From Likes to Change: Assessing the Impact of Citizen Engagement on the European Commission's Social Media Platforms

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Abstract

One or two sentences providing a **basic introduction** to the field, comprehensible to a scientist in any discipline.

Two to three sentences of **more detailed background**, comprehensible to scientists in related disciplines.

One sentence clearly stating the **general problem** being addressed by this particular study.

One sentence summarizing the main result (with the words "**here we show**" or their equivalent).

Two or three sentences explaining what the **main result** reveals in direct comparison to what was thought to be the case previously, or how the main result adds to previous knowledge.

One or two sentences to put the results into a more **general context**.

Two or three sentences to provide a **broader perspective**, readily comprehensible to a scientist in any discipline.

Keywords: keywords

Word count: X

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Introduction

In recent years, the rise of social media platforms has led to significant changes in the way institutions, including public organizations, communicate with their audiences. As a result, the importance of citizen engagement in the process of communication through social media has become increasingly recognized. This engagement involves not only a one-way flow of information from public institutions to citizens, but also an interactive dialogue between the two parties.

The concept of engagement in social media has been studied extensively in recent years, with researchers exploring various aspects of this phenomenon. One such study, conducted by Dolan et al. (2016), approached social media engagement behavior from a uses and gratifications perspective, focusing on the motivations and benefits that users derive from engaging with social media. Meanwhile, the study by Dragseth (2020) explored how social media can be used to build engagement among students in the context of political science education.

Another important aspect of engagement in social media is the role it plays in activation campaigns aimed at consumers. Mirbagheri and Najmi (2019) conceptualized and developed a scale to measure consumers' engagement with social media activation campaigns. Additionally, Smith and Gallicano (2015) analyzed public engagement with organizations through social media, highlighting the importance of two-way communication between public institutions and citizens.

The differentiating role of platform type in engagement with social media and social media advertising was explored by Voorveld et al. (2018), who found that the level of engagement varies across different social media platforms.

In addition to understanding the various aspects of engagement in social media, it is also

important to recognize the significance of citizen engagement in the context of public institutions. Citizen engagement plays a critical role in ensuring transparency and accountability in public decision-making processes. Furthermore, engagement with citizens can lead to the development of more effective policies and programs that better serve the needs of the 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.

Citizen engagement through social media can also contribute to the empowerment of individuals and groups, giving them a voice in public decision-making processes and enabling them to hold public institutions accountable for their actions. This can help to build stronger, more resilient communities that are better equipped to respond to 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 better serve the needs of the community.

Literature review

In studying the impact of citizen engagement on the European Commission's social media platforms, it is crucial to discern the key concepts that underpin this research. These concepts are engagement, social media platforms, and sentiment analysis, which form the backbone of many academic discourses that revolve around these themes.

Engagement, defined as the active interaction of users with digital content, is a fundamental element of any effective social media strategy. 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). 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. 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)]. 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 spectrum of outcomes, such as influencing voting behavior (Marquart et al., 2020) and attitudes towards vaccination (Mascherini & Nivakoski, 2022).

Simultaneously, social media platforms are becoming recognized as powerful tools for promoting and managing engagement. This dual role is exemplified in the case of the European Commission's activities 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).

In assessing the impact of citizen engagement on the EU's social media platforms, researchers employ an assortment of methods, one of which is sentiment analysis. This approach, which involves the systematic identification and categorization of the emotional tone behind words, aims to gauge public sentiment, attitudes, and emotions towards specific topics (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).

To sum up, understanding the impact of citizen engagement on the European Commission's social media platforms is a multifaceted issue. These platforms offer opportunities for meaningful citizen engagement and public communication, but their influence is dictated by a complex interplay of individual behavior, institutional strategy, societal trends, and technological developments. This complexity calls for a nuanced understanding of each constituent factor and their collective role in shaping the landscape of citizen engagement within the context of the European Commission's social media platforms. It is a call to researchers, policymakers, and practitioners to continuously explore this evolving realm to maximize the benefits of citizen engagement while mitigating its potential pitfalls.

