Political communication on social media in Latin America: unequal use of *Twitter* by members of parliament

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Abstract

This article focuses on the under-researched topic of the use of *Twitter* by members of parliament (MPs) in Latin America. There have not yet been any thorough comparative studies on this topic, and the majority of publications on the region focus on single case studies. Previous studies have primarily concentrated on presidents, or in the case of MPs, on specific case studies. A total of 2,353,138 tweets were accessed via the *Twitter* API, and 3,215 MPs were examined. Regression models and correlations were used to answer research questions, and the main variables examined concerned individual characteristics of MPs (gender and age) and socioeconomic indicators of the country (number of people on *Twitter*, internet access, Human Development Index - HDI). As a result, this paper offers a report on how MPs in Latin America are currently utilizing *Twitter*. While this social network is used by more than 90% of MPs in some countries (Argentina, Colombia, Ecuador, El Salvador, Peru, and Uruguay), there are countries where fewer than half of MPs use it (Bolivia, Honduras, and Nicaragua). The results show that female MPs are more likely than male MPs to use *Twitter*. In addition, *Twitter* is being adopted more by younger MPs. Other results show that country characteristics such as internet penetration, *Twitter* population, and the HDI are significant predictors regarding the adoption and use of *Twitter* by MPs. These results are consistent with assumptions based on cost-benefit calculus. Thus, it does not make as much sense for politicians to adopt *Twitter* in countries where there are fewer people on *Twitter* and low internet penetration. In particular, if politicians want to be elected or inform citizens about their activities, they have an opportunity to reach voters through *Twitter*. However, this is only true if *Twitter* is used in their countries.

Keywords

Twitter; Social media; Legislators; *Twitter* adoption; Social media adoption; Gender; Members of parliaments; Parlamentarians; Politicians; Political communication; Latin America; Social networks.

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1. Introduction

In recent years, there has been an increasing amount of research looking at social media and politics globally (**Casero-Ripollés**, 2018; **Jungherr**, 2016; **Matassi**; **Boczkowski**, 2020). Among social media publications, articles focusing on the United States and Europe have consistently dominated, and more recently, research on Latin America has increased. (**Matassi**; **Boczkowski**, 2020). This article looks at parliamentarians and their adoption of *Twitter* in Latin America as a currently unexplored topic. Most publications on Latin America are single case studies, and to date, there is no comprehensive comparative study of the adoption of social media by members of parliament (MPs) in Latin America.

Political actors are increasingly using *Twitter* for various purposes, including disseminating political proposals, engaging with the public, broadcasting their messages, and shaping public debate (**Casero-Ripollés**; **Alonso-Muñoz**; **Marcos-García**, 2022; **López-Meri** *et al.*, 2017). In the 2016 US presidential election, *Twitter* played a significant role in both Hillary Clinton's and Donald Trump's communication strategies (**Buccoliero** *et al.*, 2020; **Enli**, 2017). During electoral campaigns, political actors may use *Twitter* to spread political messages, reference candidate activities, emphasize personal aspects, and mobilize supporters (**López-García**, 2016). Emerging parties tend to focus on mobilization and generic announcements, while traditional parties are more likely to publish policy proposals (**López-García**, 2016). However, the use of *Twitter* for dialogue with citizens remains limited (**Alonso-Muñoz** *et al.*, 2016).

In the European context, **Fazekas** *et al.* (2021) found that most political actors did not engage with the public about EU issues, resulting in less public interaction. Meanwhile, **Vergeer**, **Hermans** and **Cunha** (2013) noted that candidates in the 2009 *European Parliament* elections primarily used *Twitter* for electoral campaigning. Members of the *European Parliament* have been found to use *Facebook* for national audiences and *Twitter* for international audiences, with language preferences varying across countries (**Haman**; **Školník**; **Čopík**, 2022). In the Spanish context, **Casero-Ripollés**, **Alonso-Muñoz** and **Marcos-García** (2022) identified ideology, political initiative, and political career as factors influencing the authority and digital influence of political actors on *Twitter*. **López-Meri**, **Marcos-García** and **Casero-Ripollés** (2017) observed a trend towards hybridization between new and conventional digital media in the platform's usage. **Jivkova-Semova**, **Requeijo-Rey** and **Padilla-Castillo** (2017) found that virality on *Twitter* did not guarantee electoral victory, but certain communication trends could provide valuable insights. The use of *Twitter* by Latin American political leaders has also been examined, with **Segado-Boj**, **Díaz-Campo** and **Lloves-Sobrado** (2015) finding no common strategy for using the platform during times of crisis.

Overall, political actors use *Twitter* for various purposes, including disseminating messages, engaging with the public, and shaping political discourse. However, the extent of their interaction with citizens and the effectiveness of their communication strategies on the platform vary across different contexts and political actors.

Most of the research on political communication on social media in Latin America concerns presidential election campaigns, with dozens of studies. Most studies examining presidential campaigns have been produced in :

