges between an X day and the day before the elections. For example, a window of size 5 to forecast the result of the July 2 primaries implies that the data to be collected and classified are all tweets generated from June 28 to July 1. Therefore, the predictive exercise must consider and make work together three variables: the classifiers (C1 and C2), the window range in which data is collected and processed, and the best day from which the windows are issued (for us it was June 27). These three variables are crossed and then compared with the actual election result.

The margin of error that occurs with the prediction is called mean absolute error (MAE), a metric used to evaluate the performance in the predictions and that accounts for the average difference between the estimates obtained by the classifiers used and the actual results (Willmott & Matsuura, 2005). The closer the MAE is to 0, the closer to the actual result of the elections. This metric is calculated with the following formula:

$$MAE = \frac{\sum_{i=1}^{n} |\hat{y}_i - y_i|}{n}$$

In it, y corresponds to the real value of an i event, $\hat{y}$ corresponds to the value of the estimate made for an i event, and finally n corresponds to the number of existing events to be estimated. A MAE below 5 qualifies as acceptable, as occurs in the metrics of traditional surveys (Bermingham & Smeaton, 2011).

Regarding the possible activity of bots in electoral campaigns, we started from the disadvantage of having tweets previously published in the context of primaries or the Chilean presidential elections. To make up for that lack of knowledge, we used data (Varol, Ferrara, Davis, Menczer, & Flammini, 2017) of research on the characterization and detection of bots, extracting features to detect their presence, grouped as follows:

a. Based on the user: the number of friends and followers, profile description and configuration,

number of tweets and retweets produced, among others.

b. Based on time: the time between tweets and consecutive retweets.

c. Based on the network: the communication between Twitter users through retweets, mentions and hashtag builds a network, which allows to characterize the type of communication between users.

Then, we took all the tweets generated during the study period and filtered them through these characteristics. Finally, we conducted a process called transfer learning, which implies that the knowledge generated to detect bots in previous studies is used to detect bots in Chilean elections. The presence of bots was not detected during the period between May 14 and July 1, 2017.

RESULTS

Overall, 162,000 users commented, during the indicated date range, at least once something about the candidates, generating 1,619,631 messages. This number includes tweets (30.32% of total messages) and retweets (69.68%). Retweets (RT) doubled the tweets, for all the candidates (figure 2).

The candidate with the highest number of mentions (tweets and RT) was Sebastián Piñera: 609,887 posts (38.1%) referred to him, followed by Beatriz Sánchez, who had almost a quarter of the mentions (figure 3).

Considering that, as mentioned in the formulation of the general objective, we were interested in relating SNs' activity with the country's context, we chose to do –in the same period– a follow-up of media events (debate and interviews with candidates) and non-media events promoted by the campaigns (proclamations, concentrations, inscriptions, etc.). We started from the conceptual assumption that the behavior of curves on Twitter is often related to situations that occur outside the network, either in traditional media or in political events. Thus, we elaborated tables (figure 4) by coalition, with their respective candidates, that cross the number of mentions (Y axis) with the events occurring at that time (axis X).

