

FROM LIKES TO CHANGE: ASSESSING THE IMPACT OF CITIZEN ENGAGEMENT ON THE EUROPEAN COMMISSION'S SOCIAL MEDIA PLATFORMS

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Abstract

Introduction: The rise of social media has changed public institution communication, increasing dialogue with citizens and presenting challenges like privacy and misinformation.

Aims/Objectives: To study how emotional resonance in communications from the European Commission on social media affects public engagement. **Methodology:** Analysis of the Commission's social media data (Feb 2019 - Apr 2023) using Fanpagekarma, evaluating participation metrics and sentiments with R. **Results:** Different emotional tones

on platforms impact engagement; both positive and negative emotions correlate with increased interaction. **Discussion:** Emotional resonance enhances engagement, varying according to the platform, indicating the need for specific communication strategies. **Conclusions:** Emotional resonance and adaptation to platform norms are key in public engagement. Understanding these dynamics improves communication between the European Commission and the public.

Keywords: social media, social networking sites, public administration, emotions, engagement.

DE LOS ME GUSTA AL CAMBIO: EVALUACIÓN DEL IMPACTO DEL COMPROMISO CIUDADANO EN LAS PLATAFORMAS DE REDES SOCIALES DE LA COMISIÓN EUROPEA

Resumen

Introducción: El auge de las redes sociales ha cambiado la comunicación de instituciones públicas, aumentando el diálogo con ciudadanos y presentando retos como privacidad y desinformación. **Objetivos:** Estudiar cómo la resonancia emocional en comunicaciones de la Comisión Europea en redes sociales afecta la participación pública. **Metodología:** Análisis de datos de redes sociales de la Comisión (Feb 2019 - Abr 2023) usando Fanpagekarma, evaluando métricas de participación y sentimientos con R. **Resultados:** Diferentes tonos emocionales en plataformas impactan en la participación; emociones positivas y negativas correlacionan con mayor interacción. **Discusión:** La resonancia emocional aumenta la participación, variando según la plataforma, lo que indica la necesidad de estrategias de comunicación específicas. **Conclusiones:** La resonancia emocional y adaptación a normas de plataformas son clave en la participación pública. Comprender estas dinámicas mejora la comunicación entre la Comisión Europea y el público.

Palabras clave: redes sociales, administración pública, emociones, compromiso.

1. Introduction

In recent years, it has been observed that the ascendance of social media platforms precipitated noteworthy transformations in the communication strategies employed by institutions, inclusive of public organizations, to engage with their respective audiences (Capriotti & Zeler, 2023). Consequently, the significance of citizen participation in the process of communication mediated through social media platforms, gained escalated acknowledgment. This participatory process transcends the conventional one-directional dissemination of information from public bodies to citizens (Tasențe, 2014, p. 75). Rather, it encapsulates an interactive discourse, fostering a two-way dialogue between the engaged parties. Therefore, it is valuable to reassess how emotions are expressed, especially in the context of unfulfilled expectations in platform design. With the varying demographics and cultural practices of users across platforms like Twitter and Facebook, each catering to distinct audiences and influenced by their specific content moderation policies, there arises a complex dynamic in how emotional responses and engagement patterns manifest. Emotional reactions to provided content can be seen as a response to the absence of rational conversation. Two scenarios may arise: firstly, the lack of a response may promote the expression of potentially negative emotional reactions; secondly, the responses themselves may be viewed as a substitute for actual dialogue.

The notion of engagement within the context of social media has been the subject of comprehensive scholarly investigation in recent years, with researchers delving into diverse facets of this phenomenon. One such study, conducted by Dolan *et al.* (2016), scrutinized social media engagement behavior through the theoretical lens of the uses and gratifications paradigm, emphasizing the motivations and benefits users acquire from their interaction with social media platforms. Concurrently, an academic study undertaken by Dragseth (2020) probed the application of social media for fostering engagement among students, specifically within the field of political science education.

Another important aspect of engagement in social media pertains to its integral role in activation campaigns directed towards consumers. Mirbagheri and Najmi (2019) conceptualized and developed a scale to measure consumers' engagement with social media activation campaigns. Complementarily, a comprehensive analysis conducted by Smith and Gallicano (2015) scrutinized public engagement with organizations via social media channels, highlighting the importance of two-way communication between public institutions and citizens. The distinctive role of platform type concerning engagement with

social media and its corresponding advertising was examined meticulously by Voorveld *et al.* (2018). This research established that the magnitude of engagement diverges significantly across distinct social media platforms.

In addition to understanding the multifaceted dimensions of engagement within social media, it is of crucial importance to acknowledge the significance of citizen participation in the realm of public institutions. Citizen engagement is instrumental in guaranteeing transparency and accountability within public decision-making procedures. Furthermore, the proactive engagement of citizens can facilitate the formulation of efficacious policies and initiatives that are more adept at meeting the requirements of the broader community. Moreover, the importance of citizen engagement in the process of communication through social media cannot be overstated. Through social media, public institutions can engage in an interactive dialogue with citizens, build trust, and develop more effective policies and programs. As such, further research, and exploration of the concept of engagement in social media is critical for ensuring that public institutions continue to effectively communicate with and serve the needs of their communities (Heath, 2018).

Citizen participation via social media platforms can further contribute to the empowerment of individuals and collective entities, effectively granting them a decisive voice in public decision-making processes and providing a mechanism for holding public institutions accountable for their actions. This empowerment strategy can potentially engender the construction of robust, resilient communities possessing enhanced capacities to navigate both challenges and opportunities.

It is also important to note that while social media has the potential to be a powerful tool for citizen engagement, there are also challenges and risks associated with its use. These include issues related to privacy, security, and the spread of misinformation and disinformation. As such, public institutions must be mindful of these risks and take steps to mitigate them, while also leveraging the power of social media to engage with citizens in a meaningful way.

Overall, the rise of social media has transformed the way public institutions communicate with citizens, placing a greater emphasis on engagement and two-way communication. Understanding the various aspects of engagement in social media is critical for public institutions to effectively communicate with and serve the needs of their communities. By leveraging the power of social media to engage with citizens, public institutions can build

trust, empower individuals and groups, and develop more effective policies and programs that effectively address the needs of the community.

This study aims to investigate the impact of emotional resonance in the communication of public institutions, with a particular focus on the European Commission, on audience engagement across various social media platforms, including Facebook, Instagram, Twitter, and YouTube. Emotional resonance, as evaluated through the R *SentimentAnalysis* package (Proelochs & Feuerriegel, 2021), refers to the ability of certain words within a message to evoke strong emotional responses, either positive or negative, depending on the context in which they are used. This assessment is conducted using existing dictionaries, such as *Harvard IV* or finance-specific ones, which rate keywords on a scale from -1 to +1 based on their emotional impact. The research will investigate how the emotional attributes of a message affect the level of public interaction. It will test the hypothesis that messages with greater emotional resonance led to higher engagement rates. Furthermore, the study aims to assess the potential influence or moderation of emotional resonance on audience engagement across various social media platforms. By conducting a thorough analysis of user interactions and sentiments on these platforms, the research intends to provide valuable insights into how public institutions can utilize social media to effectively engage and inform the public.

2. Literature review

In examining the influence of citizen engagement on the social media platforms of the European Commission, it is imperative to discern and elucidate the fundamental concepts that underlie this research. The concepts in question encompass engagement, social media platforms, and sentiment analysis, constituting the foundational pillars of numerous scholarly discussions centered around these topics.

Engagement, defined as the active interaction of users with digital content, is a fundamental element of any effective social media strategy. As Van-Dijck and Poell (2015) suggest, in the platform society, this interaction is shaped by social media's commercial mechanisms, transforming both public and private communication. The political economy of the media landscape is thus reshaped, necessitating a combination of historical-cultural, socio-technical, and techno-commercial perspectives to understand these changes. It encapsulates various forms of participation, from comments and shares to likes and views (Mirbagheri & Najmi, 2019). Smith and Gallicano (2015) argue that engagement helps in establishing

profound relationships with users, and it can vary according to the type of platform (Voorveld *et al.*, 2018). Dahlgren (2012) observes that social media can have negative effects on alternative politics due to the prominence of 'solo sphere' participation. The concept has found applicability in numerous contexts, including public health (Heldman *et al.*, 2013), student learning (Dragseth, 2020), and corporate social responsibility (Doncel-Martín *et al.*, 2023).

