

*The Spread of Information and Sentiment About the Ukraine-Russia War on X:
An Analysis of Spokesperson*

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Abstract

In the aftermath of the Ukraine-Russia war, global disruptions in political, economic, and security domains raised pressing questions about their implications for international stability. This study delves into the role of X (formerly Twitter) in spreading information and influencing public opinion during this war, with a specific emphasis on tweets centered around spokespersons from the EU, UK, France, Germany, and Italy. Our analysis of English tweets revealed a pronounced preference for content referencing EU and UK spokespersons, suggesting a unified European perspective in the context of the war. While there were observable correlations between the volume of discussions on X and the war casualties over a period of seven months, these relationships varied in statistical significance slightly, highlighting the nuanced impact of real-world events on digital discourse. A sentiment analysis (using the RoBERTa-base model) brought to light varied emotional patterns. While discussions about the EU spokesperson predominantly echoed negative sentiments, reflecting public apprehensions about the war's repercussions, conversations about Germany were largely positive. These insights offer a window into the global emotional zeitgeist, underlining the profound influence of geopolitical events on public sentiment. Although this study sheds light on the complex nexus between social media, official representations, and public sentiment amid geopolitical turmoil, its focus primarily on English-language tweets and specific spokespersons denotes its limitations. Future research endeavors are encouraged to deepen the multifaceted role of social media in sculpting narratives during global crises.

Keywords: Ukraine-Russia War, X, Information Spread, Spokesperson, Public Opinion

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Introduction

The Ukraine-Russia war, a defining geopolitical event of recent times, has its roots in historical ties that were intensified due to Ukraine's leaning towards the European Union and NATO. This eventually led to Russia's annexation of Crimea and pro-Russian uprisings in eastern Ukraine. Amidst international implications, sanctions on Russia, and NATO's involvement, the conflict significantly impacted diplomatic relations and resulted in a vast humanitarian crisis. With this backdrop, the conflict has reverberated far beyond its immediate theaters. Not only has it reshaped political affiliations and economic landscapes, but it also influenced the narrative structures through which we perceive global events. A primary mediator of this narrative engagement in today's digital era is social media, with platforms like X (formerly Twitter) emerging as pivotal forums for debate, discussion, and dissemination of viewpoints. They allow for integration and connection, enabling everyone to contribute to the conversation on global issues (Spilioti, 2015).

Spokespersons are significant in shaping narratives because they play a crucial role in communicating messages to the public and influencing their perceptions. They act as mediators between the organization or government agency they represent and the media, bridging the gap between the two (Weisbuch & Mackie, 2009). The selection of a spokesperson can have a significant impact on the effectiveness of the message being conveyed. Familiarity with the spokesperson can enhance the persuasiveness of the message, as repeated exposure to a spokesperson creates a sense of fluency that can be attributed to the message itself (Lee, 2001). In times of crisis, the choice of spokesperson becomes even more critical. Scientific experts and government officials are often the most effective messengers in communicating public health messages, as they are trusted sources of information, for instance a pandemic of covid-19 (Abu-Akel, et al., 2021). Additionally, the use of narratives in crisis communication can enhance trustworthiness, attitudes towards the spokesperson, and identification with the spokesperson, ultimately shaping the narrative in a more positive way (Clementson, 2020).

In a world increasingly interconnected by technology, the rapid propagation of information and the immediate, globalized response it garners underscores the democratizing power of digital platforms. X, with its 280-character messages, has metamorphosed from a simple microblogging platform into an influential arena where narratives are built, challenged, and reshaped. Each tweet contributes to a larger mosaic of global sentiment, especially during events of geopolitical significance.

While individual voices abound on X, lending a rich diversity to the discourse, there are certain voices that carry an added weight of authority, shaping the tone and direction of discussions. Among these are the official spokespersons representing significant geopolitical entities. During the Ukraine-Russia conflict, the spokespersons of prominent European entities such as the EU, UK, France, Germany, and Italy played a particularly influential role. Their statements, positions, and associated discussions often served as touchpoints, illuminating public sentiment, and revealing broader perceptions of Europe's role in the conflict.

