

Artículo de Investigación

Advanced statistic models applied to Social Media ads in electoral campaigns across Europe in 2019

Modelos estadísticos aplicados a las campañas electorales en Social Media en Europa en 2019

Emilia Smolak Lozano: Universidad de Málaga, España.
esmolaklozano@uma.es

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Resumen:

Introducción: Existe una necesidad cada vez mayor de establecer modelos de evaluación para la publicidad política digital, especialmente en la ciberdemocracia europea, ya que la legislación de la UE aún no está completamente adaptada a la realidad digital. Como tal, puede generar preocupaciones con respecto al alcance de la influencia de las campañas políticas electorales en las plataformas de redes sociales a la hora de persuadir las preferencias políticas y los votos. **Metodología:** La metodología aplica los modelos ML-SEM y MNCLM para explorar técnicas de reconocimiento de regularidades y técnicas de mapeo multivariado con el objetivo de evaluar las pautas de publicidad política en las campañas seleccionadas en la biblioteca de anuncios de Facebook. **Resultados:** El estudio revela las relaciones entre las características de los anuncios y el alcance e impacto social, incluidas las características de las audiencias. **Discusión:** Sin la aplicación de técnicas avanzadas en estadística, esas campañas en las redes sociales no pueden evaluarse adecuadamente en términos de impacto y relaciones estadísticas entre variables cualitativas y cuantitativas de las campañas políticas electorales en las redes sociales. **Conclusiones:** El modelo demostró un grado considerable de influencia de aquellas campañas relacionadas con determinadas estrategias de publicidad en las redes sociales.

Palabras clave: Social Media; Facebook; campañas electorales; ML-SEM; MNCLM; publicidad política; UE; biblioteca de anuncios.

Abstract:

Introduction: There is an increasing need to establish an evaluation models for digital political advertising, especially in European cyberdemocracy, as EU legislation is not yet fully adapted to the digital mechanisms and reality. As such, it may raise the concerns, regarding the extent of influence of political electoral campaigns on social media platforms, in persuading the political preferences and votes. **Methodology:** The methodology applies the ML-SEM and MNCLM models to explore regularities recognition techniques and multivariate mapping techniques with the objective to evaluate the patterns of political advertising in the selected campaigns on Facebook ads library. **Results:** The study reveals the relations between ads features and the scope and social impact, including the characteristics of the audiences. It also proves the relations between content and social impact on audiences. **Discussions:** Without the application of advanced techniques in statistics those Social Media campaigns cannot be properly evaluated in terms of impact and statistical relations between qualitative and quantitative variables of political electoral campaigns in Social Media. **Conclusion:** The model demonstrated a considerable grade of influence of those campaigns related to the certain strategies of advertising on Social Media.

Keywords: Social Media; Facebook; electoral campaigns; ML-SEM; MNCLM; political advertising; EU; ads library.

1. Introduction

Communication and political marketing are fields of academic study and professional areas accepted as natural participants in the democratic choice process. In this sense, communicating to influence voting intentions through social media is a practice that is part of any communication strategy in politics. The problem arises when citizens are influenced by messages that deviate from the most basic rules of communication ethics, such as fake news, disinformation, or manipulation. In this domain, social networks have become fertile ground for uncontrolled dissemination. Although the number of studies on political campaigns on social media is increasing, there is a growing need to establish evaluation models for digital political advertising, especially in European cyber democracy, since EU legislation is still not fully adapted to digital mechanisms and reality. Trust and transparency have become the keywords of modern societies in the digital age.

Conclusions from Edelman Trust Barometer (2020) suggest the trust is built upon the competence and ethics and as such, both constitute the base of transparency. As the response to the political ads scandal, in 2019, Facebook created Ad Library. Its availability thus calls for the research into the transparency of political Social Media campaigns just after its launch and tries to assess the performance of political advertising in Social Media in terms of audience and influence¹.

1.1. *Cyber democracy: virtues and risks*

The democratization and mediatization processes have changed the political communication, shifting thus the public sphere for more public political or citizen activity engaged in public causes and covered by media, as the result of the more open access to information (Gonçalves, 2018). As the author further argues, for this reason the political communication has become more horizontal among political actors, not being solely reduced to the voting act.

¹ Please note that the name Facebook will be used throughout the article as the common name for campaigns run both on Facebook and Instagram platforms, as Meta name for the company was introduced after 2019 political campaigns.

First, it is important to understand the context in which the presented problematic arises. Cyber democracy is a concept that refers to the use of information and communication technologies (ICTs) to enhance citizen participation, transparency, and the efficiency of democratic processes. In Europe, cyber democracy is seen as a way to revitalize traditional representative democracies, promoting greater civic engagement and facilitating communication between citizens and governments. Cyber democracy essentially involves the incorporation of ICTs into the democratic process, including tools such as e-voting, online deliberation platforms, discussion forums, and digital public consultations. The central idea is that the internet and other digital technologies can reduce barriers to political participation and make decision-making processes more inclusive and responsive.

Therefore, cyber democracy refers to the use of internet technologies, particularly social media, to facilitate democratic processes, promote civic engagement, and enhance participatory governance. Social networks like Facebook play a significant role in enhancing political participation by providing a platform for citizens to engage in political discussions, mobilize for causes, and participate in campaigns. These platforms lower the barriers to entry for political engagement, making it easier for a larger segment of the population to be involved in the democratic process (Loader & Mercea, 2011). Also, Facebook and similar platforms are powerful tools for the dissemination of information. They allow political parties, government agencies, and civil society organizations to share information quickly and broadly. This rapid dissemination can help inform citizens, enabling them to make more educated decisions (Boulianne, 2015).

Moreover, are instrumental in modern political campaigning and mobilization efforts. They enable targeted advertising, grassroots organizing, and the ability to reach voters directly. The Obama campaigns of 2008 and 2012 are often cited as pioneering examples of how social media can be harnessed for political mobilization (Kreiss, 2012).

However, there are challenges and Criticisms like echo chambers and polarization. Social networks can create echo chambers where users are exposed primarily to information and opinions that reinforce their own beliefs. This can lead to increased political polarization and reduce the quality of democratic discourse (Sunstein, 2001).