The significance of engagement reaches a higher dimension in the political and public sphere. Fuchs (2015) highlights the transformative role of social media in the public sphere, where these platforms are not merely intermediaries but active agents in shaping public discourse and emotional expression. With social media platforms becoming an integral part of contemporary political communication (Flew & Iosifidis, 2020; Krzyżanowski, 2020), citizen engagement has become paramount, as seen in the activities of European Union (EU) agencies (Müller, 2022). This is echoed by Boboc *et al.* (2015), who stress that while digital social networks do not revolutionize practices, they enable the extension of existing practices, particularly in collaborative and communication aspects. There is a myriad of ways in which citizens engage with politics on social media, from commenting on posts to sharing and liking content (De-Wilde *et al.*, 2022). This interaction has been correlated with a variety of outcomes, including voting behaviour (Marquart *et al.*, 2020) and vaccination attitudes (Mascherini & Nivakoski, 2022).

Simultaneously, social media platforms are becoming recognized as powerful tools for promoting and managing engagement. This dual functionality is exemplified through the case study of the European Commission's endeavors in Romania. (Rus *et al.*, 2021). Recognizing the potential of these platforms to facilitate citizen engagement, EU institutions have taken steps to optimize their use, implementing various strategies (Bene *et al.*, 2022; Kanol & Nat, 2021; Özdemir & Rauh, 2022).

When evaluating the influence of citizen engagement on the social media platforms of the European Union, Tasençe (2023) utilizes a variety of methodologies, including sentiment analysis. This approach entails a systematic process of identifying and categorizing the emotional undertones conveyed by textual expressions, with the objective of assessing public sentiment, attitudes, and emotions towards specific subjects (Wei *et al.*, 2021). It has been applied in diverse contexts, such as analyzing the emotional distribution in EU smart city

communication (Kowalik, 2021) and exploring public opinions on climate change policy (Wei *et al.*, 2021).

The European Union's social media landscape is remarkably complex, as shown by numerous studies. These platforms can simultaneously facilitate positive engagement, such as public service promotion (Hancu-Budui *et al.*, 2020), and breed negative phenomena like hate speech (Doncel-Martín *et al.*, 2023) and digital vigilantism (Allen & Van-Zyl, 2020). Furthermore, the influence of these platforms is shaped by broader societal and political developments, such as migration and smuggling across virtual borders (Bankston, 2021).

In conclusion, comprehending the impact of citizen engagement on the social media platforms of the European Commission encompasses a multifaceted matter. These platforms offer opportunities for substantive citizen engagement and public communication, yet their influence is contingent upon an intricate interplay of individual behavior, institutional strategy, societal trends, and technological advancements. This intricacy necessitates a nuanced comprehension of each constituent element and their collective contributions to shaping the landscape of citizen engagement within the context of the European Commission's social media platforms. Consequently, it calls upon researchers, policymakers, and practitioners to continuously explore this evolving domain to maximize the advantages of citizen engagement while mitigating potential drawbacks.

3. The present study

Grounded in the aforementioned theoretical framework, the primary objective of the current research endeavour was to examine the extent of public engagement manifested on diverse official social media platforms employed by the European Commission. Specifically, this investigation encompassed platforms such as Facebook, Instagram, Twitter, and YouTube. Furthermore, the study sought to analyse and juxtapose the discernible patterns, trends, and distinctive attributes of online user interactions and responses observed within these platforms. In order to structure the inquiry, the research questions (RQs) that guided this investigation were as follows:

- *RQ₁*. How is the communication with emotional resonance associated with higher public engagement levels?
- *RQ₂*. Do social media platforms influence the emotional resonance on public engagement?
- *RQ₃*. Do social media platforms moderate the effect of emotional resonance on public engagement?

To answer these questions, we assumed the following:

- H_1 : Communications with emotional resonance are associated with higher public engagement levels.
- H_2 : Social media platform influences the emotional resonance on public engagement.
- H_3 : The effect of emotional resonance on public engagement is moderated by the social media platform utilized.

The novelty of our study lies in the fact that we have systematically compared and contrasted user engagement and emotional resonance across multiple social media platforms utilized by the European Commission. While previous researches (Tasente *et al.* 2023; Tasente *et al.*, 2024; Tasente *et al.*, 2024) have typically focused on the impact of citizen engagement within a single social media platform, our new comprehensive cross-platform analysis makes this study unique.

Within this context, we have pursued an integrated approach to comprehending the potential influence of emotional resonance on the levels of public engagement observed within these platforms. Furthermore, our investigation encompasses an exploration of the moderating influence exerted by the underlying social media platform on the impact of emotional resonance, a novel aspect that has not been thoroughly explored in prior research.

The pioneering methodology implemented in this research allowed us to draw robust conclusions concerning the intricate interplay between communication strategy, emotional resonance, selection of platform, and public engagement. Consequently, our research has not only provided critical understanding of the modalities of citizen engagement on the social media platforms employed by the European Commission, but also proposed an advanced paradigm for comprehending how such engagement can be effectively harnessed and optimized for public outreach and policymaking.

Ultimately, this study has expanded the current discourse in the field of digital communication and citizen engagement and opened up new avenues for future research on optimizing communication strategies in a multi-platform social media environment.

4. Method

4.1. Procedure used for data gathering

We used the Fanpagekarma, a prevalent tool for conducting analytics and monitoring on social media platforms to extract data (24,917 posts) for the official Facebook (3,380 posts), Twitter (14,944 posts), Instagram (3,183 posts), and YouTube (3,411 posts) channels of the European Commission. The data included post ID, message content, post type, postdate, number of likes, comments, shares, and the rounded figure of followers for each post made by the European Commission, in the period from Feb 2019 to Apr 2023.

The engagement rate metric is commonly employed to gauge the extent of audience interaction with a brand or organization on social media platforms, and total number of reactions (comprising likes, comments, and shares) were calculated, and divided by the total follower count. A sentiment analysis method was used on engagement rate to reveal the trends and a linear regression analysis was conducted to test the hypothesis.

5. Results

5.1. Overview of data analysis

We used R (Version 4.3.1; R Core Team, 2023) and the R-packages *boot* (Version 1.3.28.1; Davison & Hinkley, 1997), *caret* (Version 6.0.94; Max, 2008), *dplyr* (Version 1.1.3; Wickham *et al.*, 2023), *flextable* (Version 0.9.3; Gohel & Skintzos, 2023), *ggplot2* (Version 3.4.3; Wickham, 2016), *ggpubr* (Version 0.6.0; Kassambara, 2023a), *interactions* (Version 1.1.5; Long, 2019), *knitr* (Version 1.44; Xie, 2015), *lattice* (Version 0.21.8; Sarkar, 2008), *lm.beta* (Version 1.7.2; Behrendt, 2023), *lubridate* (Version 1.9.2; Grolemund & Wickham, 2011), *MASS* (Version 7.3.60; Venables & Ripley, 2002), *Matrix* (Version 1.6.1.1; Bates *et al.*, 2023), *misty* (Version 0.5.3; Yanagida, 2023), *mitools* (Version 2.4; Lumley, 2019), *mvtnorm* (Version 1.2.3; Genz & Bretz, 2009), *naniar* (Version 1.0.0; Tierney & Cook, 2023), *NLP* (Version 0.2.1; Hornik, 2020), *nortest* (Version 1.0.4; Gross & Ligges, 2015), *papaja* (Version 0.1.1.9001; Aust & Barth, 2021), *psych* (Version 2.3.9; Revelle, 2023), *readxl* (Version 1.4.3; Wickham & Bryan, 2023), *relaimpo* (Version 2.2.6; Grömping, 2006), *rstatix* (Version 0.7.2; Kassambara, 2023b), *sasLM* (Version 0.9.12; Bae, 2023), *SentimentAnalysis* (Version 1.3.5; Proellocks & Feuerriegel, 2021), *survey* (Version 4.2.1; Lumley, 2004), *survival* (Version 3.5.5; Therneau & Grambsch, 2000), *tinylab* (Version

0.2.4; Barth, 2022), *tm* (Version 0.7.11; Feinerer *et al.*, 2008), and *writexl* (Version 1.4.2; Ooms, 2023) for all our analyses.

