How User Sentiments on the Italian Brain Drain Shape Social Media Engagement: Exploring Sentiment Polarity, Variance, and Platform Differences

Nicole Pitassi
MSc Security Studies, Department of Political Science, University College London., UK
nicole.pitassi.24@ucl.ac.uk
Ji Mi Park
Marketing Professor, Hult International Business School, Boston, USA
Correspondence to: jimi.park@faculty.hult.edu

ABSTRACT

Brain drain has received great amount of attention over Italy's economic slowdowns, leading people to visit the social media platforms, generate word-of-mouth, and are more attached to the issue by subsequently indicating that they like the comment. This study focuses on how different platforms influence user sentiment and drive engagement. We find that emotional platform (Instagram, Twitter) fulfills the social interaction needs, leading to express their engagement. Informative platforms (YouTube and TikTok) enhance fact checking and verification, thus sentiments are less associated with engagement. The empirical results find the brain drain sentiment polarity distribution also varies with the platform categories. Based on these insights, strategic recommendations are provided for Italy to leverage social media to foster positive sentiment, encourage constructive discourse, shape the engagement, and ultimately mitigate the brain drain by attracting talent back to the country.

Keywords: Italian Brain Drain, Social Media Platform, Marketing Communication, Public Policy, Sentiment analysis,

1. Introduction

Italy's significant brain drain, driven by persistent economic and social issues, compels skilled professionals to seek better opportunities abroad due to limited job prospects at home (Bugamelli et al., 2020). This trend has been exacerbated by negative productivity, the 2008 financial crisis, and the COVID-19 pandemic (De Philippis et al., 2022).

Although extensive research has explored brain drain's determinants and economic effects, how social media shapes public engagement on this issue remains underexamined. Organizations striving to raise awareness often face challenges in evaluating the success of their campaigns due to insufficient metrics. Conventional measures such as follower counts can be superficial, failing to reflect true impact or engagement. These metrics are not always reliable, as a large follower base does not ensure meaningful interaction. Effective brain drain campaigns should aim to inspire behavior change, including talent retention, policy influence, or return migration.

Brain drain topics engage audiences both emotionally and informatively, fostering connectedness and receptivity. Understanding how individuals engage with brain drain discussions on social media is crucial for targeted strategies that address negative sentiment and encourage awareness. This study examines how such discourse varies across different platforms and influences engagement, distinguishing between emotional and informative needs.

Research Questions:

1. **How do sentiment characteristics differ between emotional platforms (Instagram, Twitter) and informative ones (TikTok, YouTube)?**
2. **How does engagement level differ between emotional and informative platforms?**

We categorized platforms by analyzing content nature (e.g., visual vs. textual, emotional vs. informational) and specific features such as Twitter's thread format, Instagram's image-based posts, TikTok's short videos, and YouTube's in-depth content. This classification enabled an analysis of sentiment characteristics, such as polarity and variance, using natural language processing (NLP) tools. Sentiment scores (positive, negative, neutral) were calculated, and sentiment patterns were identified to compare emotional and informative platforms. Engagement metrics, including likes, shares, and comments, were assessed by distinguishing between passive (e.g., likes, views) and active (e.g., comments, shares) forms. Posts were collected from Instagram, Twitter, TikTok, and YouTube using the hashtag #fugadicervelli (#braindrain). The analysis aimed to determine if emotional platforms prompt higher engagement through charged content or if informative ones foster deeper, more extensive discussions. Findings provide insights for organizations aiming to optimize brain drain communication. Emotional platforms like Instagram and Twitter can be used to foster interaction and entertainment-driven engagement, while TikTok and YouTube may appeal to those seeking more detailed, fact-based discussions, reducing negative impacts. Users on YouTube often engage analytically, focusing on problem-solving rather than simple reactions (Maring & Gmür, 2024).

To maximize engagement, campaigns should blend emotional and informative content, promoting dialogue that fosters positive sentiment and reduces polarization. Misusing social media can exacerbate political divides and deter returns or misinform users about their choices. Recognizing each platform's unique role is essential to prevent narratives that blame the government or accuse emigrants of abandonment. Instead, emotional platforms should shift the discourse toward unity and solutions, such as talent retention and better local conditions, fostering collective progress rather than deepening conflicts.