Moreover, the spread of misinformation and fake news on platforms like Facebook poses a significant threat to cyber democracy. False information can mislead citizens, distort public opinion, and undermine the integrity of democratic processes (Allcott & Gentzkow, 2017). This risk is particularly relevant during election periods. Allcott & Gentzkow (2017: 211) point out the basic problems of the Facebook or social media electoral campaigns: lack of fact-checking, third party filtering, lack of editorial judgement and no track record or reputation.

As stated by Fenton (2019:11): “Fair elections means elections that are fundamentally honest. But in an age of social media, honesty is far from straightforward”. It depends on the intentions of the direction of the electoral campaigns, local regulations, digital platforms regulations, availability of the public information and willingness to share such information with the stakeholders, among the others. The accountability is not straightforward either as the single receiver is not able to track the records and data of the single ad. Facebook ads library is some sort of response to this issue, but yet the data has to be tracked individually and depends on the source of the campaign. How influential is paid, shared and uncontrolled media on social media platforms in persuading political preferences and votes? The uncontrolled impact of Facebook may create significant informational and symbolic asymmetries in digital public sphere in terms of knowledge and symbolic power. A core principle in political advertising is transparency – political ads (on Facebook) are supposed

to be easily visible to everyone, and everyone is supposed to understand that they are political ads (Vaidhyanathan, 2022).

Van Dijk, one of the main theorists of the concept of cyber democracy, argues that the network society can transform political relationships by allowing greater interaction and citizen participation. Van Dijk emphasizes the need for adequate infrastructure and digital literacy for cyberdemocracy to be effective (van Dijk, 2012). Floridi (2014) also discusses the revolution brought about by ICTs and their impact on democracy, believing that cyberdemocracy is part of a larger transformation in how we interact with information and make collective decisions. Examples of best practices in the era of European cyber democracy include online voting systems from anywhere in the world or direct citizen participation in consultations launched by governments. However, there are difficulties to consider, such as: 1) inequality of access (the fact that not all citizens have equal access to digital technologies); 2) security and privacy (the integrity of voting processes and the protection of personal data are critical issues in the implementation of digital systems); and 3) disinformation (the proliferation of fake news and the manipulation of information can undermine trust in the digital democratic process). This risk is particularly relevant during election periods.

1.2. EU legislative framework regarding digital platforms

Regarding the last aspect, the European Commission has been creating a set of deliberations, such as the Code of Conduct on Disinformation in 2018, aimed at social media platforms and advertisers, to combat online disinformation.

Major platforms, such as Facebook, Instagram, X (formerly Twitter), and Google would have to commit to: 1) removing fake accounts, 2) flagging and reducing the visibility of content verified as false, 3) promoting transparency in political advertisements, with clear information about who paid for the ad and its audience.

Additionally, in 2018, the European Commission implemented the General Data Protection Regulation (GDPR), with a significant impact on the use of personal data in electoral campaigns. The main provisions include: 1) explicit user consent for data collection and use; 2) transparency about how the data is used, 3) users' right to access, correct, and delete their data. The European Commission also issued guidelines to ensure fair and free elections, including clear rules on online campaign financing, transparency in online political advertising, and measures to prevent foreign interference. In this context, it is important to understand how compliance with guidelines and rules is monitored as we have been witnessing electoral campaigns whose digital communication strategies are not transparent and influence electoral results.

1.3. Does digital reconfigure democracy?

Uncontrolled presence on social media platforms can raise concerns about the extent of the influence of political electoral campaigns in persuading political preferences and votes. Uncontrolled impact can thus create significant informational and symbolic asymmetries in terms of political discourse and citizens' perceptions within the digital public sphere, particularly considering political knowledge and symbolic power.

Kreiss (2016) and Bucher (2012) highlight that the impact of digital technologies on political campaigns can lead to a reconfiguration of democratic practices and political engagement. Kreiss, in his study on Obama's 2012 presidential campaign, emphasizes how the use of Big Data and data analysis can effectively personalize political messages, while Bucher examines the role of algorithms in shaping the visibility of political content. In the face of deepfake technology, Big Data, AI, and advances in the metaverse, the contents, scopes, and techniques of persuasion must be carefully measured and evaluated to assess the real political influence of social media advertisements on society during political elections.

According to Chadwick (2013), the complexity and interactivity of digital media demand new methodological approaches to analyze political communication. Furthermore, studies by Howard and Hussain (2011) on the Arab Spring show how powerful can be Social Media tools for political mobilization but can also be used for political manipulation. Therefore, there is a growing need for specialized models using advanced statistical approaches capable of examining qualitative and quantitative data, building relationships between them in statistical terms, and ultimately determining patterns of political advertising in digital media.

1.4. A kind of accountability by Facebook

This research focuses on Facebook's Ads Library (a brand managed by Meta), created in 2019 following the company's commitment to transparency in political advertising. The commitment by Facebook consists of a series of measures and tools designed to increase clarity and accountability in political ads served on the platform. These initiatives aim to provide users with more information about who is behind advertising campaigns, what their objectives are, and how much money is being spent. The main components of this commitment are as follows:

a) Ad Library: The Ad Library is a public tool where anyone can see all political and social issue ads being run on Facebook and Instagram. This library allows users to search for specific advertisers, view ad content, and obtain detailed information about each campaign, including:

- Who paid for the ad,
- The reach and duration of the ad,
- Amount spent on the ad,
- Demographic targeting of the ads (age, gender, location).

b) Advertiser Identification and Authorization: Before a political or social issue ad can be run, Facebook requires advertisers to go through a verification process. This includes:

- Providing valid identification and proof of residence,
- Declaration of who will pay for the ad, which will be displayed on the ad itself as a "Paid for by" disclaimer.

c) Disclaimers on Ads: All political ads on Facebook must include a disclaimer indicating who paid for the ad. This disclaimer appears directly on the ad and is clickable, leading the user to more information in the Ad Library.

d) Transparency Reports: Facebook publishes periodic reports on political and social issue ads. These reports provide an overview of spending, the largest advertisers, and other relevant statistics.

e) Monitoring and Review Tools: Facebook employs a combination of human and automated review to monitor and review political and social issue ads. This helps ensure that ads comply with platform policies and that the information provided by advertisers is accurate and truthful.

f) Partnerships with Researchers: Facebook collaborates with external researchers and organizations to study the impact of political ads and develop best practices for transparency and accountability in political advertising. These measures aim, among other aspects, to reduce the spread of false or misleading information through increased oversight and transparency, making political advertising on Facebook more transparent and helping protect the integrity of democratic processes.

