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Russia Conflict on Twitter: Social factors and polarity on users' interactions

Perez-Cepeda, Maximiliano*
Garcés-Silva, Magaly**
Villacrés-Roca, Ricardo***

Abstract

In the aftermath of armed conflicts, societal expressions unfold through diverse communication channels, with Twitter. Individuals share these expressions, aiming for broader societal consumption, fostering interaction across impacted entities—individuals, businesses, organizations, and governments. This analytical endeavor aims to analyze interaction patterns responding to sociocultural factors and sentimentally charged content on Twitter in the context of the Russia-Ukraine conflict. This research employed a sequential mixed approach to examine social factors in user publications on Twitter and assess their impact on interactions, considering sentimental polarity. The qualitative phase involved netnographic exploration of a total of 2578 tweets, collected from users World Trade Organization since February 24, 2022, until March 31, 2022. The subsequent quantitative phase analyzed the relationship between social factors, sentimental polarity, and user interactions through decision tree analysis. The results show that notably, the categories MET-Mention (35.82%) and MSG-Message (35.82%) emerged as the most frequent Two interactions were the most common (52.5%). The primary theme discussed in the messages was Information with 52.99% of the twits. Negative polarity emerged as the factor triggering more engagement, resulting in higher interaction levels. The majority of interactions (52.5%) were characterized by two interactions. In conclusion, the dominance of the information category underscores the pivotal role of social media in disseminating information during global events. Furthermore, negative sentiment, is associated with conflict-related concerns, correlated with higher interaction levels.

Keywords: Twitter interaction; sentiment analysis; social factors; armed conflicts.

*   Universidad Católica de Santiago de Guayaquil. Address: Av. Pdte. Carlos Julio Arosemena Tola, Guayaquil – Ecuador. E-mail: maximiliano.perez@cu.ucsg.edu.ec ORCID: https://orcid.org/0000-0001-9145-7660
**   Universidad Católica de Santiago de Guayaquil. Address: Av. Pdte. Carlos Julio Arosemena Tola, Guayaquil – Ecuador. E-mail: magaly.garces@cu.ucsg.edu.ec
***   Investig-arte Cia. Ltda. Address: Av. José María Egas. Cdla. Sauces III Mz. 125 V.17. E-mail address: ricardo.villacres@investigarte.in ORCID: https://orcid.org/0000-0003-0792-3185

Conflicto Rusia-Ucrania en Twitter: factores sociales y polaridad en las interacciones

Resumen

Ante los conflictos armados, las expresiones sociales se desarrollan a través de diversos canales de comunicación, entre ellos Twitter. Los individuos comparten estas expresiones, apuntando a un consumo social más amplio, fomentando la interacción entre las entidades afectadas: individuos, empresas, organizaciones y gobiernos. Este artículo tiene como objetivo analizar patrones de interacción que responden a factores socioculturales y contenido con carga sentimental en Twitter en el contexto del conflicto Rusia-Ucrania. Esta investigación empleó un enfoque mixto secuencial para examinar los factores sociales en las publicaciones de los usuarios en Twitter y evaluar su impacto en las interacciones, considerando la polaridad sentimental. La fase cualitativa implicó la exploración netnográfica de un total de 2578 tweets, recopilados de usuarios de la Organización Mundial del Comercio desde el 24 de febrero de 2022 hasta el 31 de marzo de 2022. La fase cuantitativa posterior analizó la relación entre factores sociales, polaridad sentimental e interacciones de los usuarios a través de la decisión. análisis de árboles. Los resultados muestran que, en particular, las categorías MET-Mención (35,82%) y MSG-Mensaje (35,82%) surgieron como las más frecuentes. Dos interacciones fueron las más comunes (52,5%). El tema principal tratado en los mensajes fue la Información con el 52,99% de los twits. La polaridad negativa surgió como el factor que desencadenó un mayor compromiso, lo que resultó en mayores niveles de interacción. La mayoría de las interacciones (52,5%) se caracterizaron por dos interacciones. En conclusión, el predominio de la categoría de información subraya el papel fundamental de las redes sociales en la difusión de información durante eventos globales. Además, el sentimiento negativo se asocia con preocupaciones relacionadas con el conflicto, lo que se correlaciona con niveles más altos de interacción.