The present study

Relying on the theoretical framework previously described, the present study aimed to investigate public engagement across various official European Commission social media platforms (Facebook, Instagram, Twitter, and YouTube). We also compared and contrasted the patterns, trends, and characteristics of online user interactions and responses across these platforms. Translating these aims into research questions (RQs), the present study investigated the following:

- RQ_1. How is the communication with emotional resonance associated with higher public engagement levels?
- RQ_2. Does social media platforms influences the emotional resonance on public engagement?
- RQ_3. Does social media platforms moderates 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 (1) [**TASE**]

Method

Procedure used for data gathering

We used the Fanpagekarma, a prevalent tool for conducting analytics and monitoring on social media platforms to extract data for the official Facebook, Twitter, Instagram, and

YouTube channels of the European Commission. The data included post ID, message content, post type, post date, 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.

Results

Overview of data analysis

We used R (Version 4.3.0; R Core Team, 2023) and the R-packages *dplyr* (Version 1.1.2; Wickham et al., 2023), *flextable* (Version 0.9.1; Gohel & Skintzos, 2023), *knitr* (Version 1.43; Xie, 2015), *lubridate* (Version 1.9.2; Grolemund & Wickham, 2011), *mvtnorm* (Version 1.2.2; Genz & Bretz, 2009), *naniar* (Version 1.0.0; Tierney & Cook, 2023), *papaja* (Version 0.1.1; Aust & Barth, 2022), *psych* (Version 2.3.3; William Revelle, 2023), *readxl* (Version 1.4.2; Wickham & Bryan, 2023), *rstatix* (Version 0.7.2; Kassambara, 2023), *sasLM* (Version 0.9.9; Bae, 2023), and *tinylabels* (Version 0.2.3; Barth, 2022) 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. We further conducted a sentiment analysis, and, finally a linear moderated regression was used for hypothesis testing.

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) and the univariate normality assumption of the dependent variable was not met.

Please Insert Tables 1 and 2 around here

We further performed a sentiment analysis both on data with (see Fig. 1 and Fig. 2) and without extreme outliers (see Fig. 3 and Fig. 4) and the information suggested that ... [**TASE**]

Finally, 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 $\mathbf{H_0}$**:** *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% ($R^2=0.3324$, 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 *($B=0.00005$, $t=12.82$, $p < 0.001$, $\beta=0.10$)*.

Discussion

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Table 1

Descriptive analysis. Presence of extreme outliersa

Variables	N	Mean	SD	Median	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	14944	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)

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	14132	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)