2. Literature Review

2.1. On Brain Drain in Italy: An Analytical Perspective

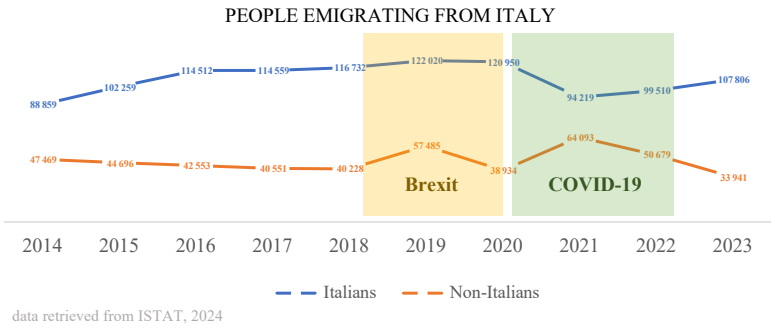
Italy is grappling with significant brain drain driven by economic and social challenges. Since the 1990s, stagnant growth, compounded by the 2008 financial crisis and the COVID-19 pandemic, has negatively impacted the country's economic trajectory (De Philippis et al., 2022). Low productivity, linked to underdeveloped service sectors within firms and difficulties faced by SMEs due to limited innovation and internationalization (Bugamelli et al., 2020), exacerbates this issue. High youth unemployment contributes further, with the NEET rate at 19%, significantly above the European average of 11.7% (Eurostat, 2022). The limited job market and career prospects compel young, educated Italians to seek opportunities abroad. Italy's aging workforce is also a concern; the nation has the highest proportion of elderly within the EU and one of the lowest participation rates among the working-age population (Brugiavini, 2020), potentially deterring young professionals from engaging in an innovation-strained market that prioritizes policies for older citizens.

Two significant socio-economic influences on emigration trends are Brexit and the COVID-19 pandemic. Before Brexit, Italy saw a steady rise in emigration (ISTAT, 2024). However, the pandemic led to a temporary decline in Italian emigration, coinciding with the return of non-Italian residents to their home countries (ISTAT, 2024). Post-pandemic, Italians resumed emigrating, while non-Italians increasingly opted to stay in Italy (ISTAT, 2024). Over the past decade, 1,542,055 individuals have emigrated, including 1,081,426 Italian citizens. The number of returnees has fallen, showing a 13% decline from 2022 to 2023.

The economic repercussions of emigration can be seen in two contrasting scenarios. The positive view suggests that returning emigrants enrich Italy with new experiences and

knowledge, promoting brain circulation that boosts innovation and GDP. Conversely, the negative outcome foresees a permanent loss of human and financial capital if emigrants do not return (Anelli, 2023). The government's fiscal strategy to incentivize returns included tax cuts of 70-90% for those coming back after two or more years abroad. However, the 2022 fiscal report indicated the policy's inefficiency, costing 674 million euros and yielding only 15,000 returnees, with 45,000 euros in unpaid taxes (Chicco, 2023). Despite its shortcomings, brain circulation poses a lower economic cost than continued brain drain (Gabanelli & Tortora, 2024). Effective implementation could stimulate economic growth, though awareness remains an issue; 14% of those surveyed were unaware of these subsidies (Skytg24, 2023). Our research explores optimal social media channels for governmental outreach and the most effective content types for such campaigns.

Figure 1 Trend line of people moving their citizenships outside Italy



data retrieved from ISTAT, 2024

2.2. Social Media Platforms and Their Categorization

The dissemination of brain drain content varies in its purpose, including raising awareness, profit generation, or framing for influence. Engagement motives differ by platform, with some users seeking information on brain drain causes (Kim, 2021) and others interacting socially, fostering a

participatory culture (Ko et al., 2005). Understanding these motives is crucial for assessing user interactions, emotions, values, and the impact on metrics like likes.

Instagram is categorized as an emotional platform, known for its "stories" feature that shares daily moments, fostering user connections (Bainotti et al., 2020). Users often present idealized versions of themselves, creating content that elicits positive emotional responses (Sonne & Erickson, 2018). Instagram's algorithm tailors content based on user engagement and preferences, enhancing its emotionally resonant experience (Bishqemi & Crowley, 2022).

Twitter is similarly emotional, marked by polarized content and low-credibility posts that may spread misinformation (Geeng et al., 2020). The platform's thread feature supports detailed discussions, but navigating Twitter requires distilling vast information, making it dynamic for content exchange (Paul et al., 2021). Engagement is influenced by users' attachment to content, which reinforces their values and emotional responses (Lee et al., 2014; Sánchez-Fernández & Jiménez-Castillo, 2021). Twitter's gamified communication methods, inspired by the gambling industry, boost interaction through mechanisms that tap into user emotions (Furtado et al., 2020; Lackey, 2021).

TikTok, initially an informative platform, is known for visually engaging, short videos that convey information effectively (Bautista et al., 2021; Li et al., 2019). It has been embraced by Gen Z for educational content, including academic explanations (Khlaif & Salha, 2021; Adelhardt & Eberle, 2024).