- Brazil: **Alves** *et al.*, 2019; **Brito** *et al.*, 2019; **Calais-Guerra** *et al.*, 2011; **Canavilhas**; **Bittencourt**; **De-Andrade**, 2019; **De-Carvalho**; **Massuchin**; **Mitozo**, 2018; **Cremonese**, 2012; **Ferreira** *et al.*, 2021; **Ribeiro-Ferreira**, 2018; **Gilmore**, 2012; **Hargreaves** *et al.*, 2020; **Ituassu** *et al.*, 2018; **Kobellarz** *et al.*, 2019; **Levy**; **Sarmento**, 2020; **Machado** *et al.*, 2019; **Massuchin**; **Campos-Domínguez**, 2016; **Mitozo**; **Massuchin**; **De-Carvalho**, 2017; **Novais**; **De-Araújo**, 2012; **D. J. S. Oliveira** *et al.*, 2017; **Passos** *et al.*, 2019; **Recuero**; **Zago**; **Bastos**, 2015; **Recuero**; **Bonow-Soares**; **Gruzd**, 2020; **Reis-Longhi**; **Santos-Oliveira**, 2020; **Santana**; **Vanin**, 2020; **Santos**, 2020; **Soares**; **Recuero**; **Zago**, 2019; **Teixeira** *et al.*, 2019; **Tomaz**; **Tomaz**, 2020.
- Argentina: **Filer**; **Fredheim**, 2017; **Gulías**; **López-López**; **Boubeta**, 2020; **López-López**; **Oñate**; **Chavero-Ramírez**, 2018; **López-López**; **Oñate**; **Rocha**, 2020; **López-López**; **Oñate**, 2019; **López-López**; **Vásquez-González**, 2018; **Mussi-Reyero** *et al.*, 2021.
- Chile: **Castillo** *et al.*, 2019; **Olivares** *et al.*, 2019; **Santana**; **Huerta-Cánepa**, 2019; **Santander**; **Elórtegui**; **Buzzo**, 2020.
- Mexico: **Andrade-del-Cid**; **Flores-González**; **Pablo-Contreras**, 2020; **Beltrán**, 2020; **Bernábe-Loranca**; **González-Velázquez**; **Cerón-Garnica**, 2020; **Camp**, 2013; **Montes-de-Oca-López**; **Sandoval-Almazán**, 2019; **González-Tule**; **Restrepo-Echavarría**, 2020; **Green**, 2021a; 2021b; **Kavanaugh** *et al.*, 2016; **De-León**; **Vermeer**; **Trilling**, 2021; **López-Chau**; **Valle-Cruz**; **Sandoval-Almazán**, 2019; **Ortiz-Espinoza**; **Espejel-Trujillo**, 2021; **Rodríguez-Fidalgo**; **Ruiz-Paz**; **Paíno-Ambrosio**, 2019; **Pérez-Salazar**, 2019; **Sandoval**; **Matus**; **Rogel**, 2012; **Jiménez-Zarate**, 2018.
- Colombia: **Acosta-Valencia** *et al.*, 2021; **Alvarado-Vivas**; **López-López**; **Pedro-Carañana**, 2020; **Cerón-Guzmán**; **León-Guzmán**, 2016; **Dajer**, 2021; **Pedro-Carañana**; **Alvarado-Vivas**; **López-López**, 2020; **Ruiz-Rojas**; **Boguslavskaya**, 2018; **Ruano**; **López**; **Mosquera**, 2018.
- Ecuador: **Rofrío** *et al.*, 2019; **Vélez-Loor**; **Córdova**, 2021; **Zumárraga-Espinosa**; **Reyes-Valenzuela**; **Carofilis-Cedeño**, 2017.
- Costa Rica: **Cruz-Romero**, 2015.
- Peru: **Cabrera-Méndez** *et al.*, 2021.

But at the same time, there are comparative studies on presidents' communications on *Twitter* (**Puertas-Hidalgo**; **Carpio-Jiménez**; **Suing**, 2019; **Waisbord**; **Amado**, 2017).

Several studies have been conducted on the topic of parliamentarians and the adoption of social media or Internet technologies in Latin America, and these are primarily single case studies, for example, case studies on Brazil (**Amaral**; **Pinho**, 2017; **Brandt**; **Vidotti**, 2020; **García-Sánchez** *et al.*, 2021; **Marques**; **De-Aquino**; **Miola**, 2014a; 2014b; **Oliveira** *et al.*, 2018); Chile (**Fuente-Alba-Cariola**; **Parada-Gavilán**, 2019; **Henríquez** *et al.*, 2022); or studies comparing Argentina, Paraguay, and Uruguay (**Welp**; **Marzuca**, 2014; 2016).

Latin America has presidential regimes, so the main focus of the research is on the political communication of presidents or during presidential elections and less on members of parliament. However, MPs are very important players in the political system that deserve attention.

The contribution of this paper is that it analyses the unexplored topic of the use of *Twitter* by Latin American MPs. This study, therefore, provides up-to-date data on the *Twitter* activity of MPs in Latin America. Previous research has focused almost exclusively on presidents or, in the case of MPs, single case studies. This paper is divided into four parts. The first section presents the research questions and hypotheses. The second section presents the methodology, and the third section presents the results. The last section is the conclusion of the paper.

2. Research questions and hypotheses

This paper aims to answer two research questions. These are:

1. What are the differences between the adoption and use of *Twitter* by parliamentarians in Latin America across countries?
2. What factors influence the adoption and use of *Twitter* in Latin America?

To answer the first research question, it will first be necessary to examine the current state of *Twitter* adoption, i.e. to identify the individual legislators who use *Twitter*. This is not an easy task, as no databases exist yet where the usernames (*Twitter* handles) of legislators on *Twitter* are present.

Multiple methods and data are used to answer the second research question. The dataset will consist of variables for each legislator and information on the number of citizens on *Twitter*, the Internet, and the HDI in each country.

In this research, *Twitter* was chosen for several reasons. Firstly, at the time of the research, *Twitter* offered the *Twitter* API for academic research to researchers, which provides access to almost all data on *Twitter*. In contrast, *Facebook* provided an API that was considerably limited, and researchers often did not have access to it or only had temporary access through various tools. Overall, *Facebook* has been criticized by academics for providing limited access to a restricted amount of posts (**Ho**, 2020). Among social networks, *Twitter* is most frequently the subject of research concerning digital communication technologies for legislators (**Neihouser**; **Tremblay-Antoine**, 2021), which demonstrates that *Twitter* is used by legislators as a common communication tool. Another issue associated with *Facebook* is that Latin American lawmakers often have a *Facebook* profile rather than *Facebook* pages, from which it is even more challenging to obtain data, and sometimes they use both. *Instagram*, on the other hand, suffers from similar problems as *Facebook* and is predominantly used for publishing images. Additionally, there is limited space in a single article, so for all the reasons mentioned above, only *Twitter* was analyzed in this research.

2.1. Gender

Although some of the earliest research on social media use suggested that women generally use social media more actively (**Hargittai**, 2007) while at the same time considering that gender may influence how online campaigning is approached (**Druckman**; **Kifer**; **Parkin**, 2007), most studies focusing on politics on social media later showed that there are no differences between women and men in the use of social media (**Chi**; **Yang**, 2010; **Grant**; **Moon**; **Grant**, 2010; **Lappas** *et al.*, 2016; **Lappas**; **Triantafillidou**; **Yannas**, 2019; **Macková**; **Štětka**, 2016; **Metag**; **Marcinkowski**, 2012; **Neihouser**, 2021; **Obholzer**; **Daniel**, 2016; **Rauchfleisch**; **Metag**, 2016; 2020; **Sandberg**; **Öhberg**, 2017; **Scherpereel**; **Wohlgemuth**; **Schmelzinger**, 2017; **Strandberg**, 2009; 2013; **Vergeer**; **Hermans**, 2013). But that does not mean that no studies are showing such a difference. While some studies show that men have adopted social media more or used it more actively (**Ausserhofer**; **Maireder**, 2013; **Lappas**; **Triantafillidou**; **Yannas**, 2018; **Vergeer**; **Hermans**; **Sams**, 2011), some studies say that women are more active (**Cook**, 2017; **Evans**; **Cordova**; **Sipole**, 2014; **Sullivan**, 2021). Differences between studies about politicians may be related to the adoption of the technology at a given time within a given country and among citizens. Since most studies have not found a difference between women and men, the hypothesis is:

H1: There will be no relationship between gender and adoption or *Twitter* activity among MPs.