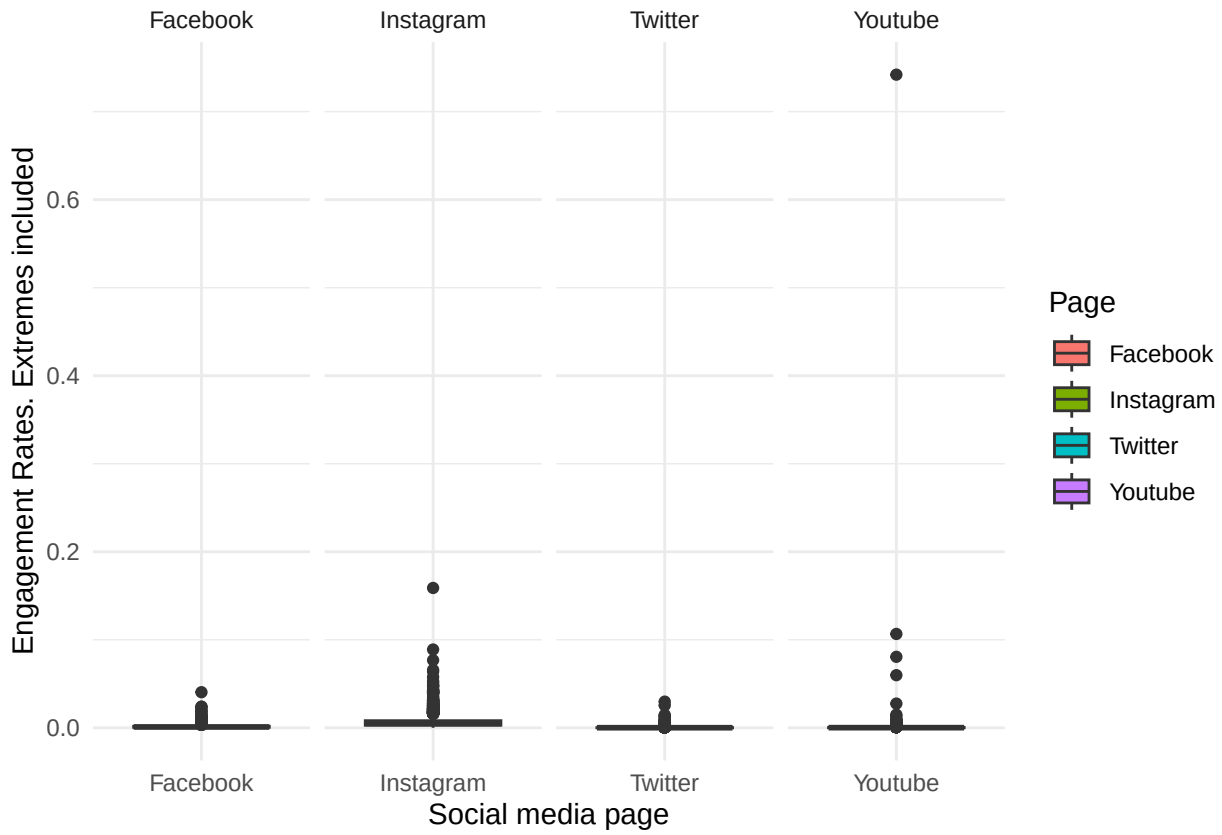

Figure 1

Boxplot of engagement rates on social media channels. Extremes included

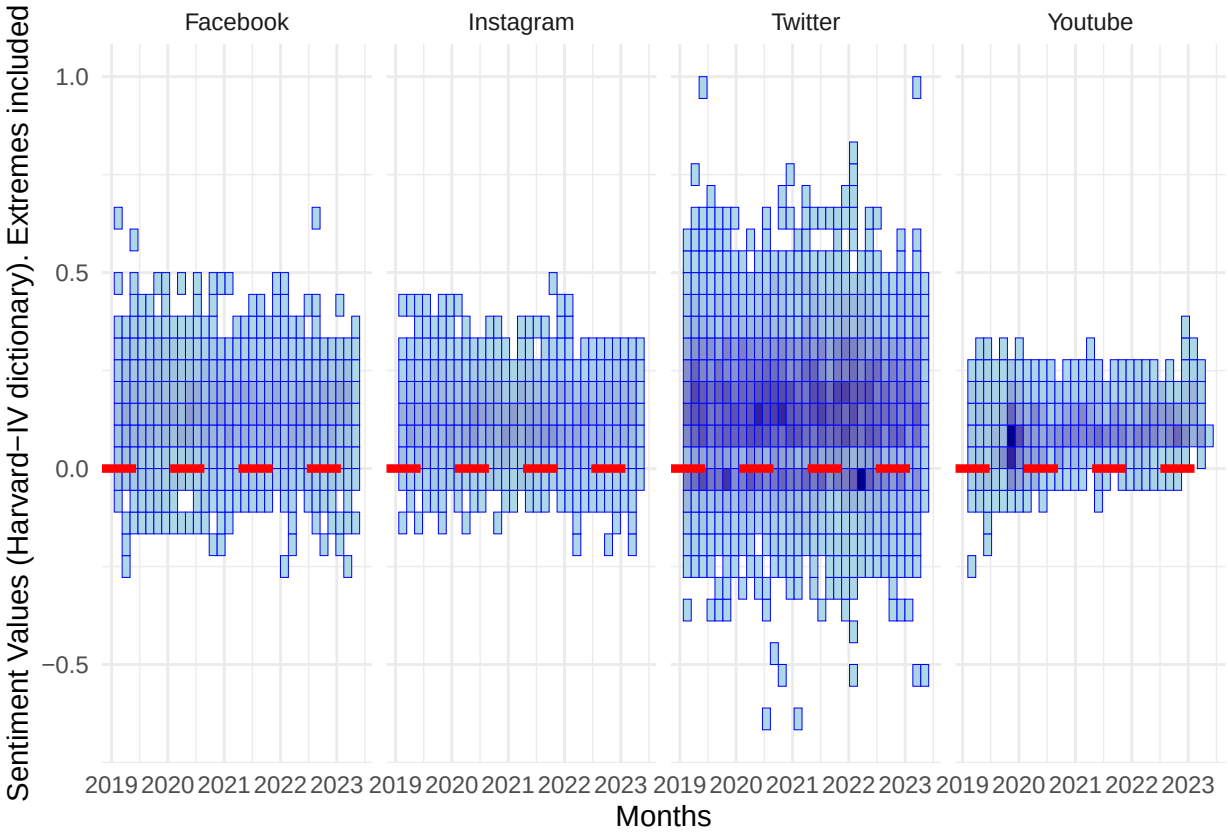