However, intentions on the platform side do not guarantee greater scrutiny. Thus the necessity for further initiatives that used the public information on electoral campaigns in Meta's platforms to guarantee a major transparency and insight into political advertising campaigns' data and impact.

2. Methodology

The main goal of the study is to evaluate the patterns of political advertising in the selected campaigns on Facebook in terms of transparency, trust building and influence on the target audiences in different electoral campaigns and countries. Therefore, three research objectives were planned:

RO1: descriptive analysis of the campaign in terms of formal, demographic, content and campaign strategy characteristics of the ads

RO2: sentiment analysis against the variables of ads strategy characteristics of duration, location, and demographic factors of audience: gender and age

RO3: sentiment analysis against the variables of ads type and keywords used in ads contents

The data proceeds from the Facebook public library: Ads Library, embracing ads data from three European countries and four electoral campaigns in 2019, performed upon the creation of ads library on Facebook: Spain (2), Poland (1) and UK (1).

The dimensions of the analysis are the following: the scope (impressions), level of financial investment in Facebook political advertisement, content (formal features), and audiences (demographic features) in each campaign, across the selected countries. The fieldwork consisted of gathering data of the ads available in the Facebook's open ads' library from all five electoral campaigns of 2019 from aforementioned countries. The data recompilation was conducted between October 19th and November 18th , 2019. Subsequently, the data were processed, coded, analysed and modelled.

The methodology applies the exploratory pattern and regularities recognition techniques (association rules and sequential patterns identification), multivariate mapping techniques (multiple correspondence analysis, cluster analysis, multidimensional scaling and social network analysis) with the objective to evaluate the patterns of political advertising in the selected campaigns on Facebook. The quantitative KPI's and metrics data is predominantly nested so, taking into account the cross-national samples, it is modelled by multigroup, multilevel hierarchical path models (ML-SEM) and hierarchical multigroup multinomial conditional logit models (MNCLM) for integrated qualitative and quantitative data.

The data analysis process was two-step. First, it applied the descriptive analysis of the ads and electoral campaigns according to the previously established variables and KPIs of political ads on Facebook. Secondly, both quantitative and qualitative data was analysed using ML- SEM and MBCLM models, mainly for sentiment assessment as the final outcome of the campaign strategy on the audiences. The data analysis was performed by professor Adam Sagan in 2019-2020, within the research framework, co-financed from the scientific programme for the scientific potential development ‘‘Programme Potential’’ at Cracow University of Economics, as the part of the research collaboration partnership.

The variables of the political ads implementation, consists of various categories of the analysis: ads formal features, distribution mechanisms, content, political communication strategy, audience and overall performance. Some of the variables were pre-established by Facebook ads library, while others had to be elaborated manually on the base of the analysed content by the researchers, following the exploratory analysis prior to the data gathering. The first category, there were the formal characteristics, such as identification of the ad (the identification number which Facebook assigns to each ad), URL for the ad, name of the politician or the party, title of the campaign, the sponsor of the ad (person, organization or political party that financed this particular ad).

The distribution category contained the following: the variables of dates of ads visibility (duration of the campaign using this particular ad); duration of the ads in days (controlling variable for the visibility of the ad); display of the ad on the final day of the campaign (yes/no); type of source (platform on which the ad was distributed- Facebook or/ and Instagram).

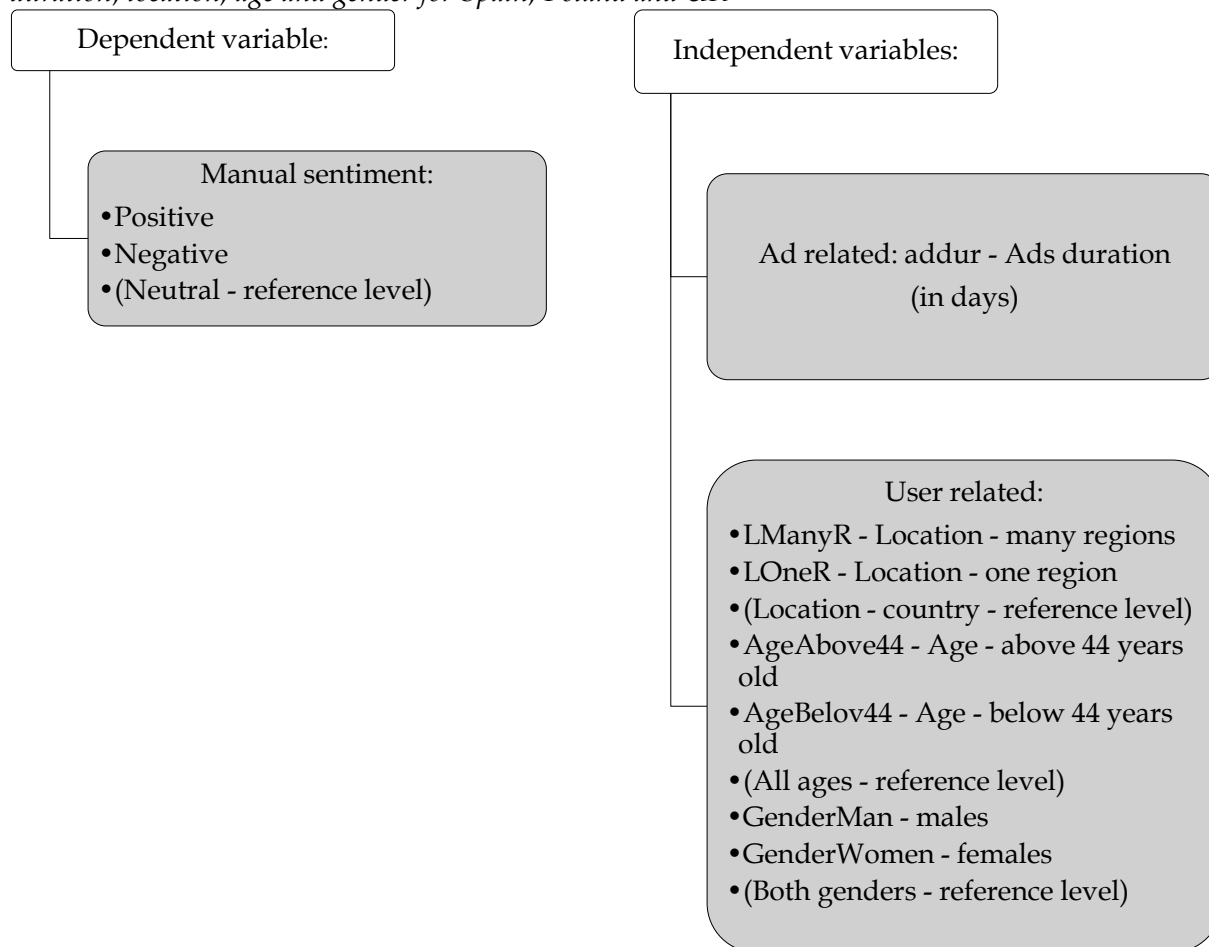
The third category embraced the content -wise variables: complete text of the ad; existence of the call for action button in the ad (e.g. Vote X party, dichotomies variable); principal keywords present in the ads text, number of hashtags that appeared in the ad; the wording of the hashtags present in the particular ad, type of format (post/banner); type of multimedia used in the ad (poster, video, graphic, photo), use of the interactive formats (link).