YouTube serves diverse needs, enabling users to be creators and consumers, supporting informal learning through tutorials and comprehensive content (Tan, 2013; Dubovi & Tabak, 2020). Videos on practical topics, like repairs or techniques, highlight its role in education (Dubovi & Tabak, 2020).

3. Methodology

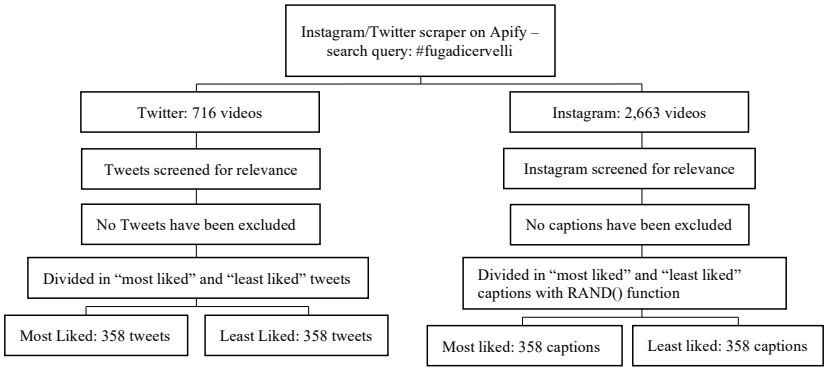
3.1. Research Design

This study explores sentiment characteristics and engagement variations between emotional platforms (Instagram and Twitter) and informative ones (TikTok and YouTube). The first research question assesses differences in sentiment polarity and variance, employing a modified version of the framework by Tafesse and Wien (2017), tailored to the brain drain context. The second question examines engagement levels across platforms. Fisher's Exact Test was used to evaluate the relationship between sentiment scores and user responses, focusing on likes for the most and least liked posts.

3.2. Data Collection

Datasets for Instagram, Twitter, and TikTok were collected on January 8th and 9th, 2024, while the YouTube dataset was compiled on February 7th, 2024, as shown in Figure 2. Posts and tweets with the hashtag #fugadicervelli (brain drain) were scraped for Instagram and Twitter, ensuring content was Italian to align with the study's focus. TikTok datasets included video captions tagged with #fugadicervelli and comments on relevant videos, using "Fuga di Cervelli" as a search term (detailed in Appendix 3.1).

Figure 2 *Data Collection Process for Instagram and Twitter Content*



Seventy-three TikTok videos were selected based on relevance, excluding those with no comments, inappropriate language, or duplicates. The Apify platform facilitated comment scraping. For YouTube, URLs and comments were also obtained through Apify, with manual review to retain pertinent videos (see Appendix 3.2). These methods allowed a comprehensive exploration of brain drain discussions across platforms.

Table 1 operationalizes variables like "sentiment score" and "sentiment polarity" to assess content differences. The Sentix package was employed for sentiment analysis to quantify emotional tones, revealing how sentiment polarity and variance manifest across platforms. Emotional platforms were expected to show broader sentiment variance, while informative platforms were anticipated to present consistent, neutral tones.

Table 1 Variable Definitions

Variable	Description
Emotional Platform	Platforms where emotional connection outweighs informational value in driving content sharing and user engagement. Users form strong emotional bonds with content creators. • Emotional attachment: the sense of intimacy followers towards influencers, leading to strong emotional connections and increased engagement with their content.
Informative Platform	Platforms focused on the exchange of factual or educational content, where users engage primarily to share and consume knowledge.
Sentiment score	A measure that quantifies the overall emotional tone of content, categorizing it as positive, neutral, or negative. • Sentiment Score Emojis: calculated using an emoji lexicon that assigns relative sentiment scores to each emoji. The score is determined by counting the emojis in the analyzed comment, and dividing the total sentiment score of the emojis by the number of emojis found in that comment. • Sentiment Score Text: calculated using Sentix package (R package to perform sentiment analysis on Italian) and udpipe Italian_isdt model.
Sentiment Polarity	Metric indicating whether the sentiment in content is positive, neutral, or negative, reflecting the overall emotional direction using the average of sentiment score
Sentiment Variance	Metric indicating the degree of variation in sentiment • Mann Whitney-U test to assess the degree of variation in sentiment within Emotional and Informative platforms. • Coefficient of Variation (CV) measured as standard deviation divided by the mean to assess the sentiment variation across platforms. High CV indicates significant fluctuation from the mean, of expressed sentiments (such as positive, negative, or neutral feelings) while low variance suggests more stable or uniform expression from the mean.
Engagement	The level of user interaction with content is measured through various engagement metrics, such as likes, shares, and comments.