This study dives into this intricate web of narratives, seeking to understand not just the content of the discourse surrounding these spokespersons but also the emotions they evoke. How do sentiments differ when discussing different spokespersons? What does this tell us about public perceptions and expectations of these entities in the context of the war?

Literature Review

Social Media's Role in Global Discourse. The transformative potential of social media in shaping global discourse is undeniable (Matang, et al., 2023). Platforms like X (formerly Twitter) have evolved from mere communication tools to arenas that significantly influence public opinion. For instance, during the Arab Spring, X was instrumental in promoting social change and grassroots activism, especially in the Middle East (Alyami, et al., 2017; Bruns, et al., 2013).

X's Influence on Major Political Events. Major political events like the Brexit negotiations showcased how X facilitates the diffusion of information and creates user-generated content, influencing public sentiment (Mora-Cantallops, et al., 2021). Studies such as Lynn, et al., (2020) and Georgiadou, et al., (2020) highlighted X's role in mediating public discourse during Brexit. Moreover, analysis demonstrated that during times of polarization, influential users dominated discussions, as observed during the Euroscepticism wave on X (Rajabi, et al., 2021).

The Changing Landscape of Spokesperson Communication. Historically, spokespersons have played pivotal roles in influencing public opinion. In the digital age, platforms like X have amplified this influence. Government spokespersons and politicians now utilize X to bypass traditional media, directly reaching the public and journalists (Park, et al., 2016; Broersma, et al., 2015; Gruzd, et al., 2018; Casero-Ripollés, et al., 2022; Caplan, 2013).

The Ukraine-Russia conflict introduced new challenges in the realm of digital narratives. Preliminary studies highlighted the intense battle for narrative control. The dynamics of identity, intertwined elements of identity and image, and the challenges of winning narrative contests on social media platforms were evident during this conflict (Miskimmon, et al., 2014; Lutz, et al., 2022; Zaharna, 2016; Neate, et al., 2010).

The Ukraine-Russia conflict has been portrayed on social media in various ways. There has been a prevalence of Russian propaganda and misinformation on platforms like Facebook and X, with a disproportionate role played by superspreaders in amplifying unreliable content (Pierri, et al., 2023). Comparative media analysis of X and Weibo platforms showed that Weibo posts are synchronized with Chinese mainstream media, while X posts are delicate and provocative from the perspective of individual encounters (Tao & Peng, 2023). The Russian government has used its official X accounts to shape English-language conversations about the war, portraying itself as a noble world leader interested in peace and cooperation (Shultz, 2023). The conflict has also led to an increase in public engagement with Russian state-sponsored media and other domains known for pushing unreliable information (Chen & Ferrara, 2023). Additionally, a dataset of tweets posted by news or media companies worldwide provides insights into the global narrative surrounding the conflict (Hakimov & Cheema, 2023).

To sum up, the landscape of global discourse has significantly evolved with the advent of social media platforms like X. From grassroots movements to major political events, these platforms shape and reflect public sentiment in real-time. While individual users contribute to the broader discourse, the voices of official spokespersons, with their authority and reach, significantly influence narratives. Despite the existing literature on X's role in global events, the specific dynamics concerning European spokespersons during the Ukraine-Russia conflict

remains under-explored. This study aims to fill this gap, providing insights into how spokesperson-led narratives on X influence public discourse during major geopolitical events.

Purpose of the Study

The objective of this research is to investigate the narratives surrounding the Ukraine-Russia war on X (formerly Twitter), emphasizing the influential role of spokespersons in shaping public opinion and the emotional sentiments echoed throughout the discourse. Given the transformative potential of social media in global discourse, understanding these dynamics is crucial for policymakers, media entities, and public relations practitioners as well as ordinary people. The questions this study seeks to answer include:

1. How does information spread on X regarding the Ukraine-Russia War influence public opinion?
2. How do X discourses around the conflict shape emotional responses among the users, especially with regard to European spokespersons?
3. How have discussion topics regarding the war evolved over time on X?
4. What broader insights can be drawn from X discourses about the societal impacts of international conflicts?