2.2. Age

The adoption of new technology is often related to age according to the diffusion of innovation theory (**Rogers**, 1962). So, it should be young politicians as early adopters and active users of social media. Early studies showed that young candidates in elections are more familiar with the internet and make more use of its potential. (**Gibson**; **McAllister**, 2006). Subsequent studies have confirmed this assumption and indeed found a relationship between age and social media use (**Gulati**; **Williams**, 2013; **Larsson**, 2015; 2015; **Larsson**; **Kalsnes**, 2014; **Larsson**; **Moe**, 2012; **Lassen**; **Brown**, 2011; **Metag**; **Marcinkowski**, 2012; **Obholzer**; **Daniel**, 2016; **Peterson**, 2012; **Scherpereel**; **Wohlgemuth**; **Schmelzinger**, 2017; **Strand-**

berg, 2009; 2013; **Straus** *et al.*, 2013; **Vergeer**; **Hermans**, 2013). But there are also studies where age is not a significant predictor (**Macková**; **Štětka**, 2016; **Rauchfleisch**; **Metag**, 2020). Given the majority of studies confirming the relationship between age and social media use, the hypothesis is:

H2: Younger MPs will adopt *Twitter* more and also use it more actively.

2.3. Technological development of the country

From a classical microeconomic approach, demand should influence supply. It is the adoption of new technologies by the population that should increase the demand for political information in the online environment and politicians should respond to this fact. Parliamentarians should use *Twitter* primarily when they believe that the benefits outweigh the costs, at least according to a simple calculation based on rational choice theory. If Internet penetration is very low, then a politician should have less incentive to use the Internet for his or her purposes. Studies of political communication on the Internet and social media tend to include a variable in the form of the popularity of the social media network in the politician's constituency (**Haman**; **Školník**, 2021; **Scherpereel**; **Wohlgemuth**; **Schmelzinger**, 2017), alternatively proxy variable as internet penetration (**Obholzer**; **Daniel**, 2016; **Sudulich**; **Wall**, 2009) or socio-economic variables of the constituency. For example, this could be the number of people with a university degree, the number of people of retirement age, and the level of urbanization or wealth (**Carlson**; **Djupsund**; **Strandberg**, 2013; **Chi**; **Yang**, 2010; **Cook**, 2016; 2017; **Gulati**; **Williams**, 2007; 2010; 2013; **Herrnson**; **Stokes-Brown**; **Hindman**, 2007; **Lappas** *et al.*, 2016; **Lassen**; **Brown**, 2011; **Metag**; **Marcinkowski**, 2012; **Peterson**, 2012; **Southern**, 2015; **Southern**; **Lee**, 2019; **Strandberg**, 2009, p. 20; 2013). Sometimes these variables are used as independent variables, sometimes they have a primary control function. Either way, they are expected to have an impact on the adoption and use of social networking by politicians. Indeed, in many of them, variables giving information about potential demand from voters are significant predictors (**Cook**, 2016; 2017; **Gulati**; **Williams**, 2010; **Haman**; **Školník**, 2021; **Herrnson**; **Stokes-Brown**; **Hindman**, 2007; **Peterson**, 2012; **Scherpereel**; **Wohlgemuth**; **Schmelzinger**, 2017; **Straus** *et al.*, 2013). However, only rarely (**Haman**; **Školník**, 2021) has research directly used data on the percentage of residents using a given social media. This is primarily because this data is not publicly available.

H3: The higher the number of citizens on *Twitter* (as well as Internet penetration and the Human Development Index - HDI), the higher the adoption of *Twitter* by MPs.

3. Methodology

First, it was necessary to collect data. Unfortunately, there is no up-to-date list of Latin American MPs and their *Twitter* accounts. Some parliaments allow an MP to put a link to their official profile on the parliamentary website. However, even in this case, not all MPs make use of this. In any case, parliamentary websites were the primary source of data. If a *Twitter* account was not found, I proceeded to use the *Google* search engine that offers the *Google Knowledge Graph*, which often lists the social media accounts of politicians and other known persons:
https://cloud.google.com/enterprise-knowledge-graph/docs/search-api

However, not all MPs are searchable in this way. Thus, there was also a direct search on *Twitter*, using various combinations of names. On parliamentary websites, MPs often have their full names listed, which makes direct *Twitter* searches problematic as some MPs do not use all their names and are therefore not easily traceable. Hispanic names can include five or more names, and a politician may only use two of them. At the same time, some parliaments use *Twitter* accounts and have lists of MPs on them. In this case, this source was also used.

There are a total of three independent variables in the paper. The first two independent variables are individual and based on data from parliamentary websites. These are age and gender. In the previous section, reference was made to studies that utilized variables such as gender and age. This study employed variables constructed in a similar manner. Gender was coded as 1 for male and 0 for female. Age was measured in years. Not all parliaments reported information on the date of birth and therefore the age of MPs, so some countries have this variable missing. Also, not all parliaments reported the sex of the MP, but gender could be inferred from the name of the MP or other characteristics. *Twitter* population data comes from the latest *Latinobarómetro* survey in 2020 (*Latinobarómetro*, 2022). Information on the number of individuals using the Internet in a given country is provided by the *International Telecommunication Union* (*International Telecommunication Union*, 2022), while not offering data for Venezuela. The HDI is then offered by the *United Nations Development Programme* (2022).

I considered *Twitter* adoption if MPs tweeted at least once in the period between 1 January 2021 and 31 March 2022. For some countries, this period was different and followed elections in those states. Thus, in states that held elections during this period, the observation period was only from the newly elected legislature after the election. In the case of subsequent states, the period began on a different date:

- Argentina - from December 10, 2021.
- Ecuador - from May 14, 2021.
- El Salvador - from May 1, 2021.
- Mexico - from September 1, 2021.
- Peru - from July 28, 2021.
- Venezuela - from January 5, 2021.