Evidently, the peaks on Twitter are closely related to occurrences in traditional media, especially in open television. For example, the largest number
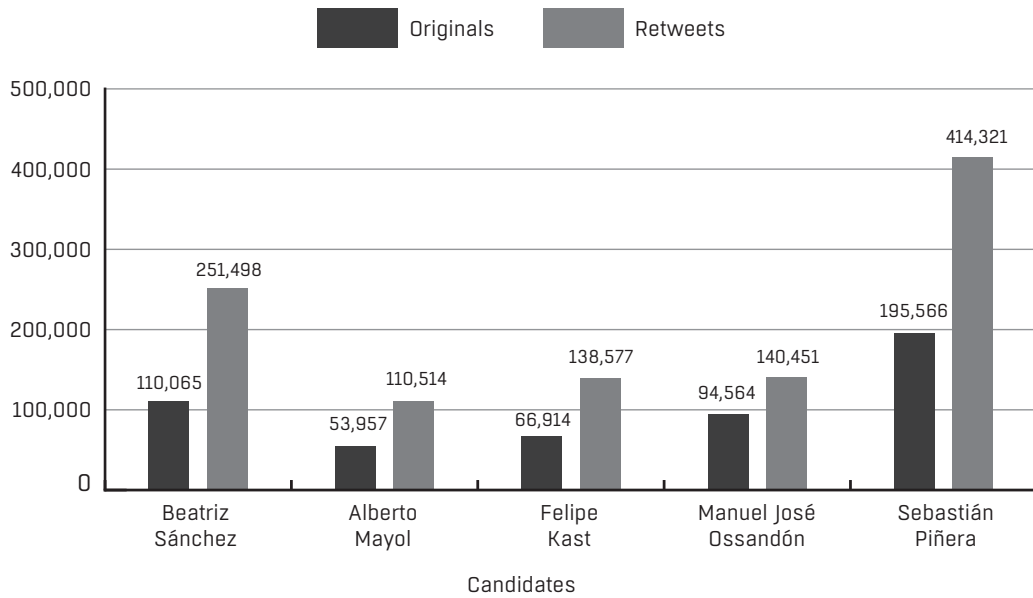
Figure 1: Number of messages per candidate
Detail of total candidate messages. From 05/14/17 to 07/01/2017
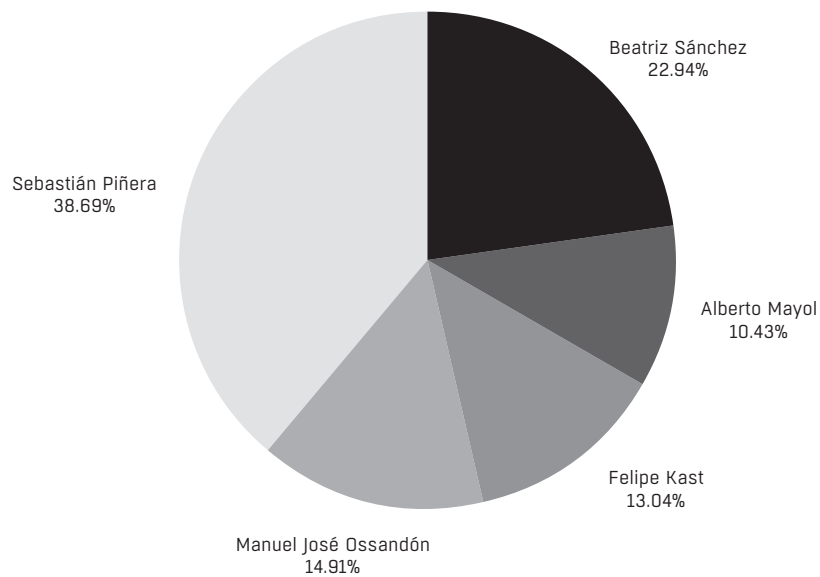
Source: Own elaboration.

Figure 2: Percentage distribution of candidacy messages
Messages about candidates. From 05/14/2017 to 07/01/2017

Source: Own elaboration.

of messages generated in a single day mentioning Beatriz Sánchez (29,371) occurred on May 29, when she attended the political program *Tolerancia Cero*, in Sunday's prime-time slot. As for the three right-wing candidates, that happened on June 26, when the open television channels, grouped in the Chilean National Association of Television (Anatel, by its Spanish acronym), organized a debate in national chain. That night, 41,083 messages were generated on Piñera, 32,211 on Manuel José Ossandón and 25,615 on Felipe Kast; these are the highest daily figures in the entire time range measured. This means that we verified that the activity cycles in SNs clearly depended on what happened in the traditional media. The cycles of relative calm or normality were interrupted when some important activity related to the candidates appeared in the media, especially interviews and debates. The dependence, in that sense, of the peaks on Twitter regarding media events is evident. Only once, on June 20, a peak did not depend on traditional media. It was when the right candidate, Sebastián Piñera, made a misogynistic joke in a campaign event, which was recorded by someone's mobile phone and viralized.

Regarding the predictive capacity demonstrated by the classifiers (C1 and C2) regarding the results of the primaries, we can conclude that, as shown in Figure 5, for the case of *Chile Vamos*, the classifier 1 (C1) showed a MAE of 1.6% on June 27, with a window of 11 days. That day, with that rank, the classifier predicted the following result in the primary elections of the right coalition: Sebastián Piñera: 59.6%; Manuel José Ossandón: 23.7%; Felipe Kast: 16.7% (actual results: SP: 58.4%; MJO: 26.2%; FK: 15.4%). C2, on the other hand, with the same window, had its lowest MAE (2.9) on June 25, predicting the following figures: Sebastián Piñera: 55.4%; Manuel José Ossandón: 20.2%; Felipe Kast: 24.3%.