The initial assumptions assessment was performed by descriptive univariate analysis, data screening for outliers, and missing cases analysis, to verify univariate normality. An additional layer of sentiment analysis was carried out to provide a more comprehensive understanding. Lastly, a moderated linear regression model was used as the methodological tool for hypothesis testing.

5.2. Preliminary analysis

Some extreme high values were identified on Facebook engagement rate (values over .00484), Instagram engagement rate (values over .0215), Twitter engagement rate (values over .000696) and Youtube engagement rate (values over .000962) and replaced with missing values, however only 5.15 % scores were missing so we decided to remove entire cases.

Results suggested that all engagement rates were highly positively skewed and highly leptokurtic (see Tables 1 and 2; Figure 1 and 3) and the univariate normality assumption of the dependent variable was not met.

Table 1. Descriptive analysis. Presence of extreme outliers

Variables	N	Mean	SD	Media n	Min	Max	Skew (SE)	Kurt (SE)
Facebook	3371	0.0015	0.0019	0.0010	0	0.0404	6.4933 (0.042)	81.9762 (0.084)
Instagram	3182	0.0067	0.0069	0.0048	0	0.1589	6.4272 (0.043)	93.0693 (0.087)
Twitter	1494 4	0.0002	0.0006	0.0001	0	0.0297	21.1298 (0.02)	837.7101 (0.04)
Youtube	3411	0.0007	0.0130	0.0002	0	0.7420	55.0118 (0.042)	3128.44 (0.084)

Source: Own elaboration

Table 2. Descriptive analysis. Extreme outliers removed

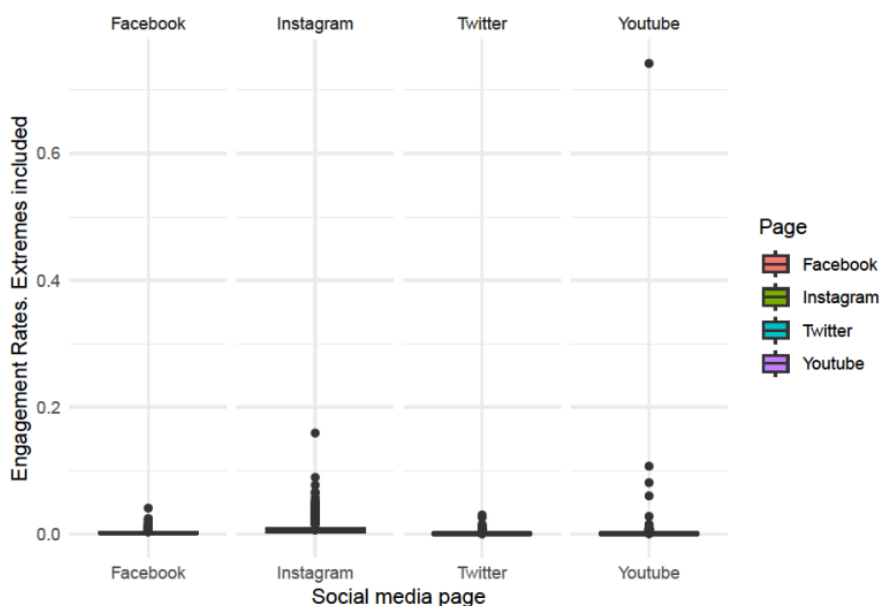
Variables	N	Mean	SD	Median	Min	Max	Skew (SE)	Kurt (SE)
Facebook	3241	0.0012	0.0009	0.0009	0	0.0048	1.4594 (0.043)	1.8452 (0.086)
Instagram	3089	0.0059	0.0041	0.0047	0	0.0214	1.3995 (0.044)	1.7972 (0.088)
Twitter	1413	0.0001	0.0001	0.0001	0	0.0007	1.488 (0.021)	2.1633 (0.041)
Youtube	3164	0.0002	0.0002	0.0001	0	0.0010	1.4692 (0.044)	1.4995 (0.087)

Source: Own elaboration

5.3. Sentiment analysis

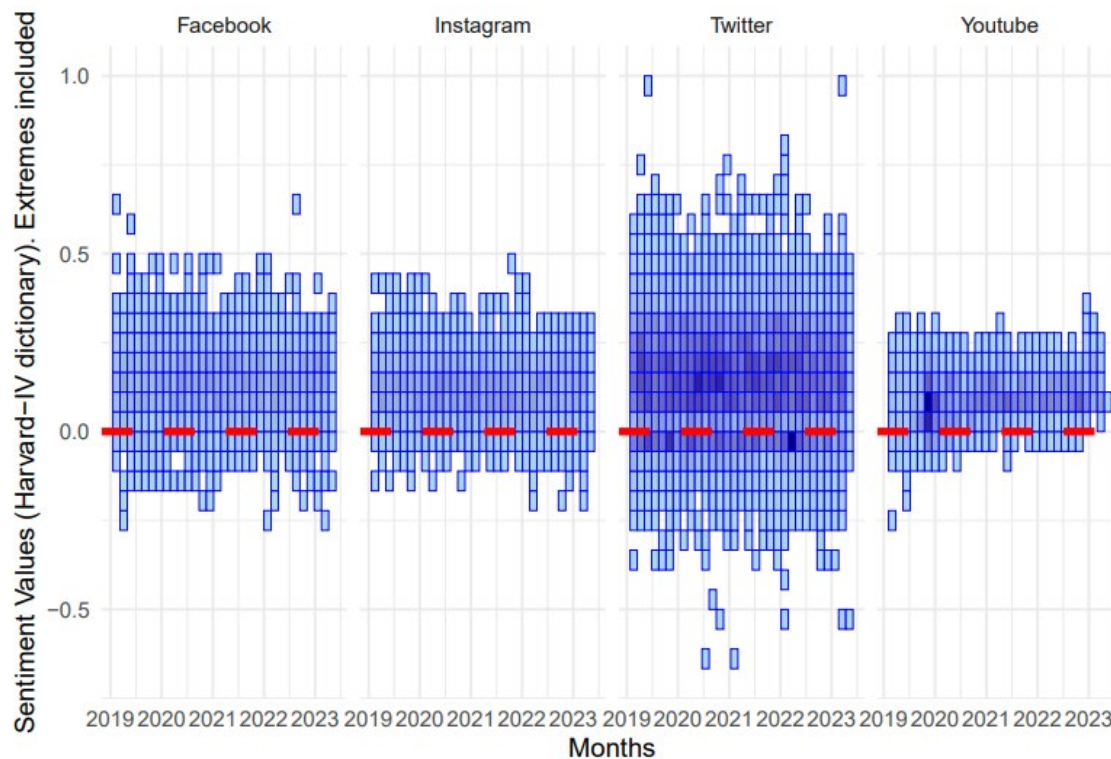
An exhaustive sentiment analysis was conducted on the dataset, considering scenarios with and without extreme outliers, as illustrated in Figures 2 and 4. This analysis suggested distinctive tonal variations employed by the European Commission across different social media platforms.

Figure 1. Boxplot of engagement rates on social media channels. Extremes included.