	• In this study, we distinguish between passive engagement (e.g., likes) and active engagement (e.g., comments, shares, retweets). Our focus is on passive engagement, specifically analyzing the use of "likes" as an indicator of user interaction.
Relationship between Likes and Sentiment scores	Examination of how sentiment scores correlate with the number of likes, revealing how emotional tone influences approval. • Fisher's Exact Test used to measure and compare the correlation of Likes and Sentiment Scores between Most and Least Liked groups of each platform.

Results indicated significant correlations in emotional posts on Instagram and Twitter, where high engagement stemmed from emotion-laden language and personal narratives, evident in highly liked (243) and least liked (188) posts. Twitter posts included user stories and future-oriented content, seen in the most liked (131) and least liked (123) posts. TikTok demonstrated functional and educational posts, while YouTube featured informative content in both highly liked and least liked posts (62 each), emphasizing discussions of policies, demographics, and socio-economic contexts.

Based on the categorizations in Table 2, the distinction between emotional and informative platforms was validated. Emotional platforms (Instagram, Twitter) prompted stronger emotional responses and higher engagement, often through personal and evocative content. Informative platforms (TikTok, YouTube) fostered structured, fact-based discussions involving professionals, policymakers, and academics. This variance in emotional intensity and user interaction supports the importance of distinguishing between emotional and informative content in social media analysis.

Table 2. Classification of Social Media Content Based on W. Tafesse and A. Wien (2017) and Polarity of Social Media Content

		Emotional Platform				**Informative Platform**			
Social media		Instagram		Twitter		TikTok		YouTube	
Posts	**Definitions**	Most	Least	Most	Least	Most	Least	Most	Least
Emotional Posts	*These posts typically employ emotion-laden language, humor, and/or jokes regarding government policies, b rain drain related statistics, and so on.*	149	140	243	188	25	35	13	8
Functional posts	*These posts highlight the attributes of products and services, that can be offered by the public sector, as well as the private sector. .*	0	140	0	0	25	31	0	0
Educational posts	*These posts educate and inform other users regarding the phenomenon of brain drain.*	65	55	95	107	14	6	62	62
Brand resonance	*These posts show the narrated identity of a person or group of people. They highlight the main qualities of these people like image narration, narrated personality, and narrated association..*	0	0	0	0	0	0	0	0
Experiential posts	*These posts show mainly things that stimulate the senses (e.g., visual, auditory, taste, odor, etc.) that can be Videos or images regarding brain drain, as well as events or performances that are related to the matter.*	33	16	5	20	0	1	2	2
Current event	*These posts initiate or comment on specific events happening in a certain period (e.g., elections, new policies enforcement, political or social events)).*	26	161	24	5	1	0	1	6
Personal posts	*These posts narrate mainly users' personal experiences or preferences regarding brain drain. They can also show users' future plans, and personal anecdotes on the matter.*	156	2	131	123	2	2	6	6
Employee posts	*These posts are about external people to the users who is posting, like Italians that have lived abroad and are returning back to the home country, or Italians that found their success abroad.*	3	11	15	6	1	1	11	12
Brand community	*These posts foster engagement within the community by asking questions or making polarized statements that lead to discussions among the community.*	35	1	8	29	8	3	5	0
Customer relationship	*These posts encourage users on leaving their feedback, reviews, or initiatives regarding the matter.*	0	3	0	0	2	0	0	0
Cause-related posts	*These posts cover and/or promote social causes or initiatives regarding brain drain.*	6	30	2	0	10	12	2	1
Sales promotion	*These posts entice other users to take actions toward the creator's ask: for example, invites to follow a specific journal, watch a documentary, and go to an event.*	35	19	8	1	0	0	3	3

3.3. Sentiment Analysis

This analysis aimed to explore how sentiment scores relate to engagement, particularly likes on the most and least liked comments and post captions, categorizing them into positive, neutral, or

negative. To compare sentiment across emotional and informative platforms, it was crucial to use equal-sized samples. Sentiment analysis was conducted in R Studio using various NLP packages, including NLP, syuzhet, tm, stringi, tidyverse, lexicon, and sentix, complemented by the Italian_isdt model for text and emoji sentiment analysis.

Each comment/caption was analyzed individually for text and emoji sentiment, with an overall sentiment score calculated as:

$$\textbf{\textit{Overall Sentiment Score}} = \frac{(\textbf{\textit{Sentiment Score of Emojis}} + \textbf{\textit{Sentiment Score of Text}})}{\mathbf{2}}$$

Including emojis in the analysis was essential due to their influence on meaning. Scores between -1 and 1 were categorized, with positive sentiments above 0.1, negative below -0.1, and neutral between these values. More granular sentiment categories were avoided due to limited R packages for Italian text, which could result in irrelevant data.