In terms of political strategy there were included the following items: the maximum spending range (in Euros, used as presented by Facebook ads library); manual sentiment (negative, positive or neutral); number of ads using the same material and text; location in which the ads were directed to be visualized (one specific region, multiple regions, whole country); language of the ad, public profile on Social Media (yes/no); type of political ad (slogan, vote mobilization, political programme, presentation of the candidate, mobilization of volunteers, invitation to the political meeting); public information on ads spending in 2019 (yes/no).

As far as the audience is concerned, place of reach (specific regions, multiple regions or town), age category as provided by Facebook ads library, gender (pre- distinguished by Facebook ads library: male or female). The performance was measured by total number of visualization of the particular ad.

Figure 1.

Multigroup Multinomial Logistic Regression- sentiment analysis with the independent variables of ads duration, location, age and gender for Spain, Poland and UK



Source: Own elaboration (2024).

Once the data was gathered, described and categorised, first part of analysis used the descriptive the multinomial logistic regression models were applied. It analyzes the manual sentiment (positive, negative, or neutral) of electoral campaign ads. The reference level for the dependent variable is "neutral." The independent variables include ad duration (addur), location (with categories LManyR for many regions, LOneR for one region, and the reference level being "country"), age (with categories AgeAbove44 and AgeBelow44), and gender (with categories GenderMen and GenderWomen), as shown on the Figure 1.

The sentiment of neutral, positive and negative was assessed against the locations, country, age and gender and with the related variable of ads display duration.

Subsequently, we proceed with the Multigroup Multinomial Logistic Regression for manual sentiment analysis however depending on the type of ads and keywords.

3. Results

The descriptive part of analysis shows the major differences in the political strategies of ads campaigns on Facebook. In UK, there are predominant the short periods of ads duration, most of ads are shown on the last days of campaign. In Spain, the most of the campaigns are long (even 10 days of duration, though the ads are not prompt to be demonstrated on the last day of a campaign. It must be noticed that Spanish regulations allows 15 days campaign periods directly prior the election day with the day just before voting when no campaigning must take place. This rule is not respected in terms of Facebook. As far as Poland is concerned an average campaign is 2-5 days long and most of them last till the last day of campaign (some ads were displayed for 12 or 16 days).

The ads were displayed on Facebook mainly while in Spain and UK, both Facebook and Instagram was used. Regarding the use of hashtags, in UK campaigns there is hardly no use of hashtags observed. Polish campaigns uses more hashtags than Spain and they are mainly parties' or campaigns' slogans, however no coherence or strategic planning of political communication is observed in this aspect. Dominant type of ads is the post, usually very long in case of Poland and Spain and very short in case of UK. As far as audience is concerned, in UK and Poland alike there are younger generations – under age of 44 and mainly women, whereas in Spain the main audience were older people of both genders. UK and Poland both avoid transparent behaviour in terms of presenting financing source and public Social Media profile next to the ads while Spain was more respectful in regards to this data. Dominant multimedia are graphics- Spain, Poland and UK mainly applies graphics (poster/banner). Spanish campaigns were those applying videos more among the investigated countries.

Regardless to the country, a limited use of Social Media style is predominant (language, graphics), the campaigns mostly apply a boring, long texts. All the countries present a limited use of mass media publications such as articles or interviews proceeding from newspapers, TV or other more reputable media. More of such publications were employed in Poland. The patterns of ads numbers using the same text and audio-visual support, visualisations average number and price range average, the numbers are the following:

Table 1.

Performance analysis: ads versions, visualisations average and financing average range

Ads numbers (versions)	Ads visualisations average	Price range average
PL- 61 (Kukiz 15)	PL- 31.290 (KO PO- 300.000; Left SLD- 125.000)	PL-104€ (KO PO-750€; PIS and SLD-380€)
UK- 1863 (Conservatives- 1525)	UK- 135.583 (Conservatives- 1.800.000)	UK-1868€ (Conservatives- 17500€, Scottish National Party SNP-7000€)
ES- 1384 (PP-1131)	ES- 229.346 (PSOE, Más País, PP, Ciudadanos- over 1 mln)	ES-703€ (PP-20.000€; Más País- 6000€)

Source: Own elaboration (2024).