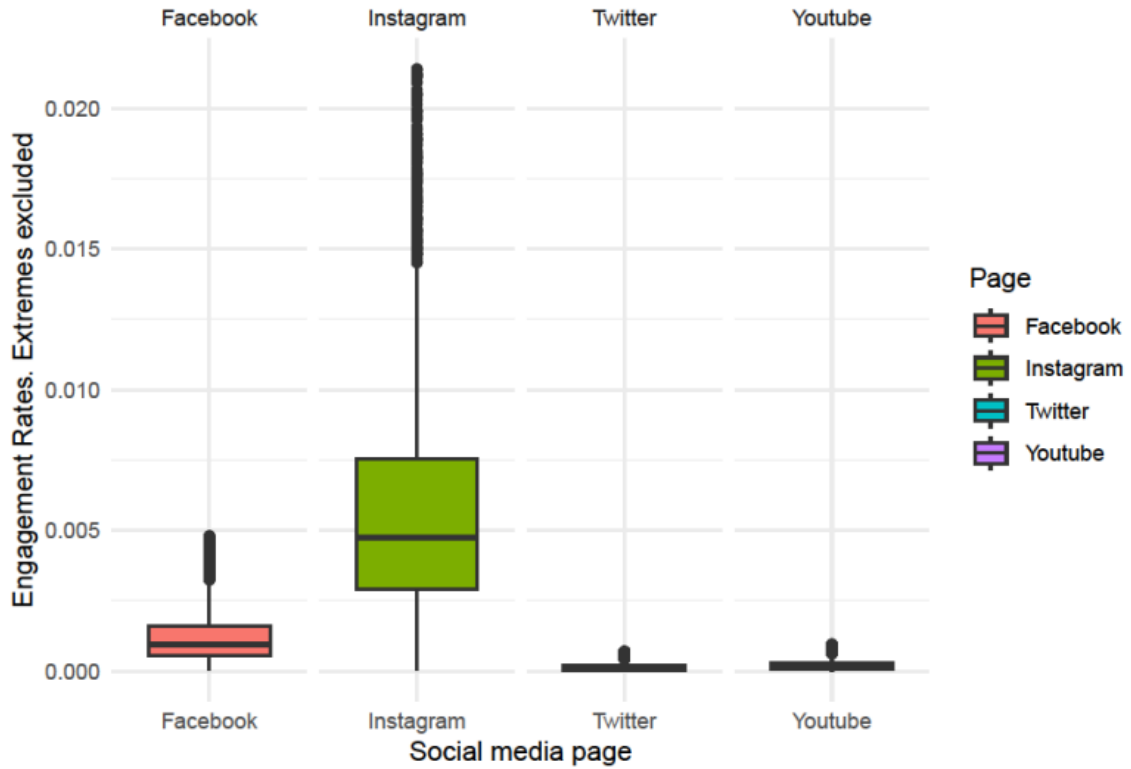
Source: Own elaboration

Figure 2. Sentiment analysis chart on social media channels. Extremes included.



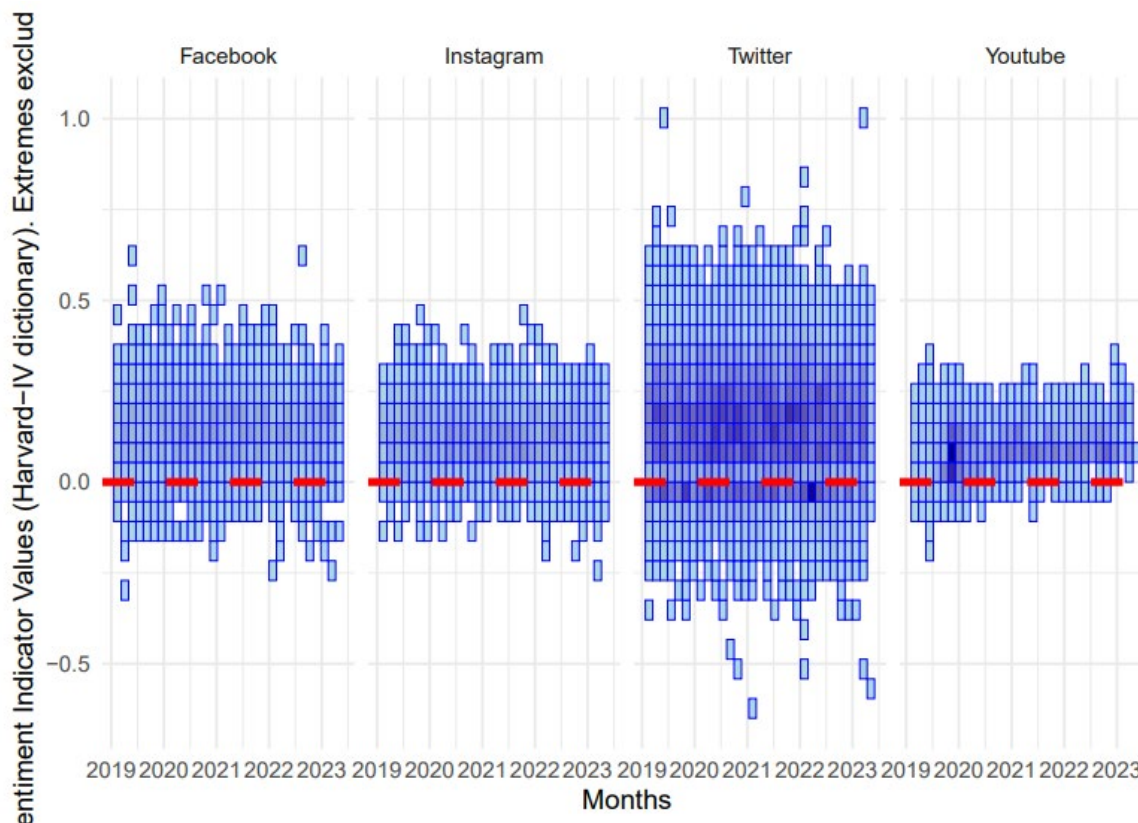
Source: Own elaboration

Figure 3. Boxplot of engagement rates on social media channels. Extremes excluded.



Source: Own elaboration

Figure 4. Sentiment analysis chart on social media channels. Extremes excluded.



Source: Own elaboration

In the case of Facebook, the sentiment's indicator mean value was 0.14 (SD=0.10), showed a tendency to a positive tone (M=0.14, SD=0.10 with extreme outliers). The sentiment ranged between -0.27 and 0.63 (-0.27 and 0.65 with extreme outliers), the discourse with a negative connotation averaged at 0.08 (SD=0.06), while the discourse with a positive undertone demonstrated a mean of 0.22 (SD=0.09), thereby further substantiating a propensity for positivity (M=0.08, SD=0.06, respectively M=0.22, SD=0.09 with extreme outliers).

In contrast to Facebook, the sentiment indicator on Instagram averaged at 0.12, which points towards a mildly positive sentiment, with the spectrum extending from -0.22 and 0.46 (-0.22 and 0.46 with extreme outliers). The mean sentiment score for negatively perceived discourse was 0.07 (SD=0.05), and the positively perceived discourse showed an

average of ($M=0.07$, $SD=0.05$, respectively $M=0.20$, $SD=0.09$ with extreme outliers), once again suggesting a bend towards positive discourse on this platform.

Conversely, Twitter displayed a broader sentiment spectrum. Although the sentiment indicator mean was marginally higher than Facebook and Instagram at 0.15, it ranged from -0.62 and 1 (-0.67 and 1 with extreme outliers), implying a more diverse expression of sentiments. Negative discourse manifested an average of 0.07 ($SD=0.07$), identical to Instagram but more negative than Facebook. Interestingly, Twitter maintained the highest average score for positive discourse, at 0.22 ($SD=0.12$ with extreme outliers), equal to the positivity in Facebook and surpassing that on Instagram.

On YouTube, the sentiment indicator's mean value was observed to be the lowest amongst the evaluated platforms at 0.10, spanning from -0.19 and 0.34 (-0.23 and 0.34 with extreme outliers), thereby indicating a more tempered sentiment. Negative discourse on YouTube scored the lowest mean of 0.03 ($SD=0.03$), while positive discourse registered the minimum average of 0.13 ($SD=0.06$ with extreme outliers) compared to the other platforms.

In conclusion, despite a general inclination towards a slightly positive mean sentiment across all platforms, Twitter demonstrated the most substantial sentiment range, signifying the potential for both intensely negative and positive discourse. Instagram and Facebook depicted a modestly positive sentiment with less variability, while YouTube exhibited the most tempered sentiment range, with the lowest averages for both positive and negative discourse.

A linear regression model was fitted using 12446 cases from the purified dataset, values on engagement rate over .000929525 were removed because of extreme outliers and the normality of dependent variable was not met (Anderson-Darling test =680, $p < 0.001$).