The year 2021 and the first three months of 2022 were chosen arbitrarily. However, it is not possible to choose a long period during which there would be no elections in all countries. Elections make the analysis problematic because one would have to examine two or more legislative periods in one country, which could cause problems for cross-country comparisons if other countries have only one legislative period. By selecting this time frame, even countries like Argentina had more than three months' worth of tweets, which should be sufficient for analysis.

At the same time, as will be shown below, a variable of an average number of posts per week and a dichotomous variable that takes the value of 1 if an MP sent at least one tweet per week on average were created for each MP. Indeed, it is not enough to include mere adoption, it is also necessary to include how much *Twitter* usage the MP has. The threshold of one tweet per week was chosen. The models also use the number of tweets per week to check the actual activity among the MPs present on *Twitter*. A total of 2,353,138 tweets were collected via the *Twitter* API using the *rtweet* package (**Kearney**, 2019) and subsequently analyzed in the R programming language, and a total of 3,215 MPs were examined.

4. Results

4.1. Use of *Twitter* by MPs

Table 1 provides some data on the adoption and activity of parliamentarians. The second and third columns give information on *Twitter* adoption. As already mentioned, in the second column I mean adoption in the form of posting at least one tweet during the period under study, The third column then requires the activity of at least one tweet per week during the period under study. These data are also displayed on two maps. The mean value of presence on *Twitter* in Latin American countries is 73.6%, while the percentage of the mean decreases to 61.5% if the activity of at least one tweet per week is required. However, as the table shows there are significant differences between countries. Six countries have more than 90% of MPs present on *Twitter* (Argentina, Ecuador, Colombia, Peru, El Salvador, Uruguay) and three countries have more than 80% of MPs (Brazil, Chile, and Mexico). Conversely, three countries in Latin America do not have even half of their MPs on *Twitter* (Bolivia, Honduras, Nicaragua). Then six states have between 50% and 80% (Dominican Republic, Guatemala, Costa Rica, Panama, Paraguay, and Venezuela).

Table 1. MPs in Latin American countries on *Twitter*

	***Twitter* adoption %**		**Number of tweets per week**		**Distribution of tweet**		**Analyzed MPs**	
Country	**Min. 1 tweet**	**Min. 1 tweet per week**	**Mean**	**Median**	**Hashtags**	**Retweets**	**Male**	**Female**
Argentina	90.7%	87.9%	17.5	9.4	24.3%	41.0%	142	115
Bolivia	36.9%	17.7%	2.4	0.9	51.6%	10.4%	69	61
Brazil	84.2%	66.5%	17.4	5.3	35.3%	13.0%	437	76
Dominican Republic	62.1%	43.2%	8.5	2.3	14.4%	36.7%	144	46
Ecuador	97.1%	95.6%	33.3	23.3	65.1%	58.5%	84	53
Guatemala	58.8%	43.1%	8.3	3.6	24.2%	43.6%	129	31
Honduras	48.8%	35.8%	7.6	2.2	29.2%	47.0%	95	28
Chile	89.0%	81.3%	20.0	10.0	49.4%	50.8%	119	36
Colombia	90.7%	79.6%	26.1	9.4	52.9%	40.9%	131	31
Costa Rica	73.7%	54.4%	11.0	4.2	14.2%	15.4%	35	22
Mexico	83.8%	75.2%	18.7	9.2	56.0%	38.6%	250	250
Nicaragua	12.1%	8.8%	5.0	1.9	60.9%	35.8%	47	44
Panama	64.8%	45.1%	6.2	2.6	18.4%	38.7%	55	16
Paraguay	65.0%	42.5%	12.1	3.8	15.0%	38.1%	66	14
Peru	96.2%	79.2%	13.1	7.1	31.9%	37.8%	80	50
El Salvador	98.8%	97.6%	64.9	50.1	31.0%	41.2%	58	24
Uruguay	94.9%	90.9%	16.6	10.5	13.7%	53.2%	75	24
Venezuela	77.3%	62.2%	20.7	8.1	56.0%	78.8%	183	95
Median	80.6%	64.4%	14.9	6.2	35.7%	40.0%		
Mean	73.6%	61.5%	17.2	9.1	31.5%	39.8%		

It is crucial to compare the results from the table with those obtained in previous research to analyze trends. Several prior studies have examined the adoption of *Twitter* among Brazilian parliamentarians. In 2013, 64.3% of Brazilian MPs actively used a *Twitter* account(**Amaral**; **Pinho**, 2017). Another study revealed that in 2019, 84.9% of MPs had a *Twitter* account (**García-Sánchez** *et al.*, 2021). The current results indicate that 84.2% of MPs have sent at least one tweet, representing an increase of approximately 20% compared to 2013. According to a study on communication and adoption of social media by Chilean MPs in 2018, 82.5% of MPs had a *Twitter* account (**Fuente-Alba-Cariola**; **Parada-Gavilán**, 2019). In this case, this signifies a 7% increase in *Twitter* usage by Chilean MPs.

Map 1. *Twitter* adoption by MPs %

Map 2. MPs that post at least one tweet a week %

Two studies examining the adoption of *Twitter* by MPs in Argentina, Paraguay, and Uruguay showed that in Argentina in 2012, 53% of MPs were present on *Twitter*, while in Paraguay, only 11% of MPs were on *Twitter*, and in Uruguay, 46% of MPs used *Twitter* (**Welp**; **Marzuca**, 2014; 2016). Thus, since 2012, all three countries have experienced an increase of several tens of percent in MPs' presence on *Twitter*. Prior studies indicate that there has been an increase of several tens of percent in the number of active MPs on *Twitter*, with a noticeable rise in the number of MPs using *Twitter* in each country.

However, the percentages of MPs on *Twitter* decrease, often significantly, if we look at the MPs who sent on average at least one post per week. Subsequently, only Ecuador, El Salvador, and Uruguay reach values above 90%. The third and fourth columns give more detailed activity information. It can be seen that the MPs from El Salvador have developed the absolute highest activity, with an average of 64.9 and a median of 50.1 tweets per week, followed by Ecuador with an average of 33.3 and a median of 23.3 tweets per week. Several countries have an average that corresponds to sending at least one tweet per week. However, it is important to note that the average and median include only MPs who are present on *Twitter*. Therefore, these two columns need to be combined with the information from the second column to see the overall state of political communication on *Twitter* in a given country.

