How #TaiwanCanHelp Reverberates: An Exploratory Analysis of Advocacy Hashtag on Twitter

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Abstract
Taiwan’s unique circumstance as a contested state makes it imperative for the country to increase international support for and awareness of its embattled democracy at the hands of the authoritarian government in Beijing through positive public visibility. #TaiwanCanHelp, while perhaps similar to other forms of hashtag activism, is also very different because it also encompasses digitalization of diplomacy, in which the Taiwanese government seeks to raise international awareness of its struggle and gain goodwill through its medical equipment donations. The social influence of #TaiwanCanHelp has not been measured and examined extensively. Evaluation of hashtag use at a holistic level is imperative to the understanding of the extent of resonance across social media. This study explores the dynamics of the #TaiwanCanHelp hashtag on Twitter by quantifying the public response and uncovering the public opinions around #TaiwanCanHelp. A mixed-methods methodology incorporating time-series analysis, sentiment analysis, spatial analysis, and word clouds has been adopted. Our results reveal that #TaiwanCanHelp has resonated beyond Taiwan and received positive responses from diverse users across the globe. Our findings also suggest that the prominence of #TaiwanCanHelp rides on real-life events and is a successful attempt by the Taiwan government in generating international interest through digitalization of diplomacy to advance Taiwan’s interests.

Keywords
hashtags, digitalization of diplomacy, social media analytics, text mining, opinion mining, sentiment analysis, public health

Introduction
#TaiwanCanHelp, a hashtag that seemed to come into use organically with its first appearance on Twitter on 31 March 2018, has subsequently gained prominence during the current COVID-19 pandemic, as Taiwan uses it to frame its success in COVID-19 management to promote its international status. However, due to Taiwan’s unique status as a contested state, being on the “periphery of states” while battling for recognition as a sovereign state, this hashtag shows how Taiwan takes advantage of its COVID-19 story’s intrinsic dual nature as a political jab, packaged and presented as a triumphant public health narrative while continuing to gain goodwill through its international cooperation efforts.

Jason Yin (2021) briefly discussed the #TaiwanCanHelp hashtag and its derivative #TaiwanIsHelping for the period April to May 2020, especially against the backdrop of Taiwan’s bid for inclusion in the World Health Organization (WHO) through digitized health diplomacy, and this article seeks to add on to his findings. The following subsections provide a literature review on hashtag advocacy and activism, and digitalization of diplomacy, a brief background on Taiwan’s unique circumstances, and a timeline of the events surrounding the hashtag #TaiwanCanHelp.

Hashtag Advocacy and Activism
Since its inception in 2007, hashtags organize tweets by establishing a searchable shortcut that connects people and ideas. Tweets with hashtags have been found to be twice as...
has now become standard practice for diplomatic institutions all over the world, with Ministry of Foreign Affairs (MOFA) from different countries engaging domestic and foreign publics on Skype, Facebook, WhatsApp, and Twitter. Most world leaders and foreign ministries have an official Twitter account that allows a nation to promote policies or directly convey messages to its domestic citizens and the global community (Statista, 2020). MOFAs now are willing to listen to the feedback of online publics and even incorporating followers’ feedback into policy formulation (Manor, 2019). As diplomats build transitory alliances or networks to accomplish specific agendas with the more vocalized non-state actors, digitalization requires them to adopt a new kind of openness. The use of digital technology in diplomacy is now a global phenomenon, with a growing emphasis on big data analysis and social media algorithm manipulation. With the constant reimagining of the environment in which diplomacy is conducted, the introduction of digital technology has had a profound impact on the conduct and study of diplomacy. This proved to be an opportunity for Taiwan to advance its interests on the international stage.

Manor (2019) deemed previous attempts at defining “Digital diplomacy” to be fractured and unable to capture three distinct features of the intersection between diplomacy and digital technologies, and therefore proposed the adoption of the new term “Digitalization of Diplomacy.” He discussed how the norm of connectivity and the tendency to seek news online have impacted the institutions of diplomacy who use online platforms to deliver services and information to their citizens, which was apparent during consular crises in which embassies and diplomats employ social media and messaging apps to communicate with citizens affected by natural disasters or terror attacks. This gives rise to the concept of domestic diplomacy and real-time diplomacy with diplomacy reacting to events as they unfold. He also discussed the current digital research corpus, noting that much of the research corpus focuses on the institutions of diplomacy. However, although much of the research corpus focuses on the institution of diplomacy, current work has centered greatly on evaluating or discussing the engagement of the domestic publics or citizens abroad. There has not been that much attention given to international issues such as the sovereignty issue of a contested state like Taiwan, which is under existential threat of annexation by the People’s Republic of China (PRC) government.