The results suggested that the null hypothesis H_0 : *Communications with emotional resonance are not associated with higher public engagement levels* could be rejected ($F(2, 12441)=11.06$, $p < 0.001$) and the H_1 : *Communications with emotional resonance are associated with higher public engagement levels* was plausible, however the engagement levels was explained only by 0.16 % by the positive and negative resonance communications ($R^2=0.0016$, $RSR=0.0002$).

The positive ($B=0.00004$, $t=2.64$, $p = 0.008$, $\beta=0.02$) and negative ($B=0.00010$, $t=3.51$, $p < 0.001$, $\beta=0.03$) emotional resonance communications were both positively associated statistically significant with engagement rates, and high values on emotional resonance, positive or negative, were associated with high values on engagement rates. However, the relative predictors relevance showed that negative emotional resonance (62.09 %) contributed more on engagement rates explanation than positive emotional resonance (37.91 %).

Furthermore, we observed that the effect of social media platform was statistically significant on all platforms compared with Twitter and the null hypothesis H_0 : *The effect of emotional resonance on public engagement is not moderated by the social media platform* could be rejected. ($F(5, 12438)=1,240.04$, $p < 0.001$). Adding the new as categorical predictor increased the prediction power at 33.24 % from 0.16 % ($R^2=0.332$, $RSR=0.0002$), as the most relevant predictor was social network (99.61 %), followed by negative emotional resonance (0.28 %) and positive emotional resonance (0.12 %).

Negative emotional resonance was still statistically significant positively associated by public engagement ($B=0.00008$, $t=3.59$, $p < 0.001$, $\beta=0.03$), but not positive emotional resonance ($B=0.00001$, $t=1.02$, $p = 0.31$, $\beta=0.01$), and compared by Twitter, engagement rates increased statistically significant on Facebook ($B=0.00038$, $t=77.88$, $p < 0.001$, $\beta=0.58$), Instagram ($B=0.00049$, $t=11.07$, $p < 0.001$, $\beta=0.08$) and Youtube ($B=0.00005$, $t=12.82$, $p < 0.001$, $\beta=0.10$).

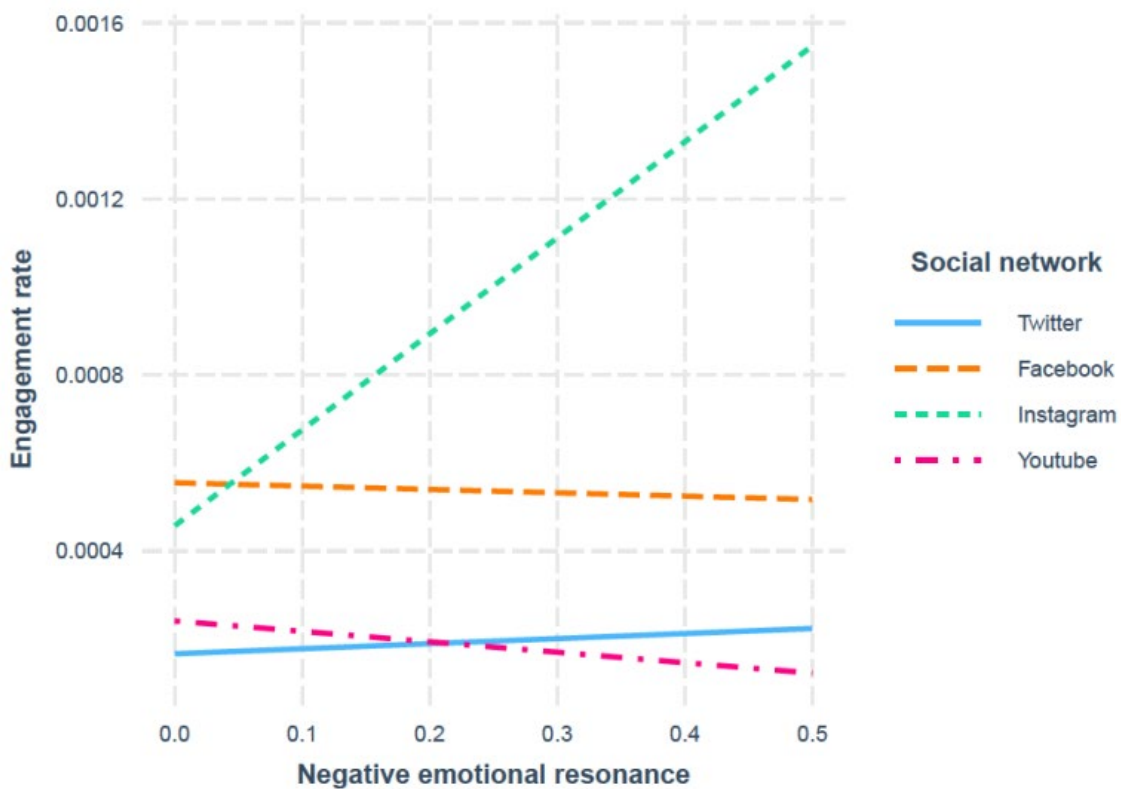
Finally, the hypothesis H_3 : *The effect of emotional resonance on public engagement is moderated by the social media platform utilized* was also plausible ($F(11, 12432)=568.57$, $p < 0.001$), the model with interaction terms explaining 33.41 % of engagement rate's variance ($R^2=0.334$, $RSR=0.0002$) and had a statistically significant better prediction power than the second model ($F(6, 12432)=6.34$, $p < 0.001$).

The main effect of negative emotional resonance emerged as statistically significant ($B=0.00012$, $t=4.62$, $p < 0.001$, $\beta=0.04$), contrasting with the main effect of positive emotional resonance which did not manifest the same significance ($B=-0.00000$, $t=-0.02$, $p = 0.981$, $\beta=0$). Both effects were observed to be moderated by the underlying social network. Furthermore, in comparison to the influence on Twitter, both Facebook and

YouTube exhibited statistically significant positive associations with the engagement rate, a phenomenon not witnessed with Instagram ($B=-0.00026$, $t=-1.39$, $p = 0.165$, $\beta=-0.04$).

The positive association between negative emotional resonance and engagement rate ($B=0.00012$, $t=4.62$, $p < 0.001$, $\beta=0.04$) was moderated statistically significant and negatively by Youtube ($B=-0.00035$, $t=-3.46$, $p < 0.001$, $\beta=-0.04$) and Facebook ($B=-0.00019$, $t=-2.24$, $p = 0.025$, $\beta=-0.03$), messages with negative emotional resonance posted on these social platforms reducing statistically significant the initial positive association. No moderation effect of Instagram was identified on association between negative emotional resonance and engagement rate ($B=0.00207$, $t=1.23$, $p = 0.218$, $\beta=0.02$) (see Figure 5)