Addressing these questions will not only provide insights into the communicative dynamics of this specific geopolitical event but also offer a blueprint for understanding how narratives evolve on social platforms during major global crises. This, in turn, holds significant implications for strategic communication efforts during such situations.

Data Collection

In order to determine what kind of impact social media has had on people during the Ukraine-Russia conflict, we collected and analyzed English tweets containing words related to the spokespersons of EU, UK, France, Germany, and Italy posted during the conflict between February 1st and September 1st, 2022. Through this data, we aim to uncover patterns, trends, and sentiments that dominated the digital discourse during this period.

Data Analysis

In analyzing the dataset, we employed a combination of text analysis and sentiment analysis tools to reveal underlying thematic trends, emotional tones, and public sentiment associated with each spokesperson and the unfolding events of the war.

Central to our sentiment analysis is the use of the RoBERTa-base model, a robust language model renowned for its achievements in various natural language processing tasks. RoBERTa-base is a replication study of BERT pretraining, evaluating the impact of hyperparameters and training data size. Notably, RoBERTa-base can match or exceed the performance of many models that followed BERT, showcasing its high accuracy and versatility in handling language-based tasks. Its state-of-the-art results on datasets such as GLUE, RACE, and SQuAD underline its capability to derive nuanced insights from vast textual datasets (Liu et al., 2019). The choice of RoBERTa-base in our study ensures precision in extracting emotional sentiments and capturing the intricate nuances of public discourse surrounding the conflict.

Findings

Our data collection encompassed a substantial 148,170 Tweets from English-speaking X (formerly Twitter) users. When sorting these tweets based on mentions of spokespersons and their associated countries, a clear trend emerged. Spokespersons representing the EU were the most frequently discussed, featuring in 47% of the collected tweets (Figure 1). Spokespersons from the UK were the next most prominent in the discourse. However, it's worth noting that the English language of the dataset could have contributed to the increased mentions of UK spokespersons.