Figure 2

Sentiment analysis chart on social media channels. Extremes included

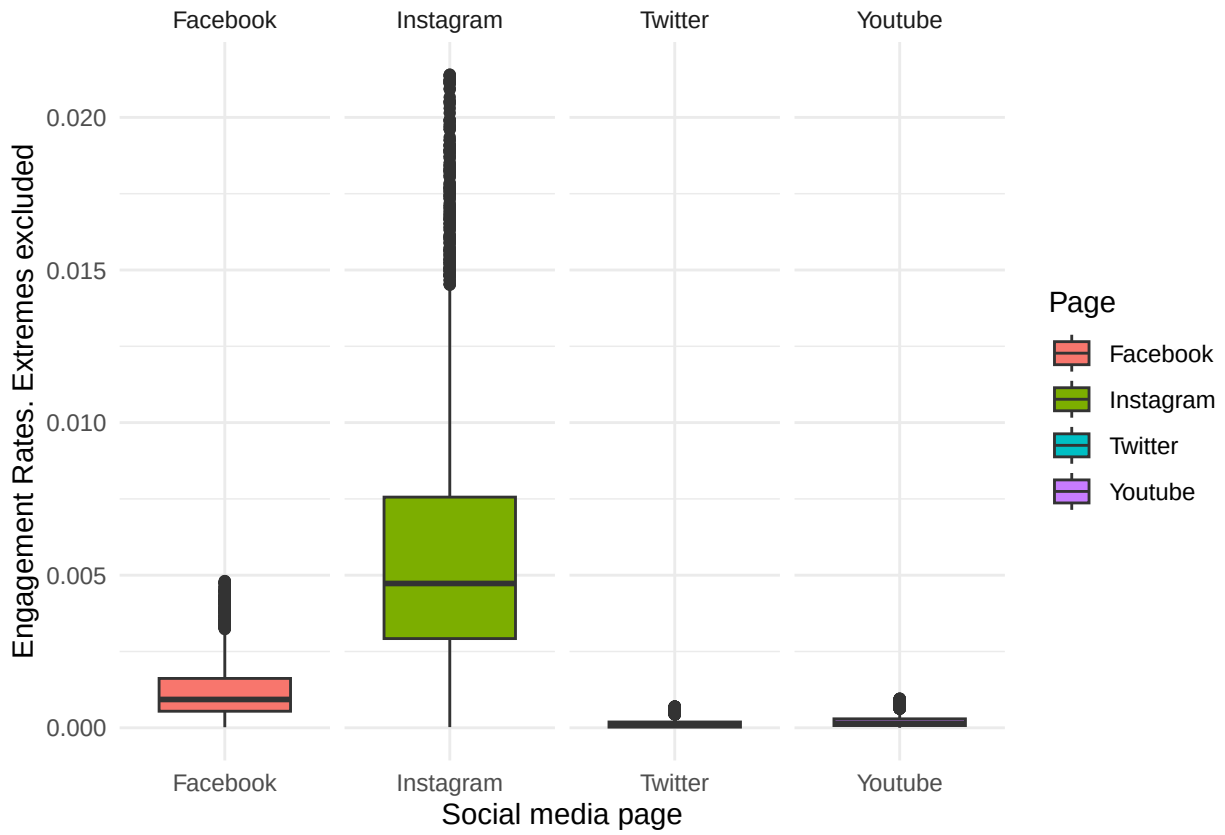

Figure 3

Boxplot of engagement rates