Non-parametric tests were chosen due to the non-normal distribution of sentiment data. Fisher's Exact Test assessed correlations between likes and sentiment scores, while the Mann-Whitney U test compared sentiment scores between platforms (e.g., Instagram vs. Twitter and TikTok vs. YouTube) [1]. Emotional platforms were shown to evoke higher sentiment variance and emotional reactions, aligning with user engagement focused on social connections and shared experiences. Informative platforms showed steadier, neutral sentiment trends, enabling fact-driven, professional dialogue and public policy discussions.

[1] The following steps outline the methodology used to determine sample sizes: A column was added to each dataset, using the formula RAND () to generate random numbers for each row. This allowed for the random selection of posts to be analyzed. Each table was filtered using random numbers, with the sample size determined by the dataset with the smaller number of posts. This ensured that comparisons between datasets (e.g., Instagram vs. Twitter) were statistically significant.

4. Results

4.1. Descriptive Analysis

Emotional Platforms

The analysis of emotional platforms, specifically Instagram and Twitter, shows distinct sentiment patterns. Instagram posts in both the most liked and least liked groups displayed predominantly positive sentiments (Appendix 4.1). Word clouds and frequent word plots (Table 3) revealed that references to the comedy movie “Fuga di Cervelli” (Brain Drain), directed by Paolo Ruffini, contributed to this positivity due to its lighthearted content. Discussions on Instagram also included the actual brain drain phenomenon, with users perceiving it more as an opportunity facilitated by governmental initiatives under Prime Minister Giorgia Meloni, as indicated by keywords such as “medicine” and “researchers” related to the PNRR (National Recovery and Resilience Plan).

The least liked posts emphasized comedies more than brain drain, critiquing government actions and referring to Italy as the “escape nation.” On Twitter, word clouds and frequent word plots (Table 2) highlighted serious discussions, focusing on job instability, low wages, and demographic issues like the low birth rate (Appendix 4.2). Keywords such as “investments” and “investors” reflected economic concerns, with users criticizing government failures and highlighting economic challenges like flooding.

Informative Platforms

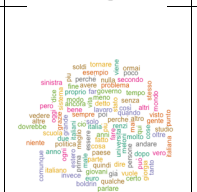
TikTok’s most liked captions exhibited higher positive sentiments (Appendix 4.3), often deviating to discuss Ruffini’s movie or educational content, contributing to positivity. The least liked captions centered on brain drain causes, such as “taxation” and “retirement,” leading to negative sentiments. TikTok comments were generally positive, with users agreeing with video

content, using terms like “bravo” and “agree” (Table 3). However, terms like “without future” suggested underlying concern.

YouTube’s most liked captions maintained a neutral tone, mentioning “opportunities” and “concessions” (Table 3). In contrast, least liked captions expressed hope for career development. Analysis of YouTube comments revealed more negative sentiments, with users dissatisfied with government inaction, shown by words like “nothing” and “should” (Appendix 4.4). Frequent mentions of “school” and “university” indicated these as perceived root issues. Comment sections of least liked YouTube videos echoed the sentiment intensity of the most liked, focusing on frustration with terms like “problem” and “end.” Mentions of “work,” “taxes,” and “wage” underscored economic reasons for youth emigration, aligning with Italy’s economic context of stagnant wages and rising costs.

Table 3. Wordclouds Comparison between most liked and least liked

Media	Findings	Most liked	Least liked	Frequent words
Emotional Instagram	High positive emotions overall due to many references to the comedy movie “Fuga di Cervelli”. The most liked group sees the phenomenon as an opportunity and tended to comment on the subsidies created from the government. The least liked group focused much more on the comedy movie rather than on the phenomenon. In the few cases the latter group covered the topic of brain drain, users were more critical towards governmental decisions.			*fugadicervelli, italia, cervelli, lavoro, film, paoloruffini, estero, laureatimedici, picofitheda, laurea, love, nord, italianiallestero, colorado, cervello, instagood.*
Twitter	More negative emotions overall. Both groups discussed the lack of permanent jobs for young adults, low salaries, and demographic issues. Users view brain drain as a problem and they often criticize the government.			*fuga, cervelli, fugadicervelli, giovani, più, Italiani, estero, lavoro, perché, investimenti, pensionati, precari, crolli, evitare, sbagliate, ricerca, bastaprecariatodistato, rientro, ricercapubblica.*
Informative TikTok Captions	More positive sentiments overall. The most liked videos often portray parts of the comedy movie “Fuga di Cervelli”, or users educate viewers on the phenomenon and suggest solutions. The least like group focused on detecting the potential causes of brain drain.			*fugadicervelli, italia, perte, Cervelli, fuga, lavoro, giovani, fyp, neiperte, estero, viral, cervellinfuga, italianiallestero, laureati, politica, meloni, link, agevolazionifiscali, film, foryoupage.*