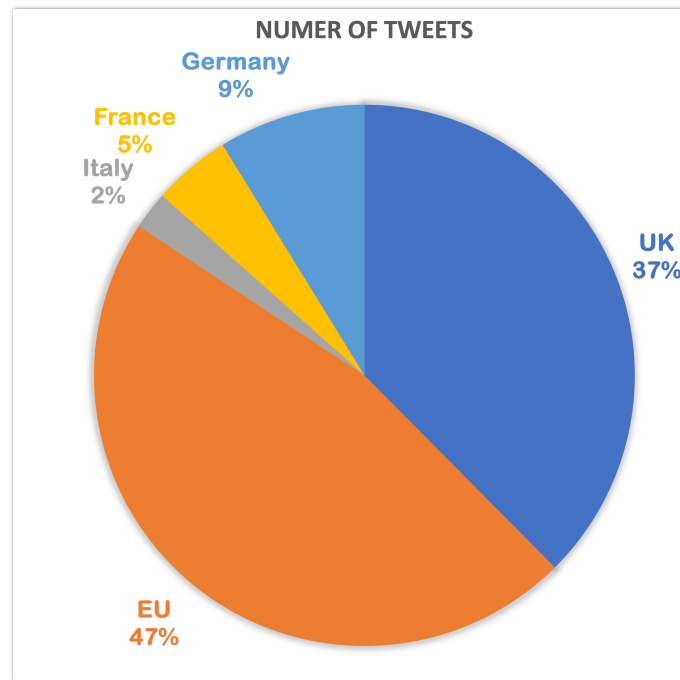


Figure 1: Number of tweets related to the spokespersons

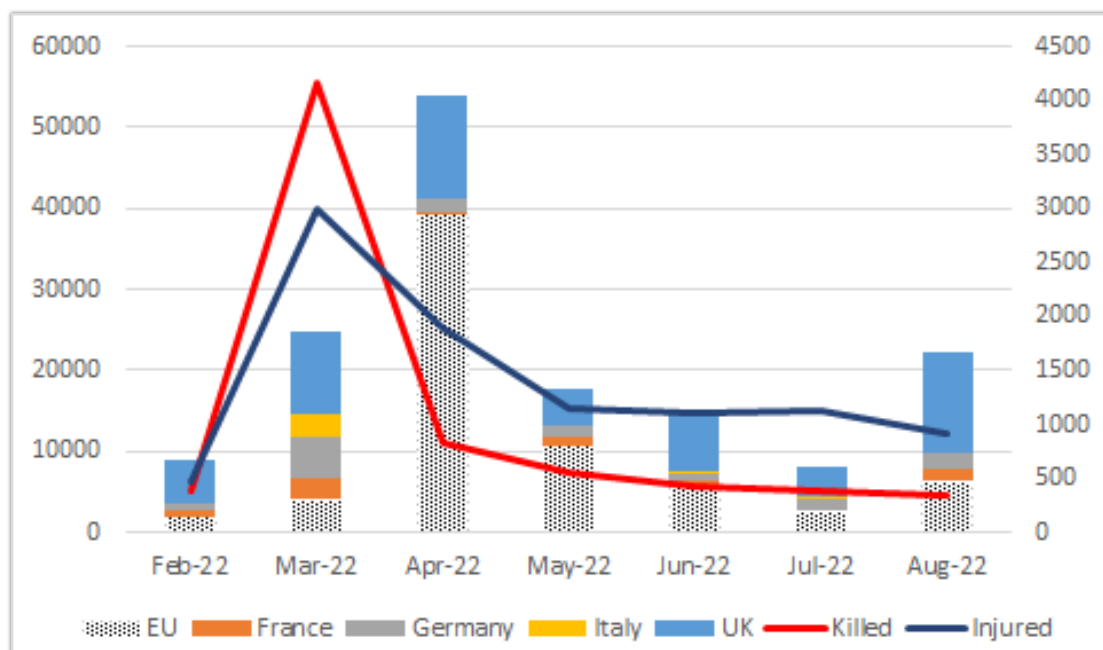


Figure 2: Correlation Between Ukraine Conflict Casualties and Tweet Volume of Major European Entities (Feb - Aug 2022)

Mentions of spokespersons associated with Germany also emerged significantly within the data. Given the nuanced stakes Germany holds in the Ukraine-Russia conflict, spanning from economic involvements and energy dependencies to historical contexts and commitments to European stability, it's understandable that English-speaking X users would engage extensively with content related to German spokespersons. In contrast, France and Italy had comparatively lower engagements.

In reviewing the data comprehensively, one discernible pattern stood out: English-speaking X users displayed a strong inclination towards content relating to spokespersons from the EU and the UK. This observation highlights the central role such spokespersons play in guiding English-speaking audiences' perceptions and understanding of the Ukraine-Russia conflict.

In the presented graph, we observe the trends in the number of tweets over a span of seven months from datasets corresponding to five significant entities: the EU, UK, Germany, France, and Italy. These trends are juxtaposed against the real-time data representing the number of individuals killed and injured in the Ukraine (Office of the High Commissioner for Human Rights, 2023) conflict during the same period (Figure 2). A distinct pattern emerges, suggesting a possible influence of on-ground events in Ukraine on the volume of X discussions. Specifically, as the numbers of casualties changed over time, there were corresponding fluctuations in the number of tweets from the datasets.