The sixth and seventh columns show the distribution of retweets in terms of the number of hashtags and retweets. The sixth and seventh columns show additional data on the use of *Twitter* by MPs. The second column provides information on how many tweets had a hashtag in the period under study. The mean for Latin American countries is 31.5%. However, there is considerable variation between countries. While 65% of tweets from Ecuador used a hashtag, only 13.7% of tweets in Uruguay did. These differences suggest that it is hardly possible to speak of a pattern of Latin American MP communication. This fact is confirmed by the third column, which shows what percentage of the tweets were retweets. The average for Latin American countries is 39.8%, but the figures range from 10.4% in Bolivia to 78.8% in Venezuela.

4.2. Adoption of *Twitter* –gender and age– individual level

In this part of the paper, only data at the first level, which is the level of the parliamentarian, will be used. The following section will then use hierarchical models (multilevel models). This is primarily a robustness testing of the results using other models as well. At the same time, for hierarchical models, the lack of cases at the second level, that is, the state level can be problematic. This paper works with a total of 18 Latin American countries, which may be considered methodologically insufficient for hierarchical models. For example, **Kreft** and **Bokhee** (1996), **Hox** (2010, p. 235), or **Snijders** and **Bosker** (1999, p. 154) propose a "30/30 rule" whereby there should be at least 30 cases at each level.

There are four models in the following Table 2. The first two models have the dependent variable as a dichotomous variable of adoption (1) of the MP on *Twitter*, i.e., posting at least one tweet during the observation period. The third

and fourth models have the dependent dichotomous variable of whether the MP sent on average at least one tweet per week (1) during the observation period. Because of the dichotomous variable, logistic regression was chosen. There are two variables in the model, namely gender, with the male taking the value of 1 and this variable being present for all MPs. On the other hand, age is not present for all MPs and therefore has separate models. Dummy variables have also been used for each country but are not presented here to save space.

Table 2. Logistic regressions

	Dependent variable:			
	***Twitter* adoption**		**At least one tweet per week**	
	(1)	(2)	(3)	(4)
Gender (Male = 1)	-0.252*	-0.162	-0.273**	-0.301*
	(0.109)	(0.151)	(0.096)	(0.135)
Age		-0.032***		-0.020***
		(0.006)		(0.005)
Constant	1.891***	3.523***	0.918***	2.008***
	(0.154)	(0.357)	(0.125)	(0.297)
Observations	3,215	1,615	3,215	1,615
Log Likelihood	-1,408.712	-734.983	-1,722.229	-900.350

Note: *p<0.05; **p<0.01; ***p<0.001

Table 2 shows that in both the first and third models, where there are the most cases, gender is statically significant and with a negative value, hence implying that women used *Twitter* more, both in the form of adoption and when including requiring a minimum activity of one tweet per week. In the second model, however, gender loses statistical significance, which is due to the fact that a number of countries where women were more prevalent in *Twitter* use than men dropped out of the model because there is no information on age in these countries. Models 1 and 3, therefore, reject the first hypothesis that there is no difference between the genders. The age variable is statistically significant in both models 2 and 4 and takes negative values, i.e. adoption and activity (in the form of one tweet per week) increase with lower age of the MPs. Models 2 and 4, therefore, confirm the second hypothesis that younger MPs adopt *Twitter* more and are more active.

4.3. Activity on *Twitter* –gender and age– individual level

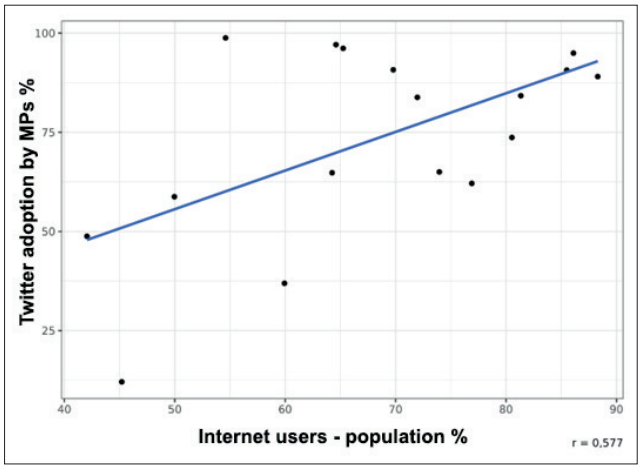
Whereas previous models looked at adoption and general activity in the form of at least one tweet per week. The following table shows four models where the subject of interest is MPs' *Twitter* activity. The dependent variable in the first and second models is the logarithmic average number of tweets per week, logarithmic because of the skewed distribution of tweets. Thus, the first two models are linear regressions (OLS). However, in political communication research, negative binomial regression is often used when examining the number of tweets, as these are the counts (**Jacobs**; **Spierings**, 2019; **Peterson**, 2012; **Sandberg**; **Öhberg**, 2017; **Scherpereel**; **Wohlgemuth**; **Schmelzinger**, 2017; **Scherpereel**; **Wohlgemuth**; **Lievens**, 2018). For example, one study rounded up the average number of tweets per week to deal with whole numbers and capped the upper value at 250 to avoid distorting the general pattern with outliers that could lead to incorrect conclusions (**Jacobs**; **Spierings**, 2019).

Table 3. OLS and negative binomial regressions

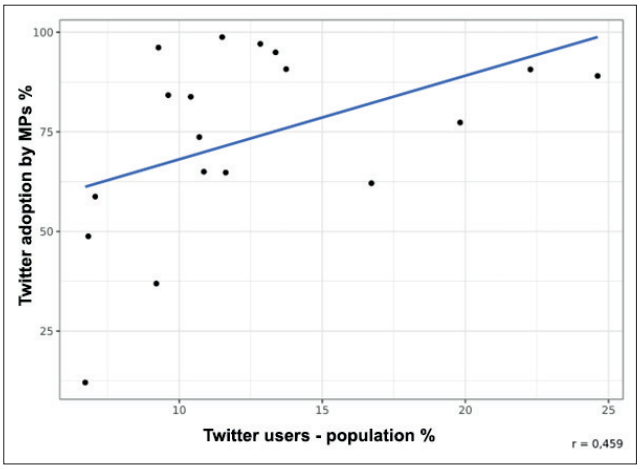
	Dependent variable:			
	Tweets per week (log)		**Tweets per week (rounded)**	
	OLS		negative	binomial
	(1)	(2)	(3)	(4)
Gender (Male = 1)	-0.191*	-0.353***	-0.105*	-0.167*
	(0.076)	(0.107)	(0.051)	(0.072)
Age		-0.002		0.004
		(0.004)		(0.003)
Constant	1.671***	1.926***	2.971***	2.839***
	(0.104)	(0.237)	(0.070)	(0.161)
Observations	2,488	1,266	2,488	1,266
R2	0.145	0.106		
Adjusted R2	0.139	0.101		
Log likelihood			-9,598.981	-4,782.554