In the case of *Frente Amplio*, C1 was the one that showed the best performance, also on June 27; with a 15-day window, the predictive error (MAE) was only 0.5 (figure 6). The classifier predicted the following results: Beatriz Sánchez: 67.1%; Alberto Mayol, 32.9% (actual result: BS: 67.6%, AM: 32.4%). Meanwhile, that same day, with the same window, the C2 generated –with a MAE of 0.7– the following forecast: Beatriz Sánchez: 66.9%; Alberto Mayol: 33.1%.

This leads us to conclude that the C1 had an excellent performance in its predictive capacity on June 27, both for *Frente Amplio* and the right coalition, with a window range as indicated. In that sense, making the prediction five days before the elections seems to be an

appropriate date, especially considering the political characteristics of a primary election. The C2 predicted quite correctly and with a very low MAE the results of *Frente Amplio*, but did not have the same capacity with the right-wing candidates, which suggests the natural difficulties that these forecasts present when the number of candidates increases. The indicators also show that the strategic activity promoted by the candidacies in social networks a few days or hours before the elections distorts Twitter's flow, which increases the prediction MAE. The following figure compares the results of the Electoral Service (Servel, by its Spanish acronym) and ours.

CONCLUSIONS

With the results of the two classifiers (C1 and C2) that were part of the research, we applied in Chile a study line that has been conducted in other electoral realities (Aparaschivei, 2011; Deltell, 2012; Larsson & Moe, 2011; Tumasjan et al., 2010). Globally, in certain political processes, the electoral tendencies emanating from Twitter have been known to be more accurate than traditional surveys (Deltell, Claes, & Osteso, 2013). The MAEs described in this investigation evidenced a projection and development of the electoral prediction through Twitter in Chile, which provides spaces for its continuity, deepening and follow-up.

The scope of the study highlighted the importance of integrating predictive political analysis with an expansive dimension of political communication, such as the digital dialogical environment of social networks and their interactions with other media. In addition, the investigation analyzed this behavior on legal primaries, a recent practice in Chile (it is the second process of that kind) and that incorporated, for the first time, the vote of Chileans abroad. Thus, the field of learning in this area is nascent, but with good results.

From the political point of view and the activity of the campaigns on Twitter, the primaries studied were also unprecedented, which entailed a difficulty and a greater challenge for the prediction. This, because there was uncertainty regarding the electorate participation due to the absence in this process of the ruling coalition, *Nueva Mayoría*. However, the decision of the government political parties of not entering the primaries did not affect the online intensity of the process nor the results of the two classifiers.