**Taiwan, the “Ghost Island”**

The Republic of China (ROC) government has been governing Taiwan Island since its defeat and retreat from communist forces on the mainland in 1949. The “One China” principle has been the subject of torturous definition and analysis, with no genuine agreement on its implications in the present day, leaving Taiwan in a precarious position in international politics, similar to a “Ghost Island,” a term
coined in 2009 by New Power Party member Kwok Kwun-Ying, in view of Taiwan’s continual struggle to become a recognized country. Currently, Taiwan oscillates between a nation and non-nation. As a nation, Taiwan participates in bi- and multi-lateral engagement with other organizations and countries when possible. When unable to do so due to the adherence of the “One China” principle by institutions or countries, such as exclusion from the International Civil Aviation Organization (ICAO) and the WHO, Taiwan had to explore alternative ways to be included in the international stage, such as being an observer at the World Health Assembly (WHA).

The absence of intergovernmental health governance networks and restricted access to information sharing have placed Taiwan and the world at risk of a transnational public health crisis. This was seen in the outbreak of the Severe Acute Respiratory Syndrome (SARS) in 2003, which struck Taiwan third hardest—after China and Hong Kong—with a total of 346 confirmed cases, 73 deaths, and 150,000 people requiring quarantine. However, Taiwan’s appeals to the WHO for universal participation remained unheard (Chen, 2018; Winkler, 2012).

Taiwan actually has many accomplishments to be proud of. It has been a global leader in the semiconductor industry for decades and often receives recognition for its digital competence, innovation capabilities, and design prowess (Greenwald, 2017). Taiwan was also commended as having the world’s best healthcare system with the most affordable and highest quality of care according to the 2019 Health Care Index (CEOWORLD magazine, 2019) and the 2014 HSBC Expat Explorer Report (HSBC, 2014). The Bloomberg Health-Efficiency Index in 2018 (Bloomberg, 2018) also rated Taiwan’s healthcare system among the 10 most efficient in the world. However, all these accomplishments and the willingness to be a responsible stakeholder in global issues had been overshadowed by its sovereignty issue.

Currently, the PRC government led by Xi Jinping has become increasingly assertive and dominating in the Asian region (Brown, 2020), and Taiwan has been at the forefront of this new attitude, with Beijing’s closure of its international space and suppression of any attempts to demonstrate its identity. For the Communist Party under Xi, nationalism is a solid cornerstone of legitimacy, with reunification of Taiwan and a strong stand toward the international community as part of the party’s delivery of a vague notion of a great, strong country. This continued assertion of power by the PRC government has pushed Taiwan to rethink its traditional diplomacy strategy and place increased emphasis on its search for new spaces to appeal to the international community, and public diplomacy and engagement on social media may be part of the solution.

#TaiwanCanHelp

The #TaiwanCanHelp hashtag came into use organically, first appearing on Twitter on 31 March 2018 in a post by a Taiwanese citizen, with reference to the short film titled A Perfect Pair that showcased Taiwan’s medical efforts in helping a Vietnamese patient to overcome congenital lymphedema. However, Audrey Tang, Digital Minister of Taiwan, had claimed in numerous interviews that she was the originator of this slogan “Taiwan Can Help.” She came up with this slogan in her attempt to seek a diplomatic breakthrough on behalf of Taiwan and she had been distributing name cards and stickers printed with the slogan to fellow attendees at international and local conferences and events, so as to increase domestic and international awareness of Taiwan’s circumstances and promise of international cooperation and collaboration.

The Taiwanese President Tsai Ing-wen and Taiwan’s MOFA began to use the hashtag #TaiwanCanHelp on Twitter and other social platforms (Ministry of Foreign Affairs, 2018), for example, Facebook from April 2018, to advocate Taiwan’s international standing on various issues, ranging from inclusion in the WHA in 2018 and 2019 (Ministry of Foreign Affairs, 2019) to donation of medical supplies to the international community during the current COVID-19 pandemic. #TaiwanCanHelp was chosen over less-assertive alternatives such as #TaiwanCares and #TaiwanShares, which would have de-emphasized Taiwan’s exclusion from WHO (Aspinwall & Rauhala, 2020). Although #TaiwanCares and #TaiwanShares appeared earlier than #TaiwanCanHelp, the publics were not as caught on these two slogans and there was not much of a ripple observed across social media. #TaiwanCares and #TaiwanShares are still intermittently being used by Taiwanese officials or bodies now, but #TaiwanCanHelp remains at the forefront of Taiwan’s perpetual quest for international recognition, especially due to its international reach in 2020.