Note: * p<0.05; ** p<0.01; *** p<0.001

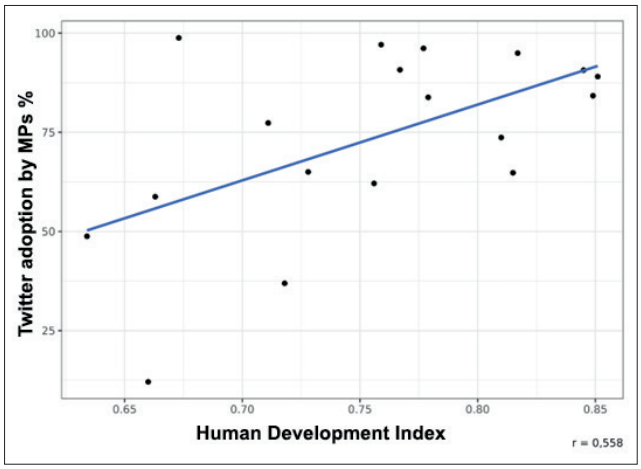
In these models, only MPs with a *Twitter* account are included. In the second and fourth models, age is then added. All four models show that the gender variable is negatively statistically significant, i.e. women use *Twitter* more actively. At the same time, no statistical significance is found for the age variable. Thus, while the models in the previous table implied that women are more likely to be on *Twitter*, these models confirm that women are also more likely to be more active among MPs who are on *Twitter*. In contrast, the models showed that younger MPs are more likely to adopt *Twitter*. However, when the analysis includes MPs who have a *Twitter* account and their activity, it loses statistical significance, so there is no way to confirm the second hypothesis in the activity part. Younger MPs adopt *Twitter* more, but this is no longer the case for activity in terms of the number of tweets.



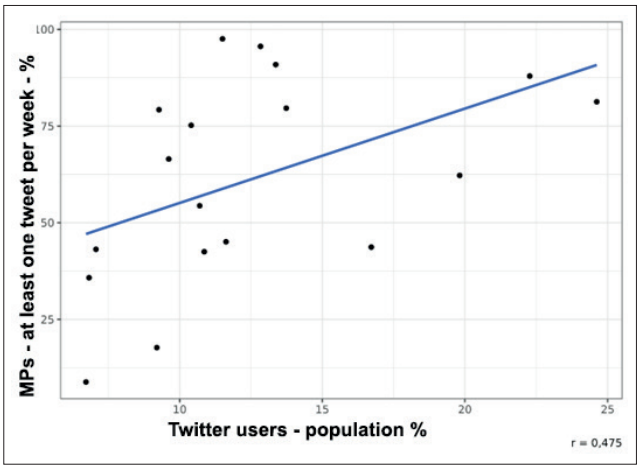
Graph 1. Correlation between Internet users - population in countries and the percentage of MPs who have adopted *Twitter*



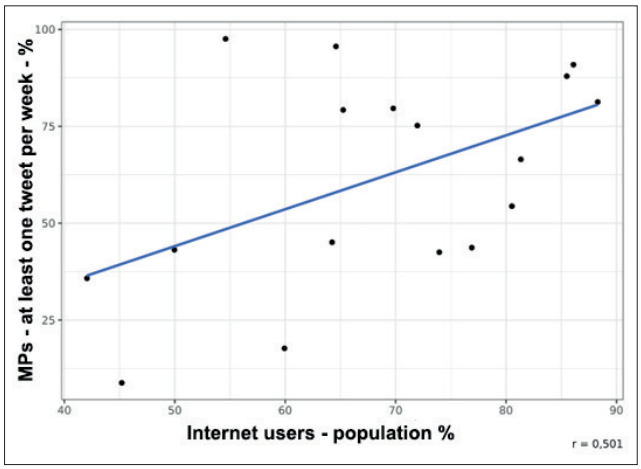
Graph 2. Correlation between *Twitter* users - population in countries and the percentage of MPs who have adopted *Twitter*



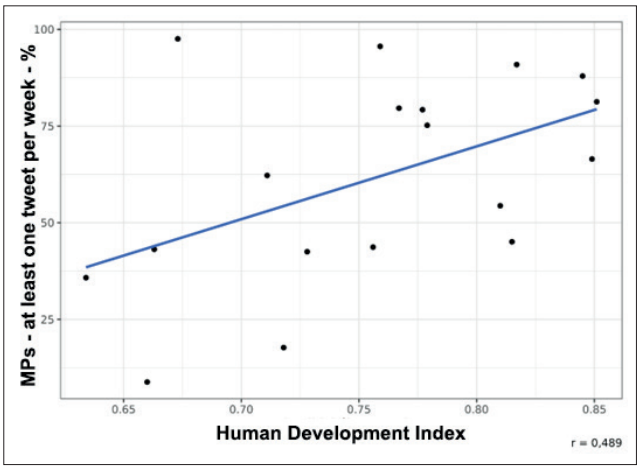
Graph 3. Correlation between countries' HDI and the percentage of MPs who have adopted *Twitter*



Graph 4. Correlation between *Twitter* users - population in countries and the percentage of MPs who sent at least one tweet per week



Graph 5. Correlation between Internet users - population in countries and the percentage of MPs who sent at least one tweet per week



Graph 6. Correlation between countries' HDI - population in countries and the percentage of MPs who sent at least one tweet per week

4.4. Technological development of countries

The following Graphs 1 to 6 show the relationship between the presence of MPs in each country on *Twitter* and the number of people on the internet, the number of people on *Twitter*, and the Human Development Index (HDI) for that country. The data on the *Twitter* population comes from *Latinobarómetro*'s latest survey for 2020 (*Latinobarómetro*, 2022). Information on the number of individuals using the Internet in a given country is provided by the *International Telecommunication Union* (2022), while not offering data for Venezuela. The HDI is then offered by the *United Nations Development Programme* (2022). The relationship between the percentage of MPs who, on average, sent at least one tweet during the period under review is then plotted against these three indicators. These three variables are moderately to strongly correlated. The highest correlation is between the HDI and the percentage of people on the internet (r = 0.905), while the relationship between the percentage of people on the internet and on *Twitter* (r = 0.717) also shows a very strong correlation. The least correlation, but still significant, is between the HDI and the percentage of people on *Twitter* (r = 0.534). Strong correlations are not surprising, as they give similar information, namely about the socio-economic and technological progress of a given country.