Palabras clave: Interacción en Twitter; análisis de sentimientos; factores sociales; conflictos armados.

1. Introduction

The Russia-Ukraine conflict, has had global repercussions, impacting political, economic, and societal dimensions (Endam & Wasum, 2022; Lin et al, 2023). Nitoiu & Pasatoiu (2023) emphasized the evolving role of social media, particularly Twitter, in political diplomacy over the last decade, an argument echoed by Amara et al, (2021), who underscore Twitter's prominence as a data source in the digital communication landscape.

Tao & Peng (2023) highlighted that, in the aftermath of armed conflicts, societal expressions unfold through diverse communication channels, with Twitter. Individuals share these expressions, aiming for broader societal

consumption, fostering interaction across impacted entities—individuals, businesses, organizations, and governments (Garcia & Cunanan-Yabut, 2022). Perez-Cepeda & Arias-Bolzmann (2021) further note how these shared messages serve as a means for individuals to externalize their emotions, conveying concepts and ideas that help identify sociocultural factors offering solace to the affected groups.

Highlighting the WTO, its membership exceeding 160 countries, represents the largest international trade agreement, conferring advantages like market access and a predictable trade policy environment, along with a dispute resolution framework (Kucheriava, 2022). Perez-Cepeda & Arias-Bolzmann (2021) stressed the indispensable nature of data exchange within the WTO, emphasizing the need to comprehend standards upheld by engaged individuals across communication channels, including digital platforms.

Coelho et al, (2016) highlighted the impact of post types on user interaction on social media, while Hagemann and Abramova (2023) emphasized the negative relationship between a tweet's emotionality and engagement. This analytical endeavor aims to analyze interaction patterns responding to sociocultural factors and sentimentally charged content on Twitter in the context of the Russia-Ukraine conflict.

In this research, the following research question (RQ) is asked: How do sociocultural factors and sentiment factor influence on the interaction in Twitter on @wto in time of war? In addition to the general RQ, the following research questions were developed for this study. RQ1: What is the structure and intensity of these interactions? RQ2: What are the topics addressed by users who interact with the Twitter user @wto?

RQ3: What polarity of sentiment cause more interaction with the Twitter user conceptualized @wto? RQ4: What are the sociocultural ideologies interrelated to interactions with the Twitter user @wto?

Hence, the results of the present study are expected to offer valuable insights in the following ways: (a) aiding social media administrators in identifying the sociocultural factors that drive increased user engagement concerning the Russia-Ukraine conflict, (b) assisting researchers in analyzing tweet content to unveil the latent sociocultural factors influencing the generation, interpretation, and dissemination of messages among users, and (c) providing academics with insights into the practical utility of Twitter as a data collection tool for assessing user perceptions in times of conflict, such as the Russia-Ukraine situation.

2. Sociocultural Dynamics and Sentimental Polarity in Twitter Interactions within the World Trade Organization and Armed Conflicts

In the realm of contemporary discourse, the examination of sociocultural dynamics and sentimental polarity within Twitter interactions has emerged as a focal point of scholarly investigation, particularly within the sphere of the World Trade Organization (WTO) and armed conflicts. The comprehensive understanding of the nuanced sentiment expressed in social media conversations pertaining to these subjects is crucial for discerning public perceptions and attitudes. This study endeavors to delve into the multifaceted nature of these interactions, shedding light on their far-reaching implications.

2.1. Sociocultural Dimensions During Armed Conflicts

People's reactions to conflicts are diverse and influenced by personal experiences, cultural backgrounds, and the nature of the conflict. Emotional responses range from fear and anger to sadness and anxiety, often resulting in stress and trauma. Societal responses include community support, social divisions, and mistrust, while individuals may become activists, advocates for peace, or face displacement due to conflict-related migration (Chen et al, 2022; Polyzos, 2023).