	France	Germany	Italy	UK	Killed	Injured
EU	0.143	0.464	-0.714 [†]	0.536	0.357	0.429
France	1	0.607	0.5	0.321	0.179	0.179
Germany		1	-0.036	0.571	0.429	0.643
Italy			1	-0.036	-0.071	-0.214
UK				1	0.214	0.214

Killed					1	0.929 ^{**}
Injured						1

** : $p < .01$ * : $p < .05$ † : $p < .1$

Table 1: Spearman's Correlation Coefficients for Tweet Volume and Casualties Across Major European Entities and the Ukraine Conflict

Table 1 displays Spearman's Correlation Coefficients between the volume of tweets related to various European entities and the Ukraine conflict against the number of casualties. It is observed that while there are fluctuations in the number of tweets in relation to the changing numbers of casualties, these correlations may not always be statistically significant.

For instance, a notable correlation is observed between tweets mentioning the EU and those referencing Italy, with a Spearman's ρ value of -0.714. However, it is important to note that this correlation, despite its magnitude, is not perfectly statistically significant at the commonly accepted levels ($p < .01$). Similarly, while a moderate correlation ($\rho = 0.536$) is seen between the EU and UK datasets, and a strong correlation between Germany and France with a ρ value of 0.607, further tests and analyses are essential to ascertain the significance and implications of these observed trends. However, since these values are not significant, it is necessary to calmly understand the meaning of the pseudo-correlation where is a risk in assuming that tweets are linked to core public opinion within each country or the EU. Then, as we delve deeper into the data analysis, it becomes evident that the shifting online discourse

This duality in the conversation surrounding Italy underscores its unique position in global discourse, balancing its identity as a luxury fashion epicenter while simultaneously engaging in key geopolitical dialogues.

In a comprehensive examination of the five visualization networks, distinct patterns emerge concerning the discussions surrounding various spokespersons and countries. For the EU, the discourse is primarily centered on Ukraine's potential EU membership, coupled with concerns about nuclear challenges and global crises. Shifting focus to the UK, conversations are diverse, touching upon the Royal Family, nuclear safety in Ukraine, and diplomatic interactions, notably the removal of tweets from the Russian Embassy and China's principled stance on the Ukraine issue. Germany's narrative is deeply intertwined with energy topics: the intricacies of gas trade, the operation of nuclear power plants, the importance of nuclear safety, the nation's reliance on Russian oil, and proactive steps towards diversifying energy sources, as evidenced by their deal with Qatar. Furthermore, sanctions against Russia also pique interest in the German discourse. France's discussions reveal a geostrategic landscape, encompassing their relationships with both China and Russia, and their reactions to energy disruptions, such as the halt of gas flows from Germany. The narrative also touches upon France's involvement in arming Ukraine.