All the graphs show at least a moderate correlation between the variables. The figures and the Pearson correlation coefficient values at the bottom right of each figure suggest that the MP's adoption of *Twitter* increases with the percentage of people on the Internet, on *Twitter*, and the value of human development. The relationships between the percentage of MPs on *Twitter* with at least one tweet per week and these three indicators are very similar in Pearson correlation coefficient values. These data are further used in the multilevel models.

Table 4 shows the values for each country. It can be seen that there are a few exceptions where the Internet is not very prevalent, yet it is very much used by MPs. The most notable exception is El Salvador, where just over half of the people have access to the internet, but almost all of its MPs use *Twitter*. Other countries with internet penetration of around 50%, while having a lower HDI, are among the countries with the lowest adoption of *Twitter* by MPs.

Table 4. Countries - the relationship between the number of MPs on *Twitter* and state characteristics

Country	*Twitter* adoption %	Min. 1 tweet per week %	Population on *Twitter* %	Population - Penetration of Internet %	HDI
Argentina	90.7	87.9	22.3	85.5	0.845
Bolivia	36.9	17.7	9.2	59.9	0.718
Brazil	84.2	66.5	9.6	81.3	0.849
Chile	89.0	81.3	24.6	88.3	0.851
Colombia	90.7	79.6	13.7	69.8	0.767
Costa Rica	73.7	54.4	10.7	80.5	0.81
Dominican Republic	62.1	43.2	16.7	76.9	0.756
Ecuador	97.1	95.6	12.8	64.6	0.759
Guatemala	58.8	43.1	7.1	50.0	0.663
Honduras	48.8	35.8	6.8	42.1	0.634
Mexico	83.8	75.2	10.4	72.0	0.779
Nicaragua	12.1	8.8	6.7	45.2	0.66
Panama	64.8	45.1	11.6	64.3	0.815
Paraguay	65.0	42.5	10.9	74.0	0.728
Peru	96.2	79.2	9.3	65.3	0.777
El Salvador	98.8	97.6	11.5	54.6	0.673
Uruguay	94.9	90.9	13.4	86.1	0.817
Venezuela	77.3	62.2	19.8		0.711

4.4. Multilevel models

In Table 5, there are six multilevel models, where the variables gender or age are at the first level. Then at the second level are the variables percentage of citizens on the Internet, HDI, and percentage of people on the Internet. The data source is the same as mentioned above. The dependent variable is whether the MP was on *Twitter* (1) with at least one tweet sent during the period under study. The six models are because the three second-level indicators are always in the model separately due to the strong correlation but also the fact that they give similar information to some extent and the age variable was not available for some countries. The models confirm what the correlations and models in the previous part of the paper already showed. MPs adopt *Twitter* more when the country's technological development is greater. Younger MPs also adopt *Twitter* more. At the same time, all three variables are statistically significant. Thus, *Twitter* is used more in countries where there is a higher demand, i.e. where citizens have adopted new technologies more,

in the form of the Internet or *Twitter* directly, to find political information. This result is in line with the assumption that in these countries MPs will benefit more from using it as it reaches a larger percentage of the electorate.

Table 5. Multilevel models - the adoption of *Twitter* by MPs

	Dependent variable:					
	Adoption of *Twitter*					
	(1)	(2)	(3)	(4)	(5)	(6)
Gender (male)	-0.291*	-0.152	-0.248*	-0.153	-0.248*	-0.156
	(0.117)	(0.150)	(0.109)	(0.150)	(0.109)	(0.150)
Age		-0.031***		-0.031***		-0.031***
		(0.006)		(0.006)		(0.006)
Population - penetration of Internet	0.048*	0.065**				
	(0.024)	(0.020)				
Population on *Twitter*			0.107+	0.133*		
			(0.064)	(0.067)		
HDI					9.703*	12.196**
					(4.532)	(3.728)
Constant	-1.682	-1.880	0.212	1.215	-5.780	-6.714*
	(1.645)	(1.452)	(0.876)	(0.883)	(3.443)	(2.901)
N	2,937	1,615	3,215	1,615	3,215	1,615
Log Likelihood	-1,296.891	-745.550	-1,449.047	-747.065	-1,448.418	-745.529

Note: +p <0.1; *p<0.05; **p<0.01; ***p<0.001

Therefore, it can be concluded that the first hypothesis was not confirmed. Existing global research suggests that there is generally no difference in the use of social media between male and female politicians (**Chi**; **Yang**, 2010; **Macková**; **Štětka**, 2016; **Metag**; **Marcinkowski**, 2012; **Strandberg**, 2009; 2013; **Vergeer** *et al.*, 2013). However, in this case, a difference was found, as there is a gender gap in Latin America, with female parliamentarians using *Twitter* more. This finding represents an original contribution to the field of study, as it significantly contradicts previous findings from other countries, and is based on a large dataset. One potential reason for female MPs being more active on *Twitter* could be their desire to bypass traditional media, which has been known to portray them less favorably (**Heith**, 2003; **Kahn**, 1996).

By using *Twitter*, female politicians can present a more open, personal, and interactive image (**Carlson**; **Djupsund**; **Strandberg**, 2013) and communicate directly with voters, mobilizing them and targeting specific groups like young women. This direct communication allows female politicians to promote both themselves and their parties more effectively while simultaneously sidestepping gendered coverage (**Lawless**, 2012). Another possible explanation for the observed results could be the different communication styles adopted by women and men. Studies have indicated that women tend to use technology in a more sociable manner (**Walton**; **Rice**, 2013; **Lasorsa**, 2012), which may contribute to their more active engagement on *Twitter*. This communication style can help female politicians forge stronger connections with their audience, enabling them to better address their constituents' concerns and needs.