In the context of social networks during armed conflicts, sociocultural dimensions involve a complex interplay between social and cultural factors in the digital sphere. This interplay shapes how societies engage with crises, encompassing the rapid dissemination of conflict-related information, public discourse reflecting diverse sociocultural viewpoints, mobilization and activism of support networks, expressions of solidarity, and preservation of cultural heritage (Perez-Cepeda & Arias-Bolzmann, 2022; Sufi, 2023).

2.2. Sentimental polarity in social network landscape

Sentimental polarity in the context of people's reactions to armed conflicts on social media is indeed a complex and multifaceted phenomenon. Individuals, during times of conflict, express a diverse range of sentiments on platforms like Twitter, Facebook, or Instagram. These emotions can include both positive and negative reactions, with some individuals expressing empathy, sorrow, and calls for peace, while others may exhibit anger, frustration, or show support for one side

of the conflict (Garcia & Cunanan-Yabut, 2022; Johnson et al, 2022; Ngo et al, 2022).

The emotional responses on social media during armed conflicts reflect the various ways in which people cope with and process the traumatic events associated with conflict. Social media serves as a means for seeking solace and support within online communities, as well as a platform for advocacy and activism to raise awareness about the conflict and promote peace. The sentiment expressed is not only individual but also becomes evident in the reactions of entire online communities and networks (Sielska, 2023).

Social media's role in rapidly disseminating information and connecting individuals across geographical boundaries is emphasized, influencing emotional responses and sentiments related to armed conflicts (Atad et al, 2023; Vyas et al, 2023). Johnson et al. (2022) note that social media can be a tool for promoting empathy, understanding, and peace, but it can also serve as a platform for the expression of anger, frustration, and division.

Researchers and humanitarian organizations often monitor them to gauge public reactions, sentiment trends, and identify potential areas for intervention or conflict resolution efforts (Soleimanvandi-Azar et al, 2021). Social media platforms, through their interactive nature and global reach, play a significant role in shaping public discourse during conflicts. Sociocultural impacts, encompassing both positive and negative effects, are evident in alterations in human behavior resulting from social interactions during these times (Kabalmay et al, 2022).

2.3. Twitter interactions

Interactivity, highlights the extent to which communication parties can act on each other, the communication medium, and the messages, with the degree of influence being synchronized. In the realm of social media, Twitter, in particular, holds a central role in influencing human behavior on individual and societal scales (Johnson et al, 2022). Its real-time updates and succinct messaging continue to attract users, making it a key platform for engaging with a vast audience (Woo et al, 2020).

Twitter's significance in the context of conflicts is underscored by its role as a real-time information source. For journalists, the platform provides immediate access to breaking news and on-the-ground reports, facilitating timely and comprehensive coverage of conflicts (Fahmy et al, 2022). Beyond journalism, Twitter serves as an essential information hub for the general public, offering unfiltered news from around the world and democratizing access to diverse perspectives (Hagemann & Abramova, 2023).

The impact of Twitter extends beyond information dissemination. It plays a crucial role in shaping public discourse, influencing opinions, and mobilizing support for various causes related to conflicts (Chen et al, 2022). The platform's real-time interactions, facilitated by hashtags and trending topics, contribute to the amplification of important issues, raising awareness and driving collective action (Jin et al, 2014). In the context of the Russia-Ukraine conflict in 2022, Twitter has served as a crucial hub for the dissemination of news, updates, and personal perspectives, providing real-time insights into global sentiments and reactions (Pohl et al, 2022).

2.4. The World Trade Organization (WTO)

A notable historical moment in the intersection of social media and the WTO occurred during the 1999 protest in Seattle, marking an early instance where social media supported a social movement. This event marked the beginning of a trend where new media technologies played a role in political expression, the formation of collective identities, and information sharing (Linvill et al, 2021).