Although *Frente Amplio* (327,613) obtained a much smaller number of votes than *Chile Vamos* (1,418,167),
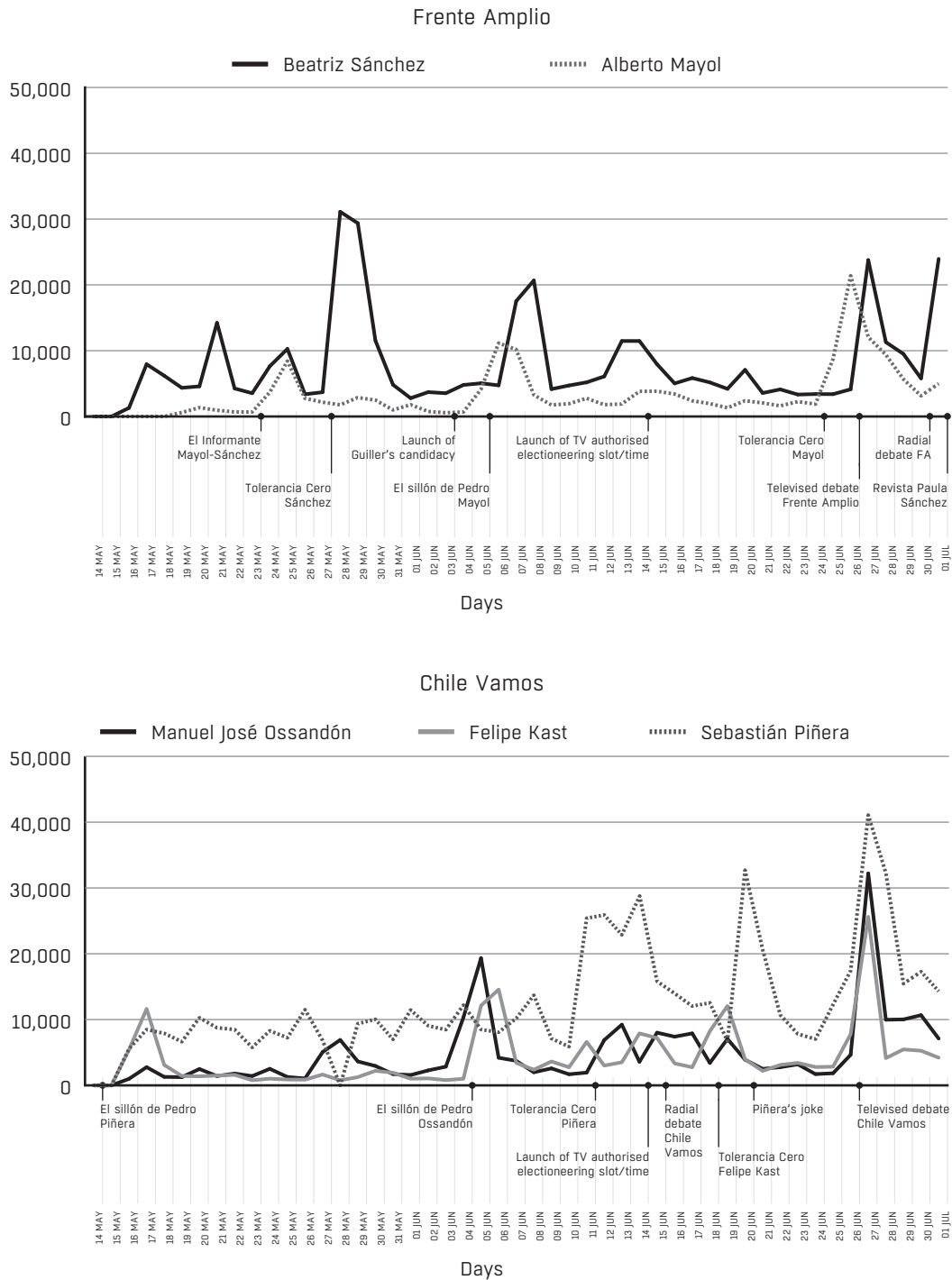
Frente Amplio

——— Beatriz Sánchez   ········· Alberto Mayol

El Informante
Mayol-Sánchez

Tolerancia Cero
Sánchez

Launch of
Guiller's candidacy

El sillón de Pedro
Mayol

Launch of TV authorised
electioneering slot/time

Tolerancia Cero
Mayol

Televised debate
Frente Amplio

Radial
debate FA

Revista Paula
Sánchez

Days

Chile Vamos

——— Manuel José Ossandón   ——— Felipe Kast   ········· Sebastián Piñera

El sillón de Pedro
Piñera

El sillón de Pedro
Ossandón

Tolerancia Cero
Piñera

Launch of TV authorised
electioneering slot/time

Radial
debate
Chile
Vamos

Tolerancia Cero
Felipe Kast

Piñera's joke

Televised debate
Chile Vamos

Days

Figure 3: Mentions of candidates and events

Messages about candidates generated in the candidacy period 05/ 14/2017 to 07/ 01 /2017
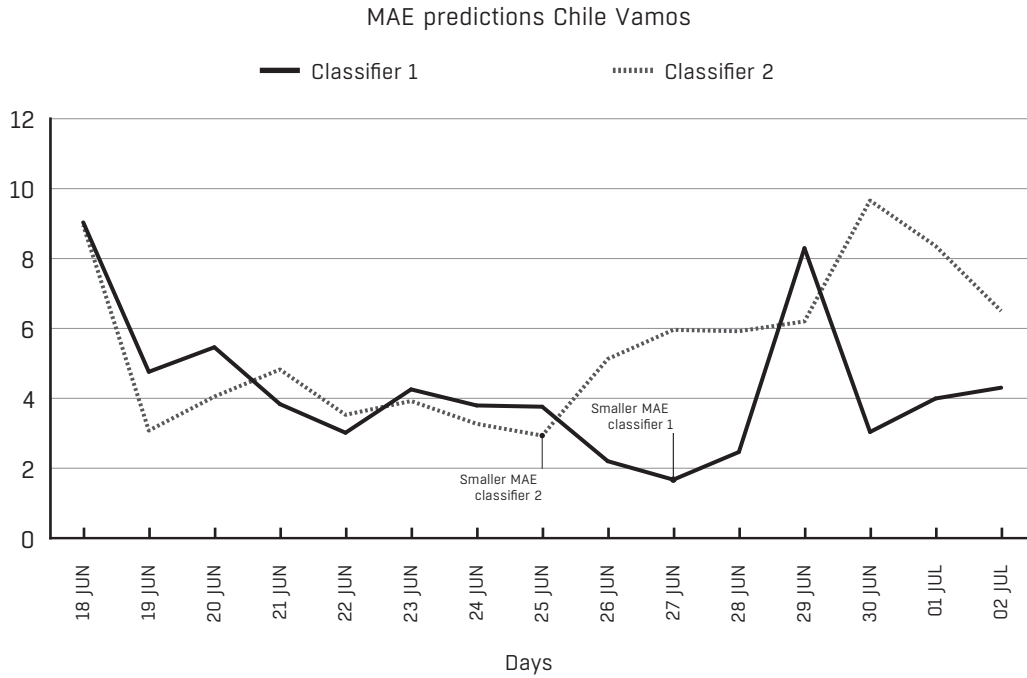
Source: Own elaboration.