A crowdfunded campaign placed a full-page advertisement in the New York Times on 14 April 2020 to promote Taiwan as an ally in the fight against the COVID-19 pandemic. This campaign is a collective response from the average Taiwanese to Director-General of the WHO, Dr Tedros Adhanom Ghebreyesus, who alleged that he was a victim of racist attacks from Taiwan on 8 April 2020. The campaign raised around NT$10 million (US$330,000) from over 26,000 contributors. This advertisement increases the exposure of Taiwan’s plight in the United States and garnered much attention coverage from conventional media outlets across the globe. The organizers also launched a website https://taiwancanhelp.us, which features a timeline of the COVID-19 pandemic as well as media coverage of Taiwan’s contribution to the international community so far. The catching on of the slogan by the domestic and international publics signals a reservoir of data waiting to be captured and analyzed, so as to provide insight into this underexplored area of hashtag advocacy and activism, and digitalization of diplomacy.

Evaluation of hashtag use at a holistic level—in its parts and as a whole—is imperative to understand whether and how the messages conveyed within the hashtag reverberate
throughout the social media space. Furthermore, we were motivated to understand the public sentiment and opinion toward #TaiwanCanHelp in the rest of the world (RoW) beyond Taiwan. In this exploratory study, we aimed to explore the dynamics of the #TaiwanCanHelp hashtag on Twitter by (1) quantifying the public response toward #TaiwanCanHelp using the temporal, spatial, sentiment, and engagement dimensions, and (2) uncovering the public opinions around #TaiwanCanHelp through the visualization of keywords.

Our research questions aim to answer in more detail how the #TaiwanCanHelp hashtag reverberates across the Twittersphere, and with the information gathered, this article aims to provide an insight and contribute to the increasingly important research involving hashtag activism and digitalization of diplomacy.

**RQ1.** How did public response toward #TaiwanCanHelp develop over time?

**RQ2.** What was the public sentiment toward #TaiwanCanHelp and what were the keywords that are associated with positive and negative tweets mentioning #TaiwanCanHelp?

**RQ3.** Did #TaiwanCanHelp reverberate beyond Taiwan?

**RQ4.** How did the hashtags expand the social influence of Taiwan’s diplomatic campaign? Which were the most influential tweets, and who were the top influential users?

### Materials and Methods

In response to our research questions, we developed a mixed-methods analysis framework incorporating quantitative and qualitative approaches, comprising time-series analysis, sentiment analysis, spatial analysis, and word clouds (Figure 1).

**Data Collection and Preprocessing**

We utilized a two-step approach for Twitter data collection. In the first step, we retrospectively collected tweets using monthly intervals from 1 January 2018 to 30 June 2020 using the GetOldTweets3 (GOT3) python library (Mottl, 2019). GOT3 enabled us to retrieve tweets older than a week compared to the standard search Tweepy application programming interfaces (APIs). Specifically, our query was restricted to all English-language tweets containing the hashtag “#TaiwanCanHelp” or the adapted hashtags—“#TaiwanIsHelping” or “#TaiwanHelps.” Tweet collection was conducted on 15 July 2020, which returned the following information: tweet ID, source link, username, tweet location, timestamp, tweet text, number of retweets, number of likes, number of replies, mentions, and hashtags. Duplicates of tweets (defined as having the same tweet ID) were excluded.

Although the location associated with a tweet provides another dimension for analysis, geo-tagging of a tweet is entirely optional and is off by default. As only a tiny proportion (1%–2%) of tweets are geo-tagged, it was not surprising that our query of tweet locations returned null values for all tweets. Instead, the largest geospatial metadata source for tweets is provided by the “Location” field in every Twitter Profile. Nevertheless, it should be noted that not every user has provided location information, and this free-form character field might not contain metadata that can be geo-referenced (Twitter Developer [TD], 2020c). Twitter has a verified account program, in which an authentic account of public interest will be granted a blue verified badge next to the account name upon request (Twitter, 2020). A verified account has been generally regarded as an indicator to determine the user authenticity, tweet credibility, or celebrity status (George et al., 2018; Harlow & Benbrook, 2019).