In this investigation, the focus is on the interaction of the virtual community with the WTO, with Twitter serving as a key platform. Tweets related to the Russia-Ukraine conflict on Twitter, particularly those directed at the official WTO Twitter account "@wto," hold significant relevance. Analyzing these interactions allows for the identification of social factors, conceptualizations, and ideologies that emerge from the virtual community's engagement with the WTO.

3. Methodology

This research employed a sequential mixed approach (Hernández-Sampieri & Mendoza-Torres, 2018) to examine social factors in user publications on Twitter (@wto) and assess their impact on interactions, considering sentimental polarity. The qualitative phase involved netnographic exploration of World Trade Organization (@wto) tweets, informing the subsequent quantitative phase that analyzed the relationship between social factors, sentimental polarity, and user interactions through decision tree analysis using machine learning.

The netnographic approach, as outlined by Kozinets (2002a), comprised two key stages: selecting relevant

communities and forums for examination and gaining insights into member interactions within those forums. The study found that user @wto aligns with Kozinets' recommendations, and the messages exchanged within the virtual community during times of conflict directly relate to the research question (RQ). The second stage involved decision tree analysis for visualizing decision-making processes. It starts with data collection, selects features to split data, and recursively subdivides it into subsets (Lee et al, 2022).

3.1. Sampling

In line with the analytical approach advocated by Giesler and Thompson (2016) and the insights of Perez-Cepeda and Arias-Bolzmann (2022) on the role of social networks as virtual environments, this study utilized Twitter as a valuable source for investigating consumer culture across diverse domains.

The research focused on the period from the initiation of the Russia-Ukraine invasion and war on February 24, 2022, until March 31, 2022, as proposed by Giesler and Thompson (2016) for studying events with different temporal parameters. A total of 2578 tweets were collected from users interacting with @wto (World Trade Organization) during this period, providing a comprehensive dataset for analysis.

3.2. Data Analysis

The data analysis process incorporated insights from prior research on sociocultural factors, drawing on theoretical foundations applied in studies related to the homosexual subculture, refugees, and the global COVID-19 crisis (Perez-Cepeda & Arias-Bolzmann, 2020, 2021, 2022). Following recommendations from Zimmer and Proferes (2014), a non-exclusive class was initially used to categorize tweets, allowing for messages that could pertain to multiple categories. Subsequently, an exclusive class was applied for more specific classification, considering categories such as URL-Link, COM-Comment, TAG-Hashtag, RWT-Retweet, MSG-Message, and MET-Mention (Table 1).

Table 1
Tweets - Categorization and Classification - prepared by the authors

Number of Messages	War-related messages		Categorization	War-related messages		Quantity	Percentage	Classification	War-related messages		Quantity	Percentage
	Si	No		Yes	No				Yes	No		
2578	896	1682	MET-Mention	896	1682	2578	35,82%	Information	430	936	1366	52,99%
	34,76%	65,24%	MSG-Message	896	1682	2578	35,82%	Reflection	213	194	407	15,79%
			MSG-Emoticon	174	337	511	7,10%	Sociocultural	52	183	235	9,12%
			TAG-Hashtag	180	285	465	6,46%	Rude	49	88	137	5,31%
			URL-Text Link	79	275	354	4,92%	Political	55	48	103	4,00%
			URL-Image Link	109	213	322	4,47%	Economic	28	66	94	3,65%
			RWT-Retweet	60	175	235	3,26%	Human Rights	25	63	88	3,41%
			COM-Comment	39	85	124	1,72%	Commerce	20	48	68	2,64%
			URL-Object Link	4	27	31	0,43%	Religion	4	40	44	1,71%
								News	14	11	25	0,97%
								Humor	6	5	11	0,43%
			TOTAL	2437	4761	7198						
								TOTAL	896	1682	2578	

In the subsequent step, tweets were further classified into sociocultural dimensions, leveraging criteria from various researchers, including Bozdag and Smets (2017), Ghounane (2020), Guzek (2019), Leeman & van Koeven (2019), Olimat (2020), Rogstad (2016), Samuel & Sharma (2017), Schillinger et al. (2020), and Wills & Fecteau (2016) (Table 1).