on social media channels. Extremes excluded

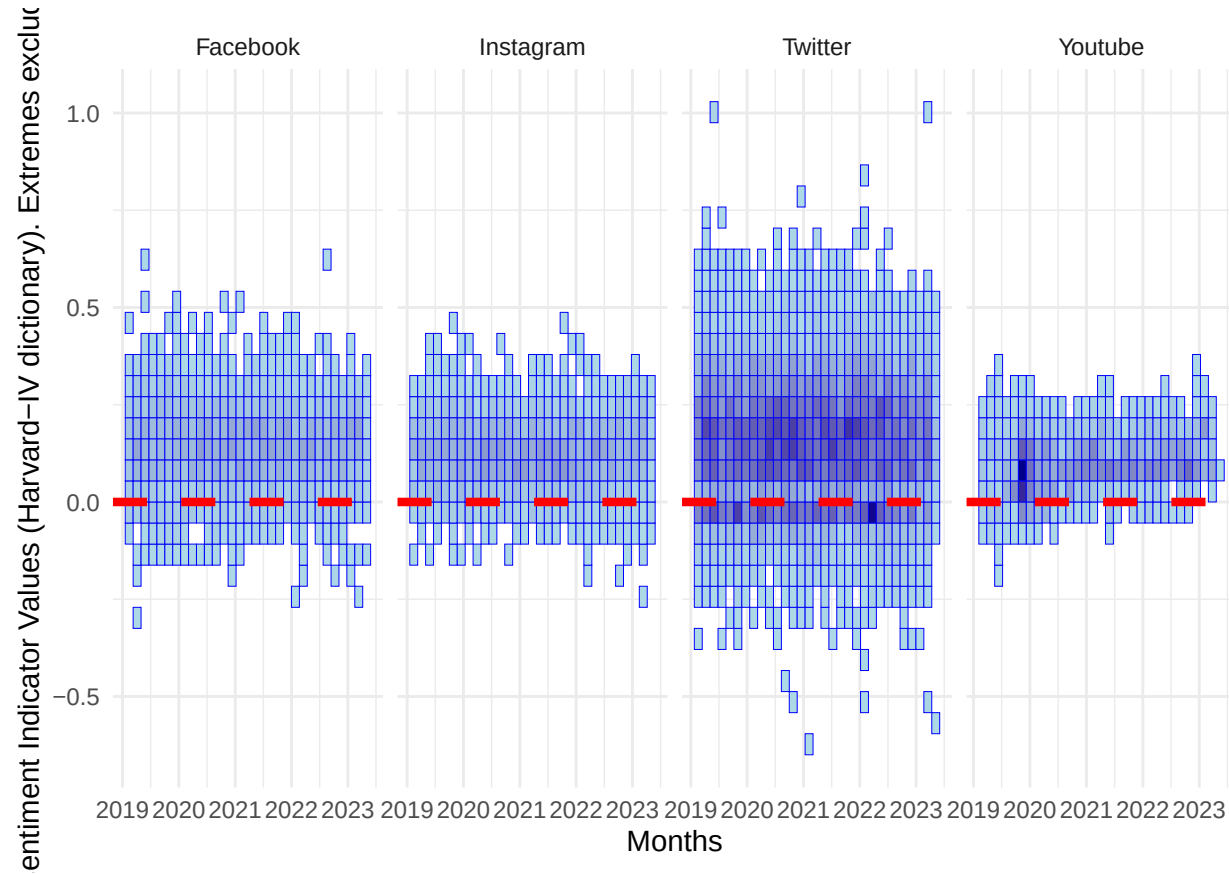

Figure 4

Sentiment analysis chart on social media channels. Extremes excluded