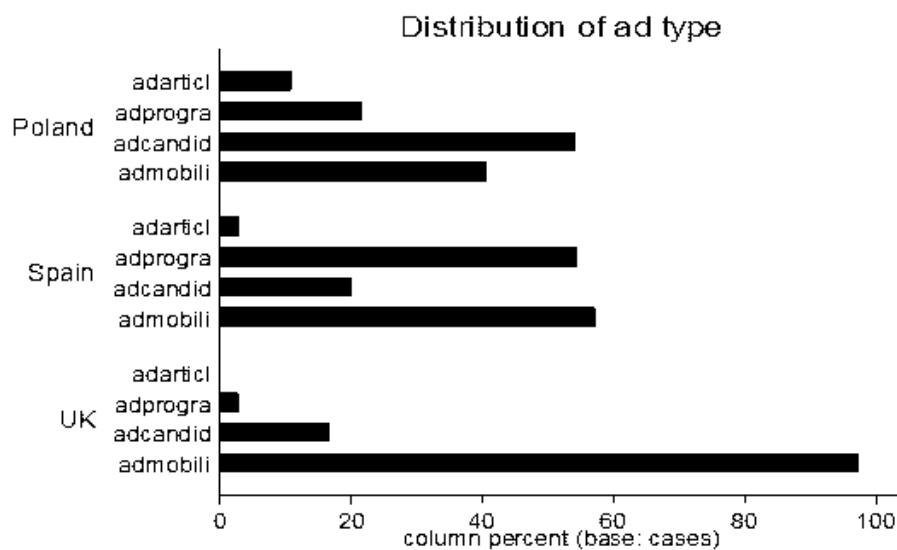
As data show, UK applied the highest number of ads versions comparing to Poland, with right wing parties in all analysed countries with the highest number of ads versions applied in their campaigns. In terms of visualisation level, Poland counts with the lowest number of ads visualisation average (just over 30k), comparing to UK with over 130k and Spain with almost 230k. The Conservatives in UK are the party with the highest visualisation number- 1.8mln and Spain achieves 1 mln but unevenly distributed across the political scene. In Poland, the highest visualisations numbers belong to central and left wing, giving the central coalition the advantage, well above the average range.

The financing average demonstrates the importance of Facebook campaigns in each electoral campaigns in each country - Poland being the one with the lowest investment average per campaign, just over 104 euros and UK with the highest one - over 1870 euros on average and Spain in the middle- over 700 euros per ad. However, it is PP in Spain, right wing party that spends the most on average on Facebook campaigns- 20.000 euros, more than Conservative party in UK and almost 4 times more than extreme left wing in Spain. In Poland it was central coalition with average 750 euros spending per campaign.

Regarding ads type and most popular keywords there were observed the following patterns:

Figure 2.

Distribution of ads type per country

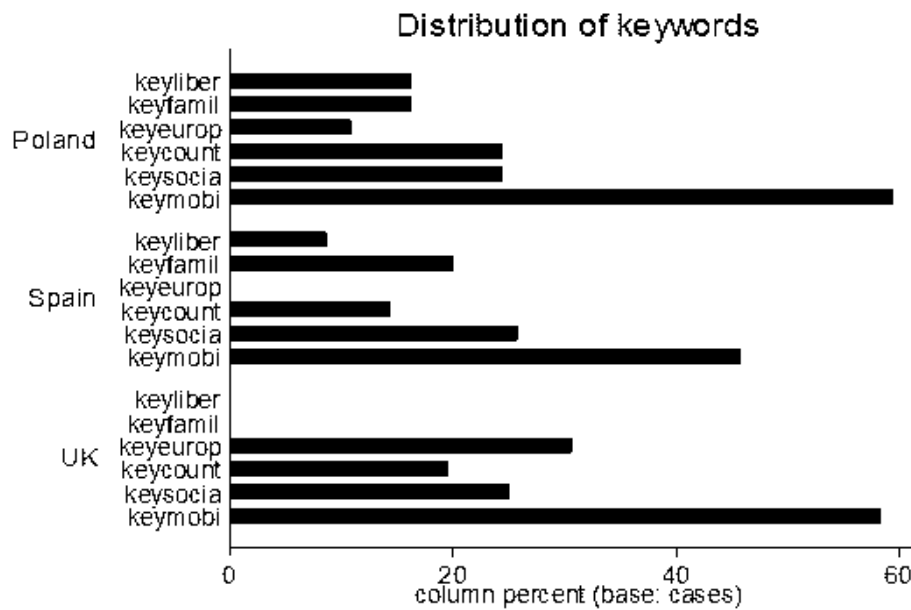


Source: Own elaboration (2024).

As data reveals, Poland mainly present the candidates for the elections. Spanish campaigns are focused on both programme presentations and vote mobilisation. UK campaign's main communication objective is mobilisation of voters that coincides with the ads being displayed mainly on the last days of the campaign duration.

Figure 3.

Keywords distribution in ads per country



Source: Own elaboration (2024).

Keywords present in Polish and Spanish campaigns alike are mainly related with mobilisation and social issues, being Polish electoral campaigns on Facebook more focused on mobilisation while Spanish strategies on social issues, followed by family. UK predominantly keywords content are related to mobilisation of the vote and European issues.

The application of the Multigroup Multinomial Logistic Regression model of the sentiment analysis for Poland, included the use of the variables of ads duration, location and gender/age independent variables showed a wide range of the parameters.²

Odds ratio interpretation for above model proves no significant relations for Spain and UK, with significant relations for Poland for the combination of the variable gender – Women and Positive vs Neutral Sentiment (significant at p-level = 0.05). Additionally, in case of Poland it shows significant relations for ads duration variable for Negative vs Neutral Sentiment (significant at p-level = 0.1).

Table 2.

Odds ratio interpretation for Poland

Negative vs Neutral	Coefficient	OR
Addur	-1.3934* -significant at p-level- 0.1	0.248229887
LManyR	-3.014	0.049094906

² Multigroup Multinomial Logistic Regression applied to sentiment analysis against the variables of duration, regions, age and gender is shown only for Poland, as the only one proving the significant relations between analysed variables. Data for model are the following: Multinomial logistic regression, Number of obs = 37 LR chi2(12) = 23.89; Prob > chi2 = 0.0211; Pseudo R2=0.3459

LOneR	-1.777	0.169144821
AgeAbove44	3.247	25.71308484
AgeBelow44	-	-
Men	15.5727	5796124.138
Women	13.61016	814361.7854

Positive vs Neutral	Coefficient	OR
Addur	0.1496	1.161369602
LManyR	17.1408	27807046.01
LOneR	17.5469	41737059.12
AgeAbove44	-3.4277	0.032461516
AgeBelow44	-	-
Men	1.6249	5.077911221
Women	3.6322**	37.79587615

Source: Own elaboration (2024).

The following is a comparison of the reference level of Neutral and Negative in the Polish data. As per Addur: Coefficient = -1.3934, OR = 0.2482, the longer ad duration decreases the likelihood of a negative sentiment. In case of variable LManyR: Coefficient = -3.014, OR = 0.0491, ads shown in many regions are less likely to be perceived negatively. But the same proves to be truth for LOneR variable: Coefficient = -1.777, OR = 0.1691, as it means that ads shown in one region are also less likely to be perceived negatively. Age (above 44 years) and regardless to gender (Men or Women) are shows more likelihood to have ads perceived negatively (AgeAbove44: Coefficient = 3.247, OR = 25.7131; GenderMen: Coefficient = 15.5727, OR = 5796124.138).