These dimensions covered a wide range, including Human Rights, Information, Commerce, Economic, Political, News, Reflection, Sociocultural, Religion, Rude, and Humor.The resulting classifications and categorizations from tweet analysis were integrated into a sociocultural factors model, facilitating a comprehensive mapping of their impact within an overarching framework. For sentiment analysis, tweets and their corresponding polarity scores based on the lexicon were collected and stored in an Excel file. R Studio software, utilizing the "Sentiment Analysis" library, was then employed for further analysis.

4. Findings: Exploring the Structure, Intensity, Topics, Sentiment Polarity, and Sociocultural Ideologies in Interactions with the Twitter User @wto

This research embarks on a comprehensive exploration of interactions with the Twitter user @wto, aiming to address key inquiries: the structure and intensity of interactions, the topics discussed, the sentiment polarity driving engagement, and the sociocultural ideologies underpinning these interactions.

- **RQ1: What is the structure and intensity of these interactions?**

Addressing Research Question 1, the analysis considered categories outlined in Table 1. Notably, the categories MET-Mention (35.82%) and MSG-Message (35.82%) emerged as the most frequent, indicating that the majority of messages incorporated one or more recipients, emphasizing their intent to ensure that users interacting with @wto consumed the disseminated information. Additionally, 7.10% of messages fell under MSG-Emoticon, using emoticons to accentuate messages.

Further breakdown revealed that 6.46% of messages belonged to TAG-Hashtag, 4.92% were URL-Text Link, 4.47% were URL-Image Link, 3.26% were RWT-Retweet, 1.72% were COM-Comment, and 0.43% were URL-Object Link. To measure interaction intensity, an overview categorized interactions based on their frequency. Two interactions were the most common (52.5%), followed by three interactions at 31%.

The accumulated percentages revealed that the majority of interactions (83.5%) were accounted for by the first three categories (Two, Three, and Four interactions). These findings are consistent with Atad et al. (2023), who observed factors like media format, message language, and tone influencing user engagement and interaction with diplomatic content (Diagram 1).

Diagram 1
Decisional Tree Analysis of Socio-Cultural Factors, Polarity and Interactions
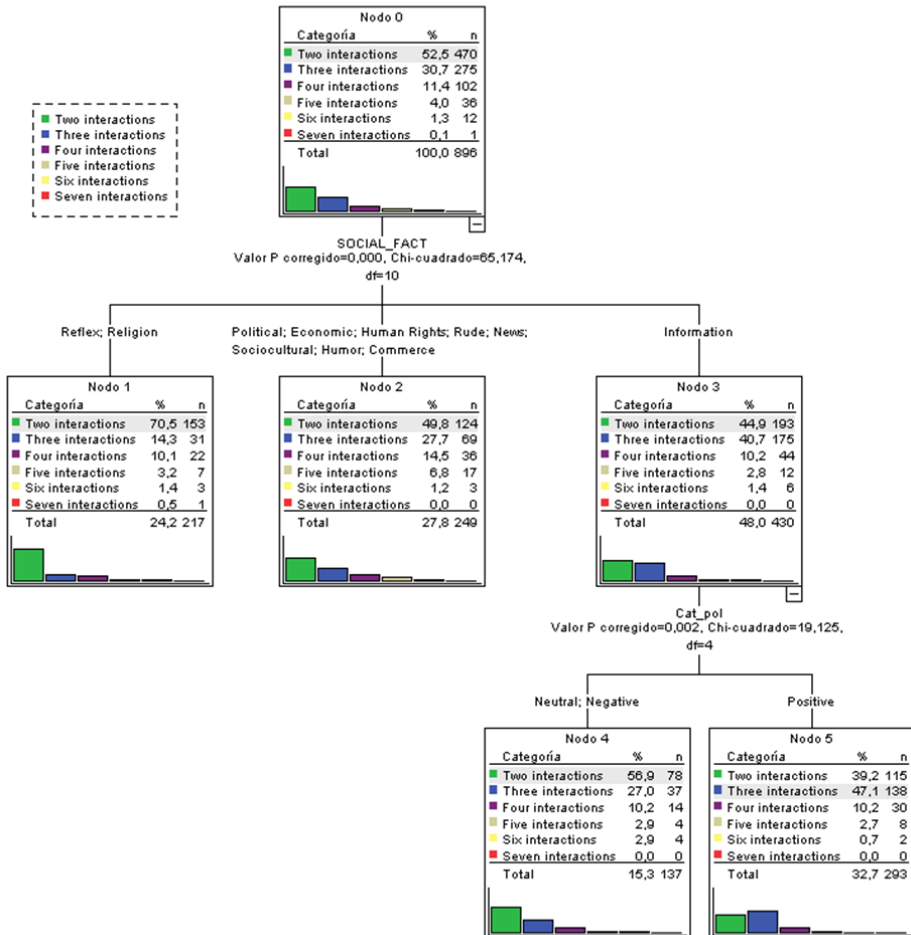
• RQ2: What are the topics addressed by users who interact with the Twitter user @wto?