The second hypothesis is confirmed as younger MPs adopt *Twitter* more frequently. Existing research suggests that younger representatives are more likely to embrace social media (**Gulati**; **Williams**, 2013; **Larsson**, 2015; 2015; **Scherpereel**; **Wohlgemuth**; **Schmelzinger**, 2017; **Strandberg**, 2009, 2013; **Straus** *et al.*, 2013). In this regard, the results align with current research. Younger age cohorts in developed nations are often labeled as "digital natives" due to their lifelong exposure to computers, demonstrating a more intuitive command of online technologies compared to "digital immigrants" from older cohorts (**Scherpereel**; **Wohlgemuth**; **Schmelzinger**, 2017). Individuals from younger generations typically exhibit greater proficiency in using online platforms for political engagement (**Bakker**; **De-Vreese**, 2011). This expertise is also likely to manifest among younger politicians (**Larsson**, 2015). Younger and freshman politicians might be more motivated to leverage all available communication channels to consolidate political support and cultivate their brand (**Peterson**, 2012), unlike older politicians who might have already built their brand via traditional media.

At the same time, the hypothesis regarding country characteristics was also confirmed when variables such as the number of people on the Internet, on *Twitter*, and the HDI were statistically significant in the models. Based on assumptions from rational choice theory and cost-benefit analysis, if politicians aim to be elected or re-elected, they should consider the number of citizens on a given social network. If no one uses the social network, no one will read the politician's *Twitter* posts, making it illogical for the politician to be present on *Twitter* in a country where almost no one utilizes the platform. In this case, correlations initially revealed a strong relationship between the number of people on the internet in a given country, the quality of life as a socioeconomic indicator, the number of *Twitter* users, and the adoption of *Twitter* by MPs. Subsequently, these variables were statistically significant in regression models, confirming the hypothesis. Of course, the results do not imply that there are no exceptions with a smaller percentage of internet users where MPs

simultaneously use *Twitter*. These findings corroborate a previous study comparing the relationship between *Twitter* usage by citizens and MPs in Europe (**Haman**; **Školník**, 2021).The most significant exception is El Salvador, which has a low standard of living and fewer people on both the internet and *Twitter*; nevertheless, nearly all its MPs are present on *Twitter*. This intriguing phenomenon is worth investigating further.. Consequently, it does not solely depend on the number of people on the internet in a given country, but other factors are also involved.

5. Conclusion

This paper has provided a unique analysis of the use of *Twitter* by Latin American MPs. More than 3,000 MPs were examined and two million tweets were collected. Research on political communication in Latin America was dominated by research on elections, especially presidential elections, and presidential political communication. The paper, therefore, provides an update on the current state of the MPs' adoption in Latin America. The use of *Twitter* by MPs in Latin America varies considerably. While in several countries more than 90% of MPs use *Twitter* (Argentina, Colombia, Ecuador, El Salvador, Peru, and Uruguay). Then there are countries where less than half of MPs use *Twitter* (Bolivia, Honduras, Nicaragua). At the same time, in several countries there is very low activity, so we cannot speak of much active use, even if a higher percentage of MPs are on *Twitter*. Differences were also found between the use of hashtags and the proportion of retweets among tweets. While MPs in some countries actively use hashtags, in others they do not use this form of communication at all. A high proportion of retweets means that MPs in a given country are spreading ideas already formulated by someone rather than creating their content.

In terms of factors that may help explain *Twitter* use, the first hypothesis was rejected when a significant relationship was found in that female MPs were more likely to use *Twitter* than male MPs. When analyzing MPs on *Twitter*, it was also found that women are more active. The second hypothesis was confirmed and younger MPs adopt *Twitter* more. However, when comparing MPs already present on *Twitter*, the models did not show younger MPs to be more active at a statistically significant level. The third hypothesis was also confirmed when MPs in states with higher numbers of *Twitter* users adopted *Twitter* more. Results were similar when using Internet penetration and human development variables. Similar results are consistent with assumptions based on rational choice theory and cost-benefit calculus. Thus, in countries where *Twitter* or the Internet is less used, it does not make as much sense to use *Twitter* as in a country where many people are connected to the Internet. Especially if a politician wants to get elected, he or she has a unique opportunity to reach voters through social media. But this is only true if social media are used in the country.

Thus, these results have contributed to the scholarly debate on the adoption and use of social media by MPs in different countries (**Amaral**; **Pinho**, 2017; **Fuente-Alba-Cariola**; **Parada-Gavilán**, 2019; **García-Sánchez** *et al.*, 2021; **Marques**; **De-Aquino**; **Miola**, 2014a; **Welp**; **Marzuca**, 2014; 2016) with new and updated data. As has been mentioned several times, for many countries in Latin America, no study has yet been conducted on MPs' use of *Twitter*, and therefore it was not clear how many MPs in those countries use *Twitter*. So far, comparative research on a larger number of countries has primarily focused on Europe (**Castanho-Silva**; **Proksch**, 2022; **Haman**; **Školník**, 2021; **Van-Vliet**; **Törnberg**; **Uitermark**, 2020). Just as studies focusing on European countries have noted differences between countries, the Latin American area is similar in this regard. At the same time, the results show an increasing tendency among MPs to use *Twitter* compared to previous studies. For example, in Argentina in 2012, 53% of MPs used *Twitter* (**Welp**; **Marzuca**, 2014; 2016), while the data of this paper show that more than 90% of MPs are currently active on *Twitter*.

One limitation of the article is that it primarily concentrates on the adoption and activity of Latin American parliamentarians on *Twitter*, without delving deeply into the content of their tweets. This focus may overlook important nuances or trends in the messages being communicated by these politicians. Consequently, the main objective of the article was to map the current adoption of Latin American parliamentarians on *Twitter*, rather than to examine the precise purposes for which they use *Twitter*. A more in-depth analysis of the content could have revealed patterns and differences among the parliamentarians, as well as their stance on critical matters in the region. Future research could build upon the findings of this article to explore these aspects more thoroughly, thus providing a more holistic perspective on the role of *Twitter* in Latin American politics.

Of course, there are several other limitations. For example, a shorter period was observed, but this was primarily to offer the most recent data. However, research looking at longer periods would certainly be useful in the future. At the same time, there is also a problem in identifying MPs on *Twitter*. As there are no official complete lists, and thus multiple techniques had to be used to collect the data. Therefore, it is not possible to ensure that an MP could have not missed through data collection, especially if they did not use their official name and were not registered on any lists or found through *Google* search. At the same time, of course, only two individual variables are used in the research, which is primarily due to comparisons across states. Important variables such as an MP's ideology or their position in the government were not examined. While several other variables can be collected on a single country, data on multiple parliaments does not exist in a comprehensive and uniform form. Even in this study, it was not possible to find the age of all MPs. However, the above reasons are relevant in interpreting the paper's results.

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