However, Addur is only significant at p-level 0.1. Statistical hypothesis tests are significant at the 10% level, so it is difficult to conclude that there is an impact. In the multinomial logistic regression results for Poland, the coefficient for Addur (ad duration) in the comparison of Negative vs. Neutral sentiment is -1.3934, with an odds ratio (OR) of 0.2482. This means that for each additional unit increase in ad duration (presumably in minutes), the odds of an ad being perceived as negative (as opposed to neutral) decrease by a factor of 0.2482. In other words, longer ad durations are associated with lower odds of an ad being perceived negatively compared to being perceived neutrally. The negative sign of the coefficient (-1.3934) indicates a negative relationship between ad duration and the likelihood of a negative sentiment. This means that as the ad duration increases, the likelihood of an ad being perceived negatively decreases.

Practical implications for the campaign strategy implies that if the ad duration increases by 1 minute, the odds of the ad being perceived as negative decrease to about 24.82% of what they were before the increase in ad duration. This suggests that shorter ads are more likely to be perceived negatively, while longer ads tend to mitigate negative perceptions and are more likely to be perceived neutrally (or even positively, though that would be a separate comparison).

In summary, the interpretation of the odds ratio for Addur in the Poland Negative vs. Neutral sentiment model indicates that longer ad durations reduce the likelihood of ads being perceived negatively. The table presenting the marginal effects of significant parameters from the multinomial logistic regression analysis for Poland, focusing on how these variables influence the probability of ad sentiment being positive, neutral, or negative. As ad duration

increases by one unit (likely in minutes), the probability of the ad being perceived as neutral decreases by approximately 20.42%. Conversely, the probabilities of the ad being perceived as positive or negative increase. This indicates that longer ads are more likely to evoke a stronger emotional response (either positive or negative) rather than a neutral one. When an ad is shown in many regions, the probability of the ad being perceived as positive increases by approximately 90.36%.

Meanwhile, the probabilities of the ad being perceived as neutral or negative decrease. This suggests that ads shown in multiple regions are generally better received and more likely to be perceived positively. When an ad is shown in only one region, the probability of the ad being perceived as positive increases by approximately 88.26%. Similar to the LManyR variable, the probabilities of the ad being perceived as neutral or negative decrease, indicating that region-specific ads are also likely to be perceived positively. For individuals above the age of 44, the probability of the ad being perceived as negative increases by approximately 38.59%. This suggests that older individuals are more likely to perceive ads negatively compared to younger individuals. For men, the probability of the ad being perceived as negative increases by approximately 38.59%, while the probability of the ad being perceived as neutral decreases. This indicates that men are more likely to react negatively to ads compared to women. For women, the probability of the ad being perceived as positive increases by approximately 90.36%. This suggests that women are more likely to have a positive perception of ads compared to men. GenderWomen is only significant at p-level 0.05. Statistical hypothesis tests are significant at the 5% level, so it is able to conclude that there is an impact.

The marginal effects for significant parameters determined for the above analysis are the following:

Table 3.

Marginal effects for significant parameters for Poland

Variable and category	Marginal effect dx/dy
Addur:	
Pr(sentiment=NEGATIVE)	-0.095
Pr(sentiment=NEUTRAL)	0.060
Pr(sentiment=POSITIVE)	0.035
Women:	
Pr(sentiment=NEGATIVE)	0.876
Pr(sentiment=NEUTRAL)	-1.208
Pr(sentiment=POSITIVE)	0.332

Source: Own elaboration (2024).

Marginal effects for significant parameters analysis presents the marginal effects of two significant parameters: Addur and Women, on the probability of three sentiment outcomes (NEGATIVE, NEUTRAL, POSITIVE). The interpretation of each marginal effect is the following:

a) Addur (Advertisement Duration)

For Pr(sentiment=NEGATIVE): -0.095, the marginal effect indicates that as the duration of the advertisement increases, the probability of a negative sentiment decreases by 9.5%, while for Pr(sentiment=NEUTRAL): 0.060, the probability of a neutral sentiment increases by 6% with an increase in advertisement duration. In case of Pr(sentiment=POSITIVE): 0.035, the

probability of a positive sentiment increases by 3.5% with an increase in advertisement duration.

b) GenderWomen

For $\Pr(\text{sentiment}=\text{NEGATIVE})$: 0.876, being a woman increases the probability of a negative sentiment by 87.6%. As for $\Pr(\text{sentiment}=\text{NEUTRAL})$: -1.208, the probability of a neutral sentiment decreases by 120.8% for women and in case of $\Pr(\text{sentiment}=\text{POSITIVE})$: 0.332, being a woman increases the probability of a positive sentiment by 33.2%.

The Figure 5 below shows the parameters established by the model in case of Poland for the Multigroup Multinomial Logistic Regression model of manual sentiment analysis against type of ads and most popular keywords variables.

The Multigroup Multinomial Logistic Regression model of manual sentiment analysis against type of ads and most popular keywords variables was run separately for Spain and UK against the type of ads and most popular keywords determined by the analysis for both countries, showing the similar results to Poland in terms of relations between the selected variables. In case of UK, for both Positive and Negative Sentiment there were the keywords omitted due to collinearity liberty and family, as well as ad types: programme and article (in mass media). For Spain, the keyword Europe was omitted due to collinearity for both Positive and Negative Sentiment.

As for Poland, in case for positive sentiment, AdMobili coefficient states that mobilization ads are less likely to be perceived positively, it decreases by a factor of 0.8197. Ads presenting candidates are more likely to be perceived positively, whereas those presenting programme and especially those from media are far less likely to be perceived positively. The negative sign of the coefficient indicates a negative relationship between ads presenting programme or those using traditional media coverage and the likelihood of a positive sentiment. Keywords liberty and country are more likely to be perceived positively, with the liberty being the one of the most likelihood of a positive sentiment. On the contrary, keyword Europe is the one with the highest negative coefficient that determines the highest probability of not being perceived positively. The odds ratio (OR) shows the decrease by a factor of 3.5. The other parameters present no significant relations in case of positive sentiment upon the ad type and content (keywords).