Comments	High positive sentiments overall. Users tended to agree with the content of the video. Users seemed to see the brain drain as a willingness of young adults to explore, but also there was a lack of hope for the future of young adults in Italy.			*italia, più, perché, ragione, andare, estero, lavoro, d'accordo, giovani, cervelli, italiani, politica, tasse, però, così, già, soldi, declino, parole, euro.*
YouTube Captions	The most liked videos had a neutral tone and generally they explained the phenomenon and covered government actions connected to the brain drain. The least liked videos expressed more emotional content discussing opportunities for young adults in the labor market.			*Più, Cervelli, the, fuga, italia, lavoro, opportunità, estero, presidente, italiani, progetto, perché, libro, regime, video, paesi, talenti, personali, crescita, legge.*
Comments	Higher negative sentiments overall. The comments of the most liked videos reflected a sense of disagreement with the government's actions or perceived inaction. Users also portrayed a lack of hope towards the situation. The least liked group showed dissatisfaction with the phenomenon itself offering specific suggestions for governmental action. Users also perceive taxes, and wages as the primary causes of the phenomenon.			*Italia, più, perché, lavoro, università, estero, meloni, stipendi, così, norvegia, governo, italiani, giovani, lavorare, politica, problema, casa, mese, soldi, sistema.*

4.2 Sentiment Distribution

The Mann-Whitney U test validated the categorization of platforms by sentiment scores. Instagram and Twitter's most liked groups showed similar sentiment distributions ($p < 0.01$), as did the least liked groups ($p < 0.05$). Informative platforms showed significant similarity for most liked ($p < 0.05$) and least liked groups ($p < 0.01$). High positive sentiment in captions matched user agreement in comments, except for TikTok and YouTube, where comments for most liked videos showed insignificant sentiment differences ($p > 0.10$). Comments on these platforms often held higher negative sentiments, highlighting public discontent with government policies.

4.3. Sentiment Polarity and Variance

Overall, emotional platforms exhibited more balanced sentiment distributions, while informative platforms skewed towards positivity (e.g., TikTok comments). Twitter showed a more even distribution of positive and negative sentiments, with a stronger representation of negative

sentiments in the least liked group, suggesting it is the most synchronized with user dissatisfaction (Table 4). Research supports that emotional engagement affects content sharing on Twitter, where emotionally charged, novel content spreads quickly (Vosoughi et al., 2018). Users frequently express anger and sadness (Arola et al., 2020), reinforcing the platform's emotional nature.

Sentiment variance, measured by the coefficient of variation (CV), was greater on TikTok (CV = 2.93) than Instagram (CV = 1.53), indicating more diverse sentiment expression on TikTok (Table 4[2]). The neutral average score suggests balanced positivity and negativity. Emotional platforms showed less variance due to reinforcement of existing beliefs and consistent user comments. In contrast, informative platforms' content evolves through verified discussions, leading to greater sentiment diversity as topics include political discourse and economic evaluations.

The sentiment analysis results align with attribution theory. Positive sentiments often frame emigration as an individual success, while negative sentiments cite external factors like nepotism and government inaction. This dichotomy is reflected in platforms where emotional responses are more prevalent. Informative platforms, by contrast, facilitate balanced sentiment, where diverse opinions coexist, and discussions emphasize complex socio-economic and political issues.

[2] YouTube exhibits low dispersion from the mean, with a skew towards positive sentiment. This suggests that, even among informative platforms, there are differences in how negative, neutral, and positive sentiments are expressed.

Table 4. Sentiment Polarity and Sentiment Variance

	Social media		# of Negative Contents	# of Neutral Contents	# of Positive Contents	Average Sentiment Score	Std Sentiment Score	Coefficient of variation (Std./Ave)
Emotional Platform	Instagram	Most	46	217	95	0.04	0.06	1.53
		Least	31	256	71	0.03	0.05	1.74
	Twitter	Most	64	227	66	0.00	0.06	N/A
		Least	68	235	55	0.00	0.05	N/A
Informative Platform	TikTok	Most	6	41	19	0.02	0.05	2.93
		Least	15	37	14	0.00	0.06	N/A
	YouTube	Most	1	45	20	0.05	0.05	0.98
		Least	2	46	19	0.04	0.05	1.25

4.4. Analysis Between Likes and Sentiment Scores

A significant correlation between likes and sentiment scores was observed on Instagram for most liked ($p = 0.07$) and least liked posts ($p = 0.01$), and on Twitter ($p < 0.01$ for both[3]). In contrast, informative platforms showed no significant correlation (TikTok $p = 1$, YouTube $p > 0.10$), suggesting that platforms emphasizing emotional content generate higher engagement (Table 5). The findings indicate that emotionally engaging content promotes user interaction, particularly on platforms like Twitter, where emotional resonance drives content sharing and sentiment spread[4].