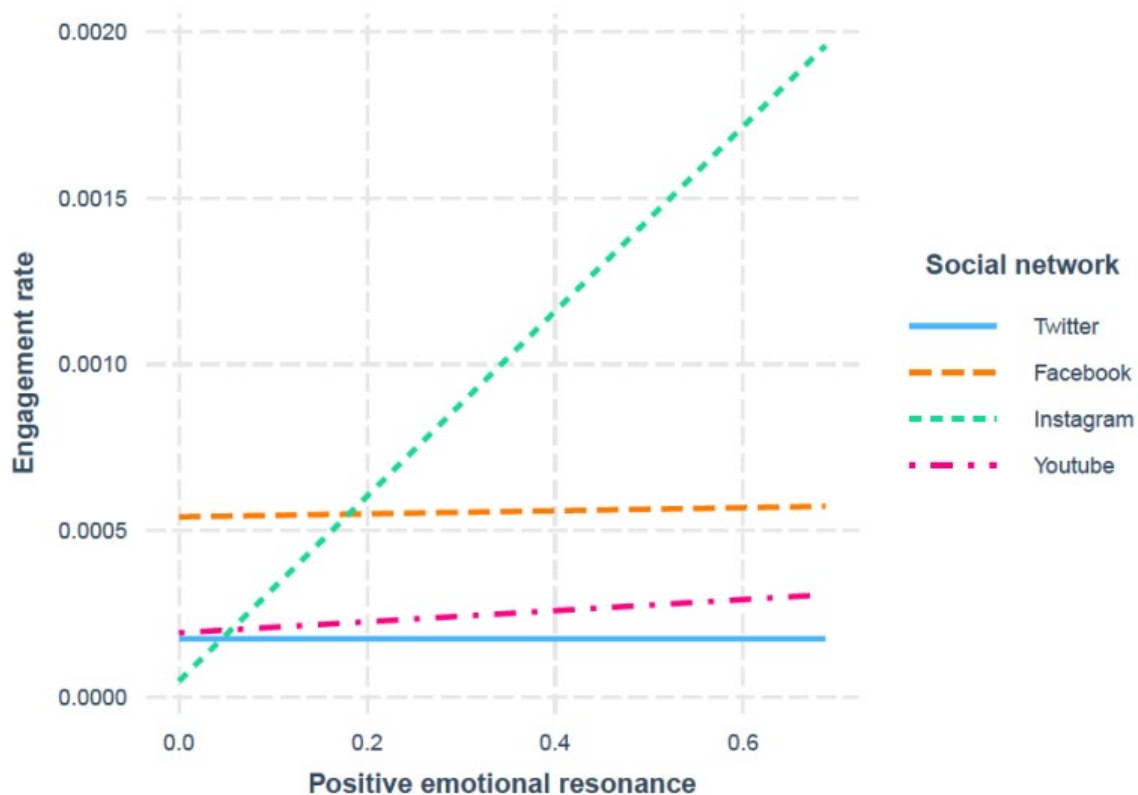
Figure 5. Interaction effect between social network and negative emotional resonance on engagement rate.



Source: Own elaboration

Between positive emotional resonance and engagement rate was no statistically significant association, ($B=-0.00000$, $t=-0.02$, $p = 0.981$, $\beta=0$), but our results showed a positive and statistically significant interaction effect with Instagram ($B=0.00278$, $t=3.74$, $p < 0.001$, $\beta=0.11$) and Youtube ($B=0.00017$, $t=2.97$, $p = 0.003$, $\beta=0.05$) (see Figure 6).

Figure 6. Interaction effect between social network and positive emotional resonance on engagement rate.



Source: Own elaboration

Contrasting with Twitter posts, communications imbued with positive emotional resonance exhibited a statistically significant increase in engagement rate when disseminated on Instagram or YouTube, with the effect manifesting more potently on Instagram relative to YouTube. Notably, no interaction effect correlating with positive emotional resonance was observed on the Facebook platform ($B=0.00005$, $t=0.89$, $p = 0.374$, $\beta=0.02$).

6. Discussion and conclusions

The present research undertook a detailed exploration to examine public engagement across an array of social media platforms implemented by the European Commission, with particular attention dedicated to the influence of emotional resonance within the disseminated content. The paramount role of social media within the communication strategies of public institutions has been extensively acknowledged (Smith & Gallicano, 2015), thus underscoring the exigency for a profound understanding of the intricacies of engagement dynamics.

Our collected data validates our primary hypothesis (H1), implying that communications imbued with emotional resonance, regardless of its positive or negative polarity, are associated with augmented public engagement. Nevertheless, the capacity of emotional resonance to illuminate engagement levels remains marginal (0.16 %). This finding is consistent with the complex nature of engagement behaviours outlined in existing academic discourse (Dolan *et al.*, 2016; Dragseth, 2020; Mirbagheri & Najmi, 2019), thereby underscoring the need for further scrutiny of additional factors influencing public engagement.

Furthermore, integrating insights from the literature on platform design and the interplay between culturally modeled user practices and socio-technical components (Van-Dijck & Poell, 2015) reinforces our understanding of how platform-specific features and norms can shape the way emotional content is received and interacted with by the public. This highlights the importance of considering not only the emotional content itself but also how it is framed within the specific context of each platform's design and user culture.

This investigation embarked on a quest to explore public engagement across various social media platforms utilized by the European Commission, with an emphasis on the impact of emotional resonance within content. The role of social media in public institutions' communication strategies is pivotal (Smith & Gallicano, 2015), necessitating a deep understanding of engagement dynamics.

The data supports our first hypothesis (H1), suggesting that communications rich in emotional resonance, whether of positive or negative valence, are associated with enhanced public engagement. However, the ability of emotional resonance to explain engagement levels is negligible (0.16 %). This corroborates the complex nature of engagement behaviors

expounded in scholarly literature (Dolan *et al.*, 2016; Dragseth, 2020; Mirbagheri & Najmi, 2019) and points towards the necessity for further examination of supplementary factors influencing public engagement.

Our secondary hypothesis (H2) suggested that the selection of a social media platform significantly impacts how emotional resonance affects public engagement. This is supported by our findings, which indicate that different platforms may be tailored to meet specific user expectations and behavioral norms. This alignment with prior research revealing platform-specific variations in engagement patterns (Voorveld *et al.*, 2018) underscores the necessity for the European Commission to recognize and adapt to these heterogeneous engagement patterns when designing their communication strategies.

The tertiary hypothesis (H3) posited that the chosen social media platform would moderate the impact of emotional resonance on public engagement. The acquired data affirmed this premise, demonstrating a statistically significant moderating effect. This indicates that the characteristics of individual platforms may shape the public's interaction with emotionally resonant messages, highlighting the need to tailor such communications to align with the norms specific to each platform.

In line with this, it becomes imperative to consider how the socio-technical environment of each platform, including algorithms, interface design, and user demographics, impacts the way emotional messages are processed and engaged with. As the European Commission strategizes its communication approach, integrating an understanding of these socio-technical dimensions could significantly enhance the effectiveness of their public engagement efforts.

This research is constrained by its reliance on secondary data obtained from platforms, suggesting that future studies could potentially reap benefits from primary data collection methodologies. Furthermore, this study did not associate Engagement Rate (ER) with significant simultaneous events, potentially overlooking the effect of emotional reactions provoked by these events. Future investigations could probe these associations, thereby enhancing our understanding of emotional impacts and expanding the existing body of knowledge in this domain.

The third hypothesis (H3) asserted that the social media platform would moderate the impact of emotional resonance on public engagement. Our data sustained this assumption, revealing a statistically significant moderating effect. This suggests that platforms may shape the way the public interacts with emotionally resonant messages, emphasizing the importance of customizing such communications to align with each platform's norms.

Notwithstanding the above findings, it is essential to recognize the inherent limitations of this study. The scope of this research was confined to the European Commission's use of four primary social media platforms. Future inquiries could potentially explore other platforms or public institutions to determine the universality of the observed patterns. Furthermore, while our focus lay primarily on emotional resonance, future research could delve into other aspects of communication, such as tone, complexity, and framing.

This research has also limitations due to the use of secondary data obtained from platforms, suggesting future studies could benefit from primary data collection. Additionally, this study did not associate Engagement Rate (ER) with significant concurrent events, potentially overlooking the impact of emotional reactions based on these events. Future studies could explore these associations to understand emotional impacts better, thus extending the existing knowledge in the field.

To conclude, this study underscores the imperative role of both emotional resonance and platform-specific norms in propelling public engagement on social media. The ability to establish an emotional connection with the audience, made possible through well-conceived and executed posts, emerges as a powerful tool for amplifying engagement levels. Such engagement transcends mere augmentation of reach or visibility of public institutions, such as the European Commission, and represents a conduit for cultivating a dynamic and interactive association between these institutions and the citizenry they serve.

Understanding these dynamics enables public institutions to tailor their communication strategies more effectively. By acknowledging the varying norms and expectations tied to different social media platforms, institutions can ensure that their messages resonate more strongly with their intended audiences, ultimately enhancing the impact and penetration of these messages. The choice of platform is not incidental but plays a significant role in how emotional resonance influences engagement, urging public institutions to be thoughtful and strategic in their selection and use of these platforms.

It is therefore essential for public institutions to engage in ongoing analysis and adaptation of their social media strategies, considering the evolving nature of platform design, user behaviors, and socio-technical trends. By doing so, they can ensure that their engagement strategies remain relevant and effective, fostering a more informed, engaged, and responsive citizenry.