Table 4.

Odds Ratios for Poland, Spain and UK

Negative vs Neutral-Poland	Coefficient	OR	Positive vs Neutral-Poland	Coefficient	OR
admobili	-1.5089	0.221153113	admobili	-0.1987	0.819795795
adcandid	0.29221	1.339384259	adcandid	0.53377	1.705349372
adprogram	-17.1904	3.42219E-08	adprogram	-0.72304	0.485274776
adarticle	2.1805	8.850730518	adarticle	-2.14135	0.117496116
keymobil	-3.1491	0.042890711	keymobil	0.73566	2.086858865
keyliberty	17.0222	24697189.26	keyliberty	20.1444	560533742.8
keysocial	-5.1852	0.005598817	keysocial	0.699129	2.011999492
keyfamily	3.999**	54.54357917	keyfamily	-1.1111	0.329196646
keyeurope	-37.3352	6.10279E-17	keyeurope	-17.16307	3.51701E-08
keycountry	-2.9372	0.05301396	keycountry	1.67598	5.344029733

Negative vs Neutral-Spain	Coefficient	OR	Positive vs Neutral Spain	Coefficient	OR
admobil	1.140418	3.128075628	admobil	-16.65074	5.87051E-08
adcandid	0.9123658	2.490206902	adcandid	-33.23837	3.67079E-15
adprogram	-0.1984856	0.819971578	adprogram	17.77061	52200884.65
adarticle	3.920574	50.42938294	adarticle	-78.30372	9.84298E-35
keymobil	-0.1947959	0.823002616	keymobil	17.95137	62543320.34
keyliberty	14.9629	3149959.016	keyliberty	79.80764	4.57107E+34
keysocial	2.194944	8.979498191	keysocial	-15.70427	1.51259E-07
keyfamily	-1.200669	0.30099278	keyfamily	1.198238	3.314272028
keyeurope	-	-	keyeurope	0	0
keycountry	1.700832	5.478503611	keycountry	-32.28059	9.56572E-15

Negative vs Neutral UK	Coefficient	OR	Positive vs Neutral UK	Coefficient	OR
admobil	30.29076	1.42926E+13	admobil	13.51563	740906.7108
adcandid	-0.6555178	0.519173165	adcandid	-2.125011	0.119431655
adprogram	-	-	adprogram	-	-
adarticle	-	-	adarticle	-	-
keymobil	-16.1765	9.43268E-08	keymobil	-17.3397	2.94757E-08
keyliberty	-	-	keyliberty	-	-
keysocial	16.12282	10047355.26	keysocial	17.81842	54757231.49
keyfamily	-	-	keyfamily	-	-
keyeurope	1.842656	6.313284095	keyeurope	1.802871	6.067040959
keycountry	0.0786018	1.081773474	keycountry	0.9036722	2.46865187

Source: Own elaboration (2024).

The negative sign of the coefficient indicates a negative relationship between ad type programme and ad type of mobilisation and the likelihood of a negative sentiment. This means that as the ad is more oriented to the mobilization of votes or more focused on presenting the programme, the likelihood of an ad being perceived negatively decreases.

Among the keywords, the ads containing the words liberty and family are much more likely to be perceived negatively - the odds of an ad being perceived as negative (as opposed to neutral) decrease by a factor of 24697189.26 and 54.54357917, respectively. Keyword Family - keyfamily, is only significant at p-level 0.05. Statistical hypothesis tests are significant at the 5% level, so it is able to conclude that there is an impact.

Interpretation of Odds Ratio in Spain for ad type and different keywords (Negative vs. Neutral Sentiment), the coefficient for ad type presenting programme in the comparison of Negative vs. Neutral sentiment likelihood is -0.1984856, with an odds ratio (OR) of 0.819971578. It means that the ads containing the political programme decreases the likelihood of a negative sentiment. Odds Ratio (OR) of 0.819971578 means that including ads with the electoral programme to the strategy, the odds of an ad being perceived as negative (as opposed to neutral) decrease by a factor of 0.819971578, so more informative ads are associated with lower odds of an ad being perceived negatively compared to being perceived neutrally. The negative sign of the coefficient of Keywords oriented to mobilization and family indicates a

negative relationship between ads containing these type of contents and the likelihood of a negative sentiment. This means that as the ad includes more keywords related to vote mobilization or topic of family, the likelihood of an ad being perceived negatively decreases. The similar relations are observed in case of UK for the negative sentiments for ads type focused on candidate’s presentation and keywords oriented to vote mobilization (coefficient of -0.6555178 and -16.1765, respectively). As per Positive vs Neutral Sentiment, the ad programme type and ads containing keywords of vote mobilization are more likely to be perceived positively in Spain, whereas in UK campaign, ads mobilization type and keywords related to social and European issues are presenting more likelihood to be perceived positively.

Table 5.

Marginal effects for keyword Family for Poland

Variable and category	Marginal effect dx/dy
Keyfamily	
Pr(sentiment=NEGATIVE)	0.3222
Pr(sentiment=NEUTRAL)	-0.0194
Pr(sentiment=POSITIVE)	-0.3029

Source: Own elaboration (2024).

Marginal Effects Interpretation for Poland is the only model presenting significant parameters for Keywords Family included in the ads’ content. As ad includes the texts related to the family in campaign, increases the probability of the ad being perceived as neutral. Conversely, the probabilities of the ad being perceived as positive or negative increase. This indicates that ads in Polish campaigns that put the family oriented keywords in their contents are more likely to evoke a stronger emotional response (either positive or negative) rather than a neutral one, see Figure 6.