MAE predictions Chile Vamos

━━━ Classifier 1   ⋯⋯⋯ Classifier 2

Figure 4: Classifiers' mean absolute error for Chile Vamos

Source: Own elaboration.

MAE predictions Frente Amplio
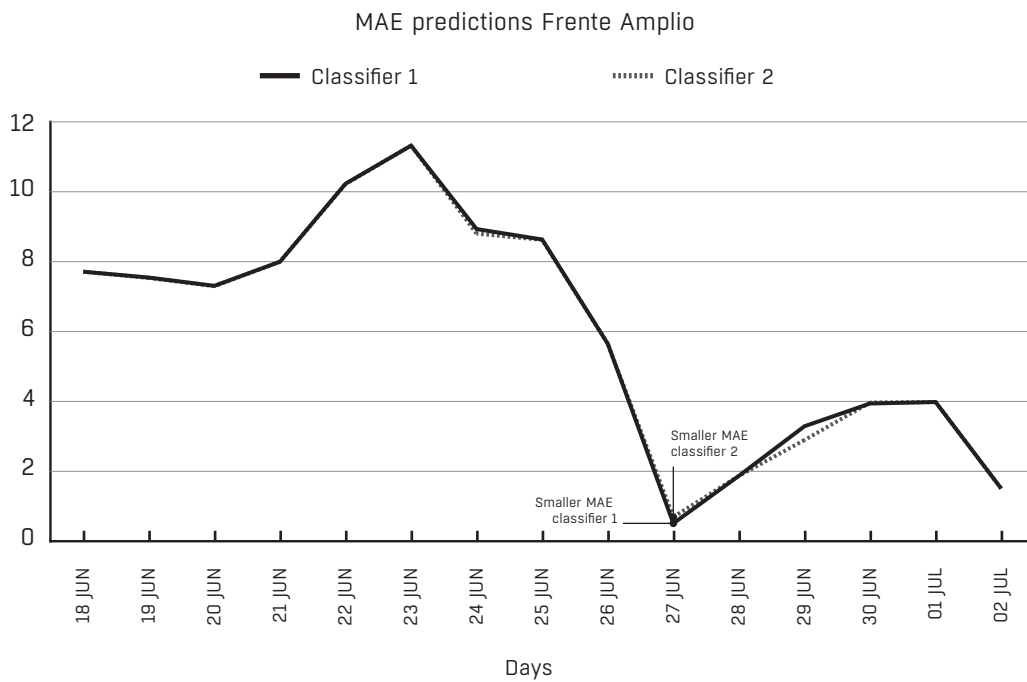
━━━ Classifier 1   ⋯⋯⋯ Classifier 2