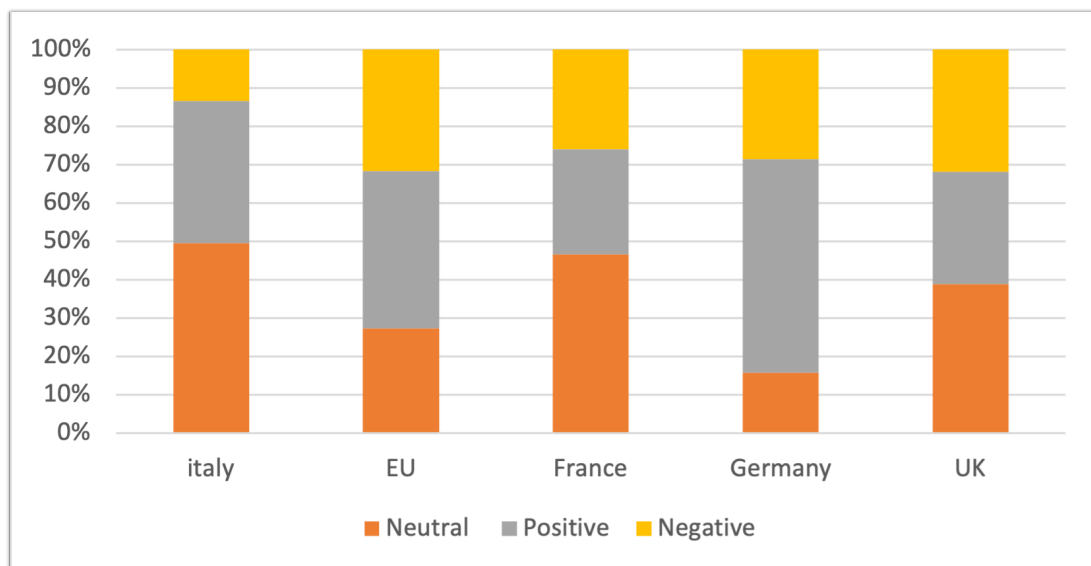


Figure 8: Sentiment Analysis Distribution for Major European Entities

Lastly, when Italy is under the lens, the dialogue leans towards luxury brands, highlighting the country's rich fashion legacy. Yet, amid this brand-focused discourse, Italy's foreign relations, especially with China and India, also carve out a space, indicating the nation's broad spectrum of influence and interests. These visualization networks underscore the multifaceted nature of conversations around spokespersons, revealing a tapestry of geopolitical concerns, energy strategies, and cultural identities.

Emotional Sentiment Analysis

The unfolding events of the war have induced dynamic shifts in public sentiment, as revealed by our study. The fluctuations in these sentiments provide invaluable insights into the emotional reactions of individuals in response to the evolving war dynamics.

The visual representation from our sentiment analysis offers a lucid depiction of the emotions expressed by the public when discussing spokespersons across various European regions during this tumultuous period. By leveraging a supervised machine learning methodology, our aim was to unravel the emotions encapsulating these discussions, providing clarity on how the public's perceptions and decisions shift in relation to the ongoing conflict.

To execute this, the RoBERTa-base model was employed—a sophisticated machine learning framework meticulously trained on an expansive dataset of roughly 124 million tweets. The RoBERTa-base model, renowned in the realm of natural language processing, has been effectively used in diverse tasks, from event extraction to text classification. This model integrates extensive prior knowledge and employs advanced techniques, such as gated fusion mechanisms, to bolster entity representation and bolster accuracy. Known for outperforming traditional BERT-based models, the RoBERTa-base model was an ideal choice, particularly given its adeptness at analyzing English language content, ensuring precision in our sentiment classifications.

Fundamentally, sentiment analysis classifies textual information into three principal emotion categories: negative, neutral, and positive (Figure 8). Our assessment vividly delineates these emotions. For instance, dialogues focusing on the EU spokesperson are predominantly tinged with negative sentiments, reflecting potential apprehensions or critiques about the EU's actions or positions. Conversely, discussions centered around Germany exude a more positive tone, suggesting a more favorable or optimistic view of Germany's role or decisions amidst the conflict. Equally revealing are the sentiments associated with spokespersons from the UK, France, and Italy. The UK presents a more balanced sentiment distribution, with nearly equal proportions of positive, negative, and neutral tones, suggesting a diverse range of opinions and responses to the UK's role and decisions in the conflict. Meanwhile, France exhibits a slight tilt towards neutral sentiments, possibly indicating a more reserved or cautious public reaction to France's actions or statements. Italy, on the other hand, showcases a predominant neutral sentiment, interspersed with similar percentages of positive and negative emotions, indicating that discussions around Italy's spokesperson may not have been as polarized or charged as those related to some other European entities. Such insights offer a snapshot into the collective emotional landscape, highlighting the deep-rooted influence of geopolitical happenings on public sentiment.

Analyzing the data from the Figure 8, our chi-square test offers compelling insights. The observed sentiment distributions—negative, neutral, and positive—in discussions about the spokespersons of Italy, EU, France, Germany, and the UK are not mere chance occurrences. There's a discernible difference in sentiment distributions in these discussions about the respective spokespersons, with this variance being statistically significant at the 1% level ($\chi^2(8) = 6303.027, p < .01$).