[3] Despite TikTok comments being statistically significant with engagement, the high positive sentiment scores in both most liked and least liked groups suggest that influencing sentiments through likes may be challenging, as the least liked group unexpectedly exhibited higher positive emotions than the most liked group.

[4] TikTok and YouTube comments showed similar patterns with Fisher's exact test for most liked video comments yielding a statistically significant, suggesting user engagement in comment can influence the likes of the post. Interestingly, for the least liked YouTube comments, the p-value was 0.89, indicating no significant correlation between likes and sentiment scores.

Table 5. Results of the Fisher's Exact Test Correlation Analysis Between Likes and Sentiment Scores

Social media	Correlation between Likes and Sentiment Scores		
	Most Liked Statistical Significance	Least like Statistical Significance	Testing
Emotional			
Instagram	0.07*	0.01**	*Significant correlation*
Twitter	0.01***	0.01**	*Significant correlation*
Informative			
TikTok videos	1	0.73	*No correlation*
YouTube videos	1	0.10	*No correlation*

(Significance level: *** p < 0.01, ** p < 0.05, * p < 0.10)

5. Discussions

Overall, our findings provide evidence that brain drain issues are communicated and engaged with differently depending on the categories of the platforms. The linkage between sentiments and engagement has become a significant priority for government public relations, as different social media platforms influence how governments, organizations, and individuals respond to brain drain topics by raising doubts about shared beliefs and information credibility. Our results support the arguments of gratification theory (Kim, 2021), demonstrating that emotional platforms show a significant relationship between sentiment scores and engagement, whereas informative platforms do not exhibit such a tie. This suggests that users with emotional motives express their approval of brain drain topics as complementary to social interaction, leading to more genuine and positive engagement with the content. Conversely, on informative platforms in the context of brain drain, sentiments are less associated with engagement as information rewards become more important than expressing preferences.

Research indicates that emotional attachment plays a significant role in how content is perceived and shared on Twitter. False information, for example, is often more novel and engaging to users compared to true information, leading to higher share rates (Vosoughi et al., 2018). Emotional intention and values are crucial in Twitter's UX evaluation. Twitter's environment, where emotional attachment and values play a significant role, supports the idea that users are more likely to internalize messages that foster emotional connections (Taylor, 2021). This makes Twitter a powerful platform for conveying and amplifying messages based on emotional resonance. Our results add to Taylor's (2021) and Vosoughi et al. (2018) study that has found that emotional platforms like Twitter's community-building process, in our study, Twitter exhibited a higher proportion of negative sentiments compared to Instagram, especially among posts with least likes. This pattern suggests that Twitter is highly synchronized with user sentiments and dislikes, meaning the platform's design and interaction features allow for a more immediate and intense expression of negative feelings when content fails to resonate with the audience. The results highlight Twitter's unique role as a platform where sentiments, particularly negative ones, align closely with user engagement metrics like likes or shares.

The results also contribute to the growing body of theoretical literature on mitigating fake news and misinformation (Geeng et al., 2020), and on building verification processes when misinformation harms the platform. Emotional platforms with low verification incentives show similar sentiment variances across different outlets, while informational platforms with high verification incentives garner diverse sentiments associated with various aspects of brain drain. Furthermore, linking sentiment scores with components of engagement offers new insights into how these two platform categories can amplify or mitigate communication cascades. Importantly, it suggests that brain drain communication via social media platforms can be

strategically extended to determine which platforms are more prone to sharing positive comments and how to shape policy interventions.