Figure 4: Classifiers' mean absolute error for Frente Amplio
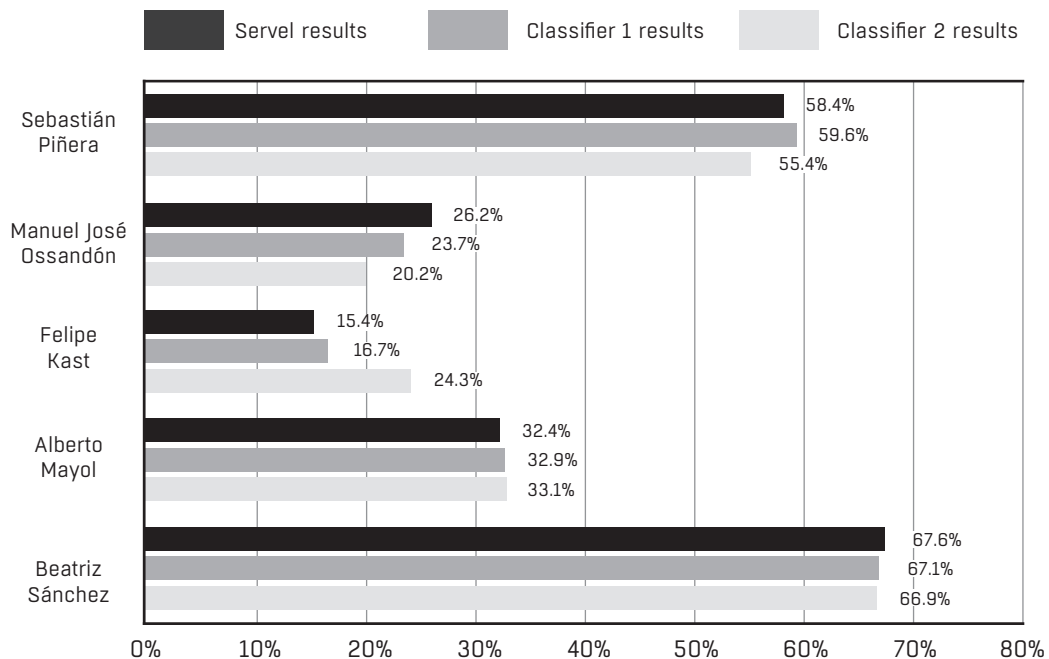
Source: Own elaboration.

Figure 6: Comparative results of Servel and classifiers

Source: Own elaboration.

there was a prominence of this new alternative in social networks that made possible its rapid positioning in the media system. This entails the articulation of a third political force in a binomial system that will mark the Chilean transition, which will establish greater competitiveness for future Chilean elections and a greater challenge for the electoral prediction on Twitter.

Our study also concludes that open television continues to determine the agenda of events that are subsequently replicated with intensity on Twitter, and then, in a sort of spasmodic behavior, heavily reduce that intensity. The social network feeds on television and amplifies its comments based on the visibility that the candidates obtain in events established by the traditional media. With this dynamic of intensity, the electoral process enters directly into the discussions of thousands of users who extend the temporality of television programs into a new debate that is re-signified for hours on Twitter and becomes more participatory. Studies should be conducted to know whether these characteristics evidenced in the primaries made possible a higher participation rate than the one projected by analysts.

The methodological challenges will also be given by the assumption of representativeness made regarding

Twitter users and the exploration of other types of message variables, such as those derived from the users' network, the impact of RTs versus the original messages, and establishing a relationship between positive messages and intention to vote. The research concludes that there is a methodological capacity replicable to the Chilean reality, with its electoral particularities and the challenge to continue improving the prediction in the following elections.

DISCUSSION

The number of messages, both tweets and retweets, were important for the leadership that each winning candidate of his/her block obtained during the campaign. Both Sebastián Piñera and Beatriz Sánchez have a greater production and circulation of interactions on Twitter, although Sánchez obtains the third majority of the five candidates of both coalitions (221,425 votes). That leadership on Twitter does not necessarily generate a tendency to win in a presidential election, nor exclusively positive assessments as it was seen in the sentiment analysis.

We hypothesized that it was precisely a combination of human and artificial monitoring that allowed the

low MAE, obtaining encouraging responses in the face of future elections. The algorithms were trained in learning and expressions of user interactions (in this case 162,000) that, we think, live in a network of media and comments that make political communication a complex space of cognitive, emotional and cultural responses (Gerstlé, 2004). Our research understands electoral processes as a continuum, which cannot be disconnected from everyday life, which is part of the symbolic expressivity of people and the thousands of connections they generate with their environments.

The ability to predict on Twitter can be a space of interest for the study of political communication, the measurement of electoral strategies, in their effects and levels of influence, and the quality of democracy. The monitoring and projection of artificial trends will continue to improve, so they can be opportunities to reestablish links with the digital citizenship. The computational intelligence allows a processing of metadata that also poses challenges that are urgent in the discussion of communication and its related disciplines.

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