In the second step, we retrieved the user-level location and verified the status based on the user’s screen name using the standard Tweepy API (Roesslein, 2020). We manually curated the country name solely based on the list of user-generated profile locations. The country names and verified statuses were initially mapped to the users, and subsequently, to the user’s tweets. A null value would be assigned to the user’s country if the location information is not provided, ambiguous, or at the continent or subcontinent level in the

![Figure 1. Mixed-methods analysis framework.](image-url)
user’s profile location field. For users who have written multiple countries in their profile locations, all mentioned locations—which could either be their current country of residence or home country—were included in the sum of each relevant country. For example, when a user indicated countries A and B, that user is counted in both countries, and therefore counted twice in total.

Data Analysis and Visualization

Metrics of Public Response. Time-series analysis was utilized to illustrate the volume of tweets containing the hashtags in the study period. We measured the influence and effectiveness of the hashtags by studying three publicly visible engagement metrics associated with the tweets: retweets (re-posting of a tweet), replies (a response to another person’s tweet), and likes (appreciation for a tweet, represented by a small heart) (TD, 2020b; Twitter, 2020). Other engagement metrics were not analyzed due to access restrictions. Next, we visualized the geographical distribution of tweets by user country using the Tableau software. Chi-square tests were carried out to assess the statistical significance among categorical groups, where a p-value <.05 is considered to be significant.

Text Analytics: Sentiment Analysis and Word Clouds. Sentiment analysis and word clouds are the opinion mining techniques increasingly applied to aggregate and demonstrate public sentiment or perceptions on a range of topics by analyzing opinion-oriented text on Twitter (Georgiadou et al., 2020; H. Yin et al., 2020). Both techniques belong to the subfields of Natural Language Processing (NLP).

As human labeling is an expensive process, we used the VADER (Valence Aware Dictionary and Sentiment Reasoner) tool by Hutto and Gilbert (2014) from the openly available Python’s NTLK library. VADER is a lexicon and rule-based sentiment analysis model specifically attuned to sentiments expressed in social media. This approach notably outperforms the traditional sentiment lexicons (Georgiadou et al., 2020; Hutto & Gilbert, 2014), as it is more sensitive to both polarity (positive/negative) and intensity of emotions by taking into consideration punctuation, capitalization, slang, and emoticons, which are important components of the Twitter text. VADER assigns each word a polarity rating and returns a compound score that is computed by summing all the lexicon ratings and then normalized between −1 (most extreme negative) and +1 (most extreme positive). In our work, a tweet sentiment is considered positive if the compound score is greater than 0.05 and considered negative if the score is less than −0.05. If the score is between 0.05 and −0.05, the tweet sentiment is regarded as neutral (Hutto & Gilbert, 2014; H. Yin et al., 2020).

Next, we adopted the Distributed Keyword Vectors (DKV) approach (Chang et al., 2019) to extract the keyword information associated with each tweet sentiment class. The sets of sentiment-specific keywords were identified using the log-likelihood ratio (LLR) (Manning & Schütze, 1999), which is an effective feature selection method. In this study, for the likelihood of assuming that the occurrence of a word w in sentiment S is not random, LLR (w, S) is computed as

$$LLR(w, S) = 2\log \left[ \frac{p(w|S)^l (1-p(w|S))^m p(w|-S)^l (1-p(w|-S))^m}{p(w)^{l+m} (1-p(w))^{m+n}} \right]$$

where S represents the set of documents (tweets) of specific sentiment; N(S) and N(¬S) are the numbers of on-sentiment and off-sentiment reviews, respectively; k denotes N(w|S), which is the number of on-sentiment reviews containing w; l denotes N(¬w|¬S), the number of off-sentiment reviews containing w; m, given by m = N(S)−k, implies the number of on-sentiment reviews with no word w; and n implies that of off-sentiment reviews, given by n = N(¬S)−l. In Equation 1, the probabilities p(w), p(w|S), and p(w|¬S) are estimated using maximum likelihood estimation.

Here, a higher LLR value signifies that w is closely associated with S. We ranked the words in the dataset based on their LLR values and selected the top-ranked words from each sentiment class to compile a polarity keyword list followed by the removal of stop words. The distribution of sentiment keywords was demonstrated using word cloud visualizations. Finally, to understand and compare the regional differences in public opinions, we generated another set of frequency-based word clouds for the Twitter texts after text cleaning, part-of-speech (POS) tagging, and lemmatization with the Python’s NTLK library.