Table 6. Practical Problems to Practical Implementation

Content Creators Profiles	Issues	Platforms To Be Used	Recommended Actions
Post Characteristics	Emotional Attachment > Informative Value		
Government Profiles	Sentiment Polarity	Instagram	Disseminate Positive Narratives And Success Stories About Returning To Italy. Use a Public Speaking Tone That Impact The Emotional Part of Viewers.
NGO Profiles	Sentiment Variance	Twitter and Instagram	Highlight Government Initiatives And Support For Returning Professionals To Instill Hope And Positivity.
Activist Profiles	Sentiment Variance	Twitter and Instagram	Sharing Personal Stories And Testimonials That Resonate Emotionally With Their Followers.
Post Characteristics	Informative Value > Emotional Attachment		
News Profiles	Sentiment Variance	TikTok, YouTube and Twitter	Publish Articles And Videos That Emphasize The Benefits Of Returning Expatriates.
NGO Profiles	Engagement	TikTok	
Activist Profiles	Engagement	TikTok	

6. Recommendation

Practical Implications & Social Implications

Table 6 provides a strategic framework linking content attributes, creator profiles, and platform selection for optimized engagement. For government profiles, figures like Prime Minister Giorgia Meloni and Minister of Labor Marina Calderone should share positive narratives and success stories about returning expatriates. Instagram is ideal for showcasing stories that influence sentiment polarity around brain drain and promote Italy's efforts to attract talent back home.

This study shows that key content creators can play an active role in reducing polarization around brain drain by combating misinformation on platforms like TikTok, which inherently supports diverse opinions. Sentiment variance is higher on TikTok than on Instagram, as emotional attachment tends to reinforce pre-existing beliefs and lead to homogenous, less varied comments. However, TikTok's content verification processes can prevent the spread of fake news and encourage balanced discourse by incorporating authentic information and discarding misinformation.

7. Limitations

This study has several limitations that highlight opportunities for future research. Although YouTube and TikTok are both categorized as informative platforms, their sentiment score distributions differ due to key characteristics. YouTube features longer, more detailed content that attracts viewers who engage in deeper analysis, while TikTok's short-form content caters to quick consumption and a younger demographic, influencing how content is perceived and responded to.

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APPENDICES

Figure 2. 2. DATA COLLECTION PROCESS FOR TIKTOK

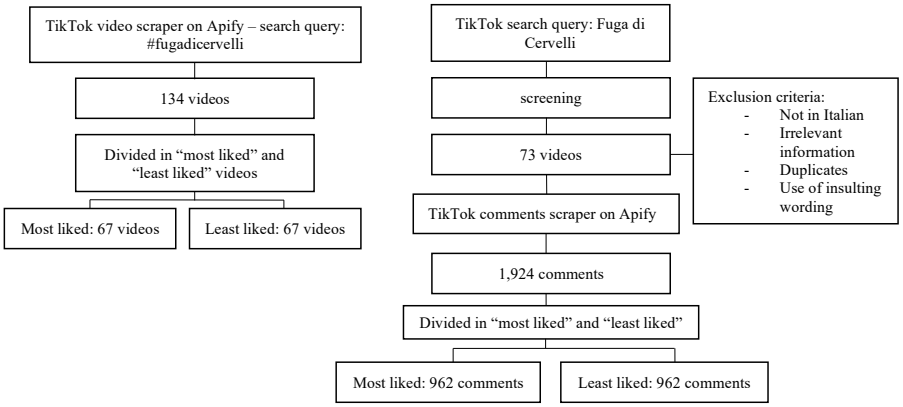

Table 6 - Data Collection Process for TikTok

Figure 2.3. DATA COLLECTION PROCESS FOR YOUTUBE

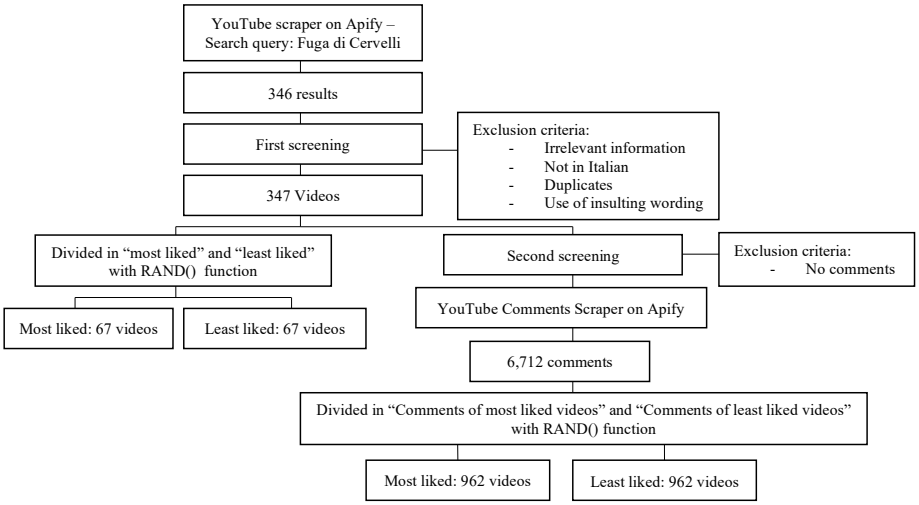

Table 7 - Data Collection Process for YouTube