Conclusions

The dynamics of the Ukraine-Russia war and its reverberations across the digital discourse have been intricate, multifaceted, and profound. Social media platforms, particularly X, have worked not merely as passive reflectors of global sentiment, but as active mediators, shaping narratives, perspectives, and emotional responses. This study, by diving deep into the discourse surrounding spokespersons from significant European entities, provides a granular understanding of these complex digital narratives.

Several key insights surface from our research, based on centrality in network analyses of European Spokespersons. The pronounced emphasis on their words from the EU, UK, and Germany, as evidenced by our data, underscores their central role in steering the digital discourse around the conflict. Their statements, perspectives, and the ensuing discussions serve as pivotal touchpoints in the broader digital conversation.

Our sentiment analysis illuminated the deep-seated emotions that geopolitical events elicit, that is “Emotional Resonance”. While discussions around the EU spokesperson were tinged with negativity, suggesting apprehensions or critiques about the EU's stance, conversations about Germany bore a positive hue, reflecting approval or optimism about its role in the conflict.

The multifaceted discussions, ranging from direct war implications to tangential topics like luxury brands in Italy or the Royal Family in the UK, highlight the intricate web of narratives that emerge on digital platforms. These conversations mirror the interplay between historical contexts, cultural identities, geopolitical strategies, and real-time events. In this sense, confirming such a multi-layered online sphere, this study revealed the existence of diverse online public opinion as “a complex web of narratives” during this crisis.

We could identify “the reverberation and influence of real-world events”. While there were observable correlations between real-world events, such as war casualties, and the volume of digital discourse, these relationships varied in statistical significance. This underscores the nuanced impact of on-the-ground realities on online narratives and the intricate relationship between the digital and physical realms in today's globalized world.

For effective digital discourse management, policymakers should keenly monitor and address sentiment dynamics on platforms like X, while spokespersons emphasize proactive, transparent communication. Media organizations, in their quest for balanced reporting, should incorporate diverse perspectives to avoid echo chambers and ensure a holistic portrayal of narratives.

On the one hand, this study offers a comprehensive analysis of English-language tweets during the conflict, on the other hand it's imperative to recognize its inherent limitations. Diverse linguistic communities may present varied narratives and sentiments, emphasizing the need for more multilingual research. Furthermore, focusing on other digital platforms, we could offer broader insights into the digital discourse around geopolitical upheavals.

In summation, the Ukraine-Russia war, as experienced and expressed in the digital domain, underscores the pivotal role of social media in today's geopolitically charged environment. Platforms like X are more than mere communication tools; they are arenas where global sentiments are forged, shaped, and disseminated. As the lines between the physical and digital worlds continue to blur, understanding these digital narratives becomes imperative, not only to grasp public sentiment but also to navigate the complex terrains of global geopolitics. Future research, building on the insights from this study, holds the promise to further unravel the intricate dance between global events and their digital echoes.

The findings of this study carry profound implications for various stakeholders. Policymakers and diplomats should recognize the vital role of spokespersons in shaping sentiment and strategize their communications accordingly. Media firms, in an era dominated by platforms, must prioritize accurate information dissemination, at the same time also they leverage these

platforms to gauge and respond to public sentiment. Digital platforms face the onus of ensuring content authenticity and promoting constructive dialogue, while researchers are beckoned to explore the rich intersections of linguistics, cultural context, technology, and global sentiment, especially in a multilingual digital landscape.

In the era of digitalization, with the burgeoning influence of artificial intelligence and sentiment analysis tools, the interplay between information dissemination, public opinion, and unfolding global events has gained unprecedented complexity. Such technological advancements not only offer a lens to comprehend public sentiment but also shape it in real-time. This study stands as a testament to this evolving landscape, illuminating potential avenues for deeper exploration into the intricate dynamics of social media, spokespersons, and global conflicts.

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