Moreover, by refining their social media strategies based on these findings, public institutions have the opportunity to foster greater citizen engagement. Higher engagement can lead to increased public awareness, enhanced understanding, and potentially even behavioral change - critical goals for public communication strategies. It can also help public institutions gain insight into public sentiment, thus providing valuable feedback that can be used to improve policies and services.

In addition, the insights derived from this study can help public institutions increase the effectiveness of their public communication. By leveraging emotional resonance and considering platform-specific norms, these institutions can design messages that are more likely to engage citizens and generate a meaningful response. This has the potential to transform the landscape of public communication, making it a more interactive, responsive, and impactful domain.

Moreover, as public institutions navigate the evolving landscape of social media, they should consider the multifarious aspects of platform design, including algorithmic influences, user interface, and the cultural and behavioral norms of their target audiences. By doing so, they can better align their communication strategies with the unique dynamics of each platform, thereby optimizing their engagement with the public.

Despite its limitations, this study provides an invaluable point of departure for further research into the intricate world of social media engagement. It opens up avenues for exploring other influential factors and for deepening our understanding of the relationship between emotional resonance, platform norms, and public engagement. These insights could be crucial in helping public institutions navigate the complex dynamics of social media engagement, enhancing their ability to communicate effectively with the public, and ultimately, improving their service to society.

In conclusion, this study accentuates the paramount importance of emotional resonance and platform-specific norms in stimulating public engagement. The findings infer that the formation of an emotional bond with the audience through meticulously constructed posts may serve to magnify the levels of engagement. By understanding these dynamics, public institutions like the European Commission can refine their social media strategies, enhance citizen engagement, and bolster the efficacy of their public communication. Despite the limitations, the study provides a valuable starting point for future research into the multifaceted world of social media engagement.

This exploration underscores the complex interplay between emotional resonance, platform design, and user practices within social media engagement. For public institutions, this entails a continuous process of adapting to and integrating these factors into their communication strategies, to effectively engage and resonate with their diverse audiences. Ultimately, the mastery of this interplay is key to fostering a more informed, responsive, and engaged citizenry.

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Conflict of interest

The authors declare no conflicts of interest.

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Data Availability Statement

Restrictions apply to the availability of these data. Data was obtained from Fanpagekarma.com and are available at www.fanpagekarma.com with the permission of Fanpagekarma.com.

Bibliographic References

Allen, K., & Van-Zyl, I. (2020). *Digital vigilantism, social media and cyber criminality*. Enact/European Union.

Aust, F., & Barth, M. (2021). papaja: Prepare reproducible APA journal articles with R Markdown. *GITHUB*. <https://github.com/crsh/papaja>

Bae, K-S. (2023). sasLM: 'SAS' linear model. *CRAN.R-PROJECT.ORG*. <https://CRAN.R-project.org/package=sasLM>

Bankston, J. (2021). Migration and smuggling across virtual borders: A European Union case study of internet governance and immigration politics. In Korkmaz, E. E. (Ed.), *Digital Identity, Virtual Borders and Social Media* (Chapter 5, pp. 73–97). Edward Elgar Publishing.

Barth, M. (2022). tinylabels: Lightweight variable labels. *CRAN.R-PROJECT.ORG*. <https://cran.r-project.org/package=tinylabels>

Bates, D., Maechler, M., & Jagan, M. (2023). *Matrix: Sparse and dense matrix classes and methods*. *CRAN.R-PROJECT.ORG*. <https://CRAN.R-project.org/package=Matrix>

Behrendt, S. (2023). Lm.beta: Add standardized regression coefficients to linear-model-objects. *CRAN.R-PROJECT.ORG*. <https://CRAN.R-project.org/package=lm.beta>

Bene, M., Ceron, A., Fenoll, V., Haßler, J., Kruschinski, S., Larsson, A. O., Magin, M., Schlosser, K., & Wurst, A-K. (2022). Keep them engaged! Investigating the effects of self-centered social media communication style on user engagement in 12 European countries. *Political Communication*, 39(4), 429–453. <https://doi.org/10.1080/10584609.2022.2042435>

Boboc, A., Gire, F., & Rosanvallon, J. (2015). Digital Social Networks. *Sociologies pratiques*, 30(1), 19–32. <https://doi.org/10.3917/sopr.030.0019>

Capriotti, P., & Zeler, I. (2023). Analysing effective social media communication in higher education institutions. *Humanities and Social Sciences Communications*, 10(656), 1-13.

<https://doi.org/10.1057/s41599-023-02187-8>

Dahlgren, P. (2012). Social Media and Counter-Democracy: The Contingences of Participation. In Tambouris, E., Macintosh, A., & Sæbø, Ø. (Eds.), *Electronic Participation* (pp. 1–12). Springer. https://doi.org/10.1007/978-3-642-33250-0_1

Davison, A. C., & Hinkley, D. V. (1997). *Bootstrap methods and their applications*. Cambridge University Press. <http://statwww.epfl.ch/davison/BMA/>

De-Wilde, P., Rasch, A., & Bossetta, M. (2022). Analyzing citizen engagement with European politics on social media. *Politics and Governance*, 10(1), 90–96.

<https://doi.org/10.17645/pag.v10i1.5233>

Dolan, R., Conduit, J., Fahy, J., & Goodman, S. (2016). Social media engagement behavior: A uses and gratifications perspective. *Journal of Strategic Marketing*, 24(3-4), 261–277.

<https://doi.org/10.1080/0965254X.2015.1095222>

Doncel-Martín, I., Catalan-Matamoros, D., & Elías, C. (2023). Corporate social responsibility and public diplomacy as formulas to reduce hate speech on social media in the fake news era. *Corporate Communications: An International Journal*, 28(2), 340–352.

<https://doi.org/10.1108/CCIJ-04-2022-0040>

Dragseth, M. R. (2020). Building student engagement through social media. *Journal of Political Science Education*, 16(2), 243–256.

<https://doi.org/10.1080/15512169.2018.1550421>

Feinerer, I., Hornik, K., & Meyer, D. (2008). Text mining infrastructure in r. *Journal of Statistical Software*, 25(5), 1–54. <https://doi.org/10.18637/jss.v025.i05>

Flew, T., & Iosifidis, P. (2020). Populism, globalisation and social media. *International Communication Gazette*, 82(1), 7–25. <https://doi.org/10.1177/1748048519880721>

Fuchs, C. (2015). Social media and the public sphere. In Fuchs, C., *Culture and Economy in the Age of Social Media* (pp. 315–372). Routledge.

Genz, A., & Bretz, F. (2009). *Computation of multivariate normal and t probabilities*. Springer-Verlag.

Gohel, D., & Skintzos, P. (2023). Flextable: Functions for tabular reporting. *CRAN.R-PROJECT.ORG*. <https://CRAN.R-project.org/package=flextable>

Grolemund, G., & Wickham, H. (2011). Dates and times made easy with lubridate. *Journal of Statistical Software*, 40(3), 1–25. <https://www.jstatsoft.org/v40/i03/>

Grömping, U. (2006). Relative importance for linear regression in r: The package relaimpo. *Journal of Statistical Software*, 17(1), 1–27. <https://doi.org/10.18637/jss.v017.i01>

Gross, J., & Ligges, U. (2015). Nortest: Tests for normality. *CRAN.R-PROJECT.ORG*. <https://CRAN.R-project.org/package=nortest>

Hancu-Budui, A., Zorio-Grima, A., & Blanco-Vega, J. (2020). Audit institutions in the European Union: Public service promotion, environmental engagement and Covid crisis communication through social media. *Sustainability*, 12(23), 1-32. <https://doi.org/10.3390/su12239816>

Heath, R. L. (2018). How fully functioning is communication engagement if society does not benefit? In Johnston, K. A., & Taylor, M. (Eds.), *The Handbook of Communication Engagement* (1st ed., pp. 33-47). Wiley. <https://doi.org/10.1002/9781119167600>

Heldman, A. B., Schindelar, J., & Weaver, J. B. (2013). Social media engagement and public health communication: Implications for public health organizations being truly “social”. *Public Health Reviews*, 35(13), 1–18. <https://doi.org/10.1007/BF03391698>