4. Discussion

In summary, the advanced modelling demonstrated that political ads available in Facebook library are rather similar to online campaigns of the low engagement products, thus proving the politics on social media is rather commodity than the public sphere issue and the voter is treated as the consumer. It does not affect meaningfully the sentiment in audience. The political strategies of the analysed ads shows that rather building an awareness of the party and ROI seem to be more important orientation in the analysed campaigns in Social Media, comparing to information, transparency, content and values. Political ads are simple political product and used as such – advertising for low engagement product, forcing mobilisation for vote and aimed on gaining awareness and overall national reach among the voters treated as the consumers of political products. Those responsible for the political ads as used in the analysed campaigns demonstrate in general no interest in values, contents or programmes which helps to avoid the negative sentiment that might cause the rejection of the ad by the audience. The formal factors such as duration of the ads alongside of demographic factors of audience plays more significant role than ads type or keywords in raising negative or positive sentiment in audience. It resembles rather the advertising strategies for consumer goods rather than aiming for political communication rules in cyber democracy. As previously stressed out by Vaidhyanathan (2022), the commercial purpose of Facebook ads understood as ‘‘efficiency, effectiveness and responsiveness’’, with the advantage of instant feedback, tailoring capacity

and customisation that improves the outcome of the campaign, shall not necessarily be accepted as the political communication rule, especially in terms of electoral campaigns

The campaigns are not informative or focused on providing trustworthy information for public debate. Their objective is vote mobilisation primarily. Similarly, the mass media or traditional media mentions are not applied in the campaigns, except few cases in Poland, raising rather negative sentiment. Therefore, information, trust or competence are becoming secondary aspects of ads design, giving the priority to the effectiveness of political advertising which is mobilisation of the voters.

Limited transparency is rather the rule content-wise. With the wide diversity of topics covered by Polish campaigns, however rising rather negative sentiment, UK is exception here when including Brexit or regional matters. Spanish campaigns on the other hand apply keywords oriented towards social issues to ads' content, hence with no significant impact on positive sentiment in audience. Parties do not dare talk about significant topics as it raises a negative sentiment as shown in the sentiment analysis against the keywords variables. Liberty, family, Europe, economy- is limited in content and keywords, being irrelevant for sentiment analysis in UK and Spain. Contents do not influence the public and keywords are not so important in impacting sentiment (meaning values). Country -oriented and mentions of the regions are not significant in parliamentary campaigns in these three countries.

5. Conclusions

In general terms, the descriptive and model phase of study shows poor transparency in terms of financing of campaigns in Poland and limited public profiles, while a lot of campaigns were financed by private sponsors. Meanwhile, trust appears only in case of UK campaigns, being mentioned few times in Spanish campaigns' ads. However, neither trust or transparency are not issues in political ads in the analysed campaigns as they not appear in most popular keywords in the ads published in the examined countries. For example, in Spain, the limited transparency shows the coalitions' and parties' mixed financing, including y media and NGOs. Regarding limited public profiles, the left wing parties are more transparent than right wing parties in case of financing/public profiles in Poland and Spain with higher levels of transparency in terms of public profiles and financing sources in UK. The analysed ads regardless to its type that as shown in the study were limited to present candidates (mainly Poland) or parties (in Spain and UK) rather than programmes in all three countries with the main objective of the vote mobilisation.

The study of the electoral ads and their characteristics available in the Facebook ads library by modelling the sentiment have few important implications for political strategy in electoral campaigns on Social Media. As observed in case of four campaigns from UK, Spain and Poland, first of all, the formal characteristics of ads and the demographics of audience have no impact on sentiment in both Spain and UK electoral campaigns. In Poland, only ads duration has got a significant impact: the longer ads tend to reduce neutral perceptions and increase both positive and negative perceptions. However, also in Polish campaigns, the ads visibility of the ads in many or single regions alike cause both that location regardless to number of regions is more likely to be perceived positively. The analysis concludes that male gender audience is more likely to perceive ads negatively, while women are more likely to perceive them positively. These marginal effects highlight how different demographic and contextual factors significantly influence the perception of electoral campaign ads in Poland: ads duration slightly increases the likelihood of a positive sentiment, similarly the age above 44 years while the gender or ads location in any case cause that ads are more likely to be perceived positively. In case of ads type and keywords content, the impact of those characteristics will vary

depending on the country. The campaign strategy will be different in each country and thus having different effect on audience in terms of sentiment response, bearing in mind that will result in no significant relations in some cases in Poland or in case of Spain or UK, few keywords and ads types are omitted due to colinearity.

In general, when analysing the campaigns available in Facebook's Ads Library, the research releases its poor functioning: it was rather difficult and laborious to access the ads and information provided, and especially to keep track on them. The register has to be done manually for each ad as they can be accessed individually only, one by one. The access to information on ad demands few clics in each ad separately and is not displayed in one transparent summary. It requires some work and effort to access the basic information on each ad hence the accountability of the campaign is rather limited in terms of accessibility and visibility.

The usefulness of the modelling of the ads and its influence on the audience depending of the characteristics has been proved, however there is a need to repeat the analysis and apply the models in other elections and countries. Although some variables have demonstrated no significant impact on sentiment, the Facebook library offers more factors to be taken into account in assessing the real influence the electoral campaigns have on audiences in Social Media. The further work shall expand the analysis to include other descriptive characteristics. Furthermore, the same variables may prove to have a significant impact in other campaigns and countries. In these terms, the Facebook library, in spite of it discouraging interface that hinders the transparent overview of the political campaigns, provide useful information to be used in order to assess the campaigns, describe their strategies and mechanisms in details and determine their real influence on audience attitudes. Therefore, Facebook Ads Library can be considered a useful contribution to the overall transparency of political campaigns in Meta's social platforms.

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AUTORA:

Emilia Smolak Lozano:
Universidad de Málaga.

Profesora e investigadora en el Departamento de Comunicación Audiovisual y Publicidad, autora de más de 60 publicaciones sobre comunicación política, comunicación digital, evaluación y medición en comunicación, y análisis semántico de la comunicación digital en Social Media. Ponente en más de 70 congresos internacionales, en España y en el extranjero. Autora de cuatro libros sobre publicidad y relaciones públicas, entre ellas acerca de comunicación digital de los *think tanks*, audiovisual branding y gestión de campañas en los entornos digitales. Profesora visitante en las universidades de Alemania, Polonia y Reino Unido. Docente y autora de cursos sobre *podcasting*, *brandmedia storytelling* o transformación digital. Investigadora en 10 proyectos de investigación con financiación pública y europea de comunicación política y de género.

esmolaklozano@uma.es

Índice H: 5

Orcid ID: <https://orcid.org/0000-0001-8193-8786>

Scopus ID: <https://www.scopus.com/authid/detail.uri?authorId=55753322100>

Google Scholar: <https://scholar.google.com/citations?user=QVx7DXUAAAAJ&hl=pl>