In addressing this question, the classifications outlined in Table 1 were considered. The primary theme discussed in the messages was information, with 52.99% of all interactions. These findings align with the observations made by various authors, who have reported that social network users engage in discussions related to a wide range of topics: Human Rights (Bozdag & Smets, 2017); Information

– Commerce – Economic – Political (Ghounane, 2020); News – Reflection (Rogstad, 2016; Schillinger et al, 2020); Sociocultural – Religion (Leeman & van Koeven, 2019; Guzek, 2019; Schillinger et al, 2020); Rude (Samuel & Sharma, 2017; Olimat, 2020; and Humor (Wills & Fecteau, 2016).

• **RQ3: What polarity of sentiment cause more interaction with the Twitter user conceptualized @ wto?**

Addressing Research Question 3, the analysis, conducted using a decision tree method (Figure 1), underscores the crucial role of sentiment polarity in determining interaction levels with the Twitter user @ wto. The key finding indicates that positive sentiment primarily led to two interactions, while negative sentiment was associated with three interactions. Consequently, negative polarity emerged as the factor triggering more engagement, resulting in higher interaction levels during the Russia-Ukraine conflict.

The implication of this result is that, during the examined period, messages expressing negative sentiments, encompassing concerns, criticisms, or strong emotions related to the conflict, had a more substantial impact on encouraging users to engage and interact with the content posted by the World Trade Organization (WTO) on Twitter.

The results align with Hagemann and Abramova (2023), who identified a tendency towards negativity and a negative correlation between the emotional tone of tweets and engagement levels. Similarly, Sufi (2023) found consistency in mean confidence scores for sentiment analyses, with negative sentiment exhibiting higher confidence levels during a seven-month tracking period of tweets related to the Russia-Ukraine conflict. In a similar context, Wadhwani et al. (2023) reported tweet distribution with 13.88% neutral tweets, 54.29% negative tweets, and 31.83% positive tweets.

• **RQ4: What are the sociocultural ideologies interrelated to interactions with the Twitter user @ wto?**

In response to RQ4, the examination of sociocultural ideologies interrelated to interactions with the Twitter user @wto revealed intricate associations, as depicted in Table 2.

Table 2
Intensity of the interactions

	Frequency	Relative	Acum.
Two interactions	1352	52,50%	52,50%
Three interactions	791	31%	83,50%
Four interactions	293	11%	94,50%
Five interactions	104	4%	98,50%
Six interactions	35	1,50%	100,00%
Seven interactions	3	0%	100,00%
Total	2578		

The majority of interactions (52.5%) were characterized by two interactions, prominently influenced by sociocultural factors and sentiment polarity. Sociocultural elements played a substantial role in three interactions (31%), particularly focusing on reflection and religion. Four interactions (11%) were primarily associated with various sociocultural themes like politics, economics, human rights, rudeness, news, humor, and commerce. Negative sentiment polarity significantly influenced the number of interactions, particularly three interactions.