Hornik, K. (2020). NLP: Natural language processing infrastructure. *CRAN.R-PROJECT.ORG*. <https://CRAN.R-project.org/package=NLP>

Kanol, D., & Nat, M. (2021). Group type and social media engagement strategies in the EU: The case of British interest groups on Facebook. *Journal of Public and Nonprofit Affairs*, 7(2), 205–219. DOI:10.20899/jpna.7.2.1-15

Kassambara, A. (2023a). Ggpubr: 'ggplot2' based publication ready plots. *CRAN.R-PROJECT.ORG*. <https://CRAN.R-project.org/package=ggpubr>

_____ (2023b). Rstatix: Pipe-friendly framework for basic statistical tests. *CRAN.R-PROJECT.ORG*. <https://CRAN.R-project.org/package=rstatix>

Kowalik, K. (2021). Social media as a distribution of emotions, not participation. Polish exploratory study in the EU smart city communication context. *Cities*, 108, 1-12. <https://doi.org/10.1016/j.cities.2020.102995>

Krzyżanowski, M. (2020). Digital Diplomacy or Political Communication? Exploring Social Media in The EU Institutions from a Critical Discourse Perspective 1. In Bjola, C., & Zaiotti, R. (Eds.), *Digital Diplomacy and International Organisations* (pp. 52–73). Routledge.

Long, J. A. (2019). Interactions: Comprehensive, user-friendly toolkit for probing interactions. *CRAN.R-PROJECT.ORG*. <https://cran.r-project.org/package=interactions>

Lumley, T. (2004). Analysis of complex survey samples. *Journal of Statistical Software*, 9(1), 1–19. DOI: 10.18637/jss.v009.i08

_____ (2019). Mitools: Tools for multiple imputation of missing data. *CRAN.R-PROJECT.ORG*. <https://CRAN.R-project.org/package=mitools>

Marquart, F., Goldberg, A. C., & de-Vreese, C. H. (2020). “This time I’m (not) voting”: A comprehensive overview of campaign factors influencing turnout at European Parliament elections. *European Union Politics*, 21(4), 680–705. <https://doi.org/10.1177/1465116520943670>

Mascherini, M., & Nivakoski, S. (2022). Social media use and vaccine hesitancy in the European Union. *Vaccine*, 40(14), 2215–2225. DOI: 10.1016/j.vaccine.2022.02.059

- Max, K. (2008). Building predictive models in r using the caret package. *Journal of Statistical Software*, 28(5), 1–26. <https://doi.org/10.18637/jss.v028.i05>
- Mirbagheri, S., & Najmi, M. (2019). Consumers' engagement with social media activation campaigns: Construct conceptualization and scale development. *Psychology & Marketing*, 36(4), 376–394. <https://doi.org/10.1002/mar.21185>
- Müller, M. (2022). Spreading the word? European Union agencies and social media attention. *Government Information Quarterly*, 39(2), <https://doi.org/10.1016/j.giq.2022.101682>
- Ooms, J. (2023). Writexl: Export data frames to excel 'xlsx' format. *CRAN.R-PROJECT.ORG*. <https://CRAN.R-project.org/package=writexl>
- Özdemir, S. F., & Rauh, C. (2022). A Bird's eye view: Supranational EU Actors on Twitter. *Politics and Governance*, 10(1), 133–145. <https://doi.org/10.17645/pag.v10i1.4686>
- Proellocks, N., & Feuerriegel, S. (2021). SentimentAnalysis: Dictionary-based sentiment analysis. *CRAN.R-PROJECT.ORG*. <https://CRAN.R-project.org/package=SentimentAnalysis>
- R Core Team (2023). R: A language and environment for statistical computing. *R FOUNDATION FOR STATISTICAL COMPUTING*. <https://www.R-project.org/>
- Revelle, W. (2023). *Psych: Procedures for psychological, psychometric, and personality research*. *CRAN.R-PROJECT.ORG*. <https://CRAN.R-project.org/package=psych>
- Rus, M., Tasente, T., & Camara, V. (2021). Social media communication of public institutions. Case study: Representation of the European Commission in Romania. *Technium Social Sciences Journal*, 17(1), 119–135. <https://techniumscience.com/index.php/socialsciences/article/view/2868>
- Sarkar, D. (2008). *Lattice: Multivariate data visualization with r*. Springer.

Smith, B. G., & Gallicano, T. D. (2015). Terms of engagement: Analyzing public engagement with organizations through social media. *Computers in Human Behavior*, 53, 82–90. <https://doi.org/10.1016/j.chb.2015.05.060>

Tasente, T. (2014). *Comunicarea politică prin social media și reacțiile publicului online*. Editura Universitară.

_____ (2023). Online communication of European public institutions and NATO during the crisis in Ukraine (February 24, 2022 - December 24, 2022). *Technium Social Sciences Journal*, 39(1), 195–206. <https://doi.org/10.47577/tssj.v39i1.8187>

Tasente, T., Carataș, M. A., & Alabdullah, T. T. Y. (2024). Analysis of sentiment in the European Central Bank's social media activity during the Covid-19 pandemic and Ukraine War: A navigating crisis communication. *Doxa Comunicacion. Revista Interdisciplinar de Estudios de Comunicación y Ciencias Sociales*, (38), 275-292. <https://doi.org/10.31921/doxacom.n38a2051>

Tasente, T., Rus, M., & Opariuc-Dan, C. (2023). Analysis of the online communication strategy of world political leaders during the War in Ukraine (February 24, 2022—January 23, 2023). *Vivat Academia*, (156), 246–270. <https://doi.org/10.15178/va.2023.156.e1471>

Tasente, T., Rus, M., & Tanase, G. (2024). From Outbreak to Recovery: An Observational Analysis of the Romanian Government's Online Communication during and post-COVID-19. *Vivat Academia*, 157, 1–21. <https://doi.org/10.15178/va.2024.157.e1513>

Therneau, T., & Grambsch, P. (2000). *Modeling survival data: Extending the Cox model*. Springer.

Tierney, N., & Cook, D. (2023). Expanding tidy data principles to facilitate missing data exploration, visualization and assessment of imputations. *Journal of Statistical Software*, 105(7), 1–31. <https://doi.org/10.18637/jss.v105.i07>

Van-Dijck, J., & Poell, T. (2015). Social Media and the Transformation of Public Space. *Social Media + Society*, 1(2). <https://doi.org/10.1177/2056305115622482>

Venables, W. N., & Ripley, B. D. (2002). *Modern applied statistics with s* (Fourth Edition). Springer. <https://www.stats.ox.ac.uk/pub/MASS4/>

Voorveld, H. A., Van-Noort, G., Muntinga, D. G., & Bronner, F. (2018). Engagement with social media and social media advertising: The differentiating role of platform type. *Journal of Advertising*, 47(1), 38–54. <https://doi.org/10.1080/00913367.2017.1405754>

Wei, Y., Gong, P., Zhang, J., & Wang, L. (2021). Exploring public opinions on climate change policy in "Big Data Era" case study of the European Union Emission Trading System (EU-ETS) based on Twitter. *Energy Policy*, 158, 1-14. <https://doi.org/10.1016/j.enpol.2021.112559>

Wickham, H. (2016). *ggplot2: Elegant graphics for data analysis*. Springer-Verlag. <https://ggplot2.tidyverse.org>

Wickham, H., & Bryan, J. (2023). Readxl: Read excel files. *CRAN.R-PROJECT.ORG*. <https://CRAN.R-project.org/package=readxl>

Wickham, H., François, R., Henry, L., Müller, K., & Vaughan, D. (2023). Dplyr: A grammar of data manipulation. *CRAN.R-PROJECT.ORG*. <https://CRAN.R-project.org/package=dplyr>

Xie, Y. (2015). *Dynamic documents with R and knitr* (2nd ed.). Chapman and Hall/CRC.

Yanagida, T. (2023). Misty: Miscellaneous functions't. yanagida'. *CRAN.R-PROJECT.ORG*. <https://cran.r-project.org/package=misty>