The data notably indicate a significant presence of the information category, accounting for 44.9% of two interactions and 40.7% of three interactions. This underscores the sociocultural ideology of information dissemination during the Russia-Ukraine conflict. Users engaging with @wto were primarily focused on seeking and sharing crisis-related information. This alignment with the information category echoes the findings of various authors, such as Bozdag and Smets (2017) and Ghounane (2020), who have emphasized the pivotal role of social media in disseminating and accessing information, particularly during times of global significance.

5. Conclusions

The predominance of two interactions underscores the significance of addressing specific recipients and sharing information on the platform, during conflict. Two interactions may account for users seeking to express their feelings beyond a single interaction, but they lack sufficient motivation to express themselves beyond those two interactions, in which mentions and messages are the most frequent expressions. However, this motivation may be influenced by messages with negative sentiments, considering that interactions increase with negative polarity compared to messages with positive tones. These findings emphasize the multifaceted nature of sociocultural dimensions in shaping online interactions during armed conflicts and stress the importance of considering these factors when analyzing user engagement with diplomatic content on Twitter.

The research findings hold several important implications and offer recommendations for various stakeholders, including policymakers, social media managers and researchers.

The study highlights the importance of leveraging social media, particularly Twitter, for accurate information dissemination during conflicts. It advocates for policymakers to use these platforms to share timely information, counter fake propaganda, and address negative sentiment effectively. By prioritizing transparency and accountability, policymakers can build public trust and maintain open communication channels, especially during challenging times.

Social media managers can use the study's findings to create content strategies for critical events, focusing on transparent and diplomatic information sharing to boost engagement and shape positive public perception. Incorporating sentiment analysis tools into their strategies is advised to monitor sentiment trends, identify concerns, and deliver timely responses for effective online communication management.

The study encourages further exploration of sociocultural factors and sentiment in online interactions during global conflicts, urging researchers to delve deeper into specific themes and

narratives influencing engagement. It also recommends conducting cross-platform analyses, encompassing various social media platforms, to gain a comprehensive understanding of user interactions and communication patterns during wartime and diplomatic efforts. In this sense, future research suggests:

The study's focus on Twitter interactions concerning the World Trade Organization (@wto) during the Russia-Ukraine conflict limits generalizability to other organizations, conflicts, or social media platforms. Future research could explore interactions with diverse international organizations and include a range of social media platforms to enhance understanding. Additionally, multilingual analyses are essential for international organizations with diverse audiences to ensure comprehensive representation.

The analysis is based on a specific dataset with limited data volume, particularly for categories like Humor. Acknowledging the limitations regarding data volume and sources is crucial. The study's findings are constrained by the dataset's scope and availability, impacting the depth of insights, especially in the Humor category. This scarcity of data may not offer a complete understanding of Humor's role in interactions related to the World Trade Organization (@wto) during the Russia-Ukraine conflict.

The study's focus on English-language content on Twitter introduces limitations in language and cultural specificity. Different languages and cultural contexts may yield varied interaction patterns, impacting how users express themselves online. Generalizing findings from English-language data to a global context has potential limitations due to distinct linguistic nuances, humor, and sentiment expressions. Cultural norms and values can influence content sharing and emotional tone, highlighting the need for comprehensive research in diverse linguistic and cultural contexts.

Data preprocessing is crucial for sentiment analysis in this study, where lexicon-based methods are used to understand tweet sentiments. However, these methods have limitations in capturing nuanced emotions due to the complexity and context-dependency of human language.

They may not fully grasp subtleties, sarcasm, or irony in social media posts, especially in multilingual or culturally diverse datasets. Furthermore, decision tree methods, while used for sociocultural factors and sentiment analysis, have limitations such as overfitting, impacting generalizability. Careful consideration of these limitations is essential when interpreting sentiment analysis results.

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