Results and Findings

A total of 27,552 English tweets from 11,365 unique Twitter users mentioning #TaiwanCanHelp, #TaiwanIsHelping, or #TaiwanHelps (hereafter collectively referred to as #TaiwanCanHelp) were collected.

Temporal and Sentiment Analysis

We explored the dynamics around the hashtags through a time-series and sentiment analysis. Figure 2 shows the timeline and sentiment trends of English tweets mentioning the #TaiwanCanHelp hashtags, thus revealing how the advocacy messages reverberated since the first tweet in March 2018.
Figure 2. Monthly distribution of English tweets mentioning #TaiwanCanHelp by sentiment as of June 2020.
Key topics or events that are probably related to the emerging volume of tweets and engagements with #TaiwanCanHelp have also been identified. Figure 3 describes the tweet engagements over time, which were measured by retweets, likes, and replies to a tweet. The #TaiwanCanHelp hashtags first appeared in March 2018 and grew increasingly prevalent on Twitter, doubling from 326 tweets with 21,346 engagements in 2018 to 783 tweets with 72,544 engagements in 2019. The hashtags started to gain immense popularity in early 2020, recording the highest peak in April 2020. In the first half of 2020, the hashtags delivering “Taiwan Can Help” messages were mentioned overwhelmingly in 26,443 tweets, which was 23.8 times higher than in the past 2 years. In particular, the sheer volume of tweets in April 2020 accounted for almost half (49.4%) of the total number from 2018 to June 2020. Thereafter, the voices for #TaiwanCanHelp began to fade on Twitter. There were 5 days on which the volumes had exceeded 1,000 tweets in a day, one in February 2020 and four in April 2020. The day with the single greatest number of voices was identified on 15 February 2020, with 1,290 tweets with hashtags mentioned in a day. Over time, there were relatively more tweets conveying positive sentiment toward #TaiwanCanHelp than tweets of negative sentiment. Furthermore, in Figure 4, we focused on the first half of 2020, where the usage of the hashtags had exploded. The evolving #TaiwanIsHelping and #TaiwanHelps hashtags only emerged on Twitter since March 2020 and started to attain widespread usage in April and May 2020. Overall, #TaiwanCanHelp had been tweeted 23,399 times and #TaiwanIsHelping 7,514 times, whereas #TaiwanHelps had been mentioned 1,923 times throughout the study period.

**User and Tweet Characteristics**

As of June 2020, #TaiwanCanHelp had garnered 27,552 English tweets from 11,365 unique users from all over the world, of which 4.6% of the tweets, as presented in Table 1, were posted by verified users, who comprised around 1% of the unique users. The geo-referenced tweets constituted about 51.4% of the total 27,552 tweets. Of the 5,877 users (51.7% of the total unique users of 11,365) who had updated their location in their profiles, 98.1% (5,764) listed only one country, 1.6% (94) listed two countries, 0.2% (13) listed three countries, and 0.1% (6) listed four countries. The majority of the geo-referenced tweets came from the RoW (31.2% of total tweets), while 23.3% is from Taiwan and 0.7% from users who listed Taiwan and other countries in their profile locations. On average, a user posted 2.4 tweets mentioning #TaiwanCanHelp since the hashtag first appeared in 2018. Figure 5 visualizes the geographical distributions of the geo-referenced tweets from the RoW, comprising 102 countries and two special administrative regions (Hong Kong and Macau). Beyond Taiwan (43.3%), the highest volume of international voices of #TaiwanCanHelp notably came from the United States (15.6%), Hong Kong (13%), Canada (4.8%), the United Kingdom (3.9%), and India (3.2%) (Table 2). Figure 6 displays the sentiment of tweets by geographical distribution. In general, the tweets expressed overwhelmingly favorable sentiment toward #TaiwanCanHelp with a total of 15,533 positive tweets over 5,010 negative tweets (average ratio of 3:1). Tweets from Taiwan had the highest positive-to-negative sentiment ratio of 3.9. Although having the lowest ratio, tweets from the RoW had 2.6 times more positive than negative sentiments. The p-value of <.001 indicates that the sentiments (positive, neutral, negative) differ significantly by geography (unknown, RoW, Taiwan, Taiwan/RoW).

Figure 7 depicts that the majority (97.1%) of the users, regardless of their geolocations, had voiced #TaiwanCanHelp once to not more than 10 times over the study period. Only 16 (0.1%) highly active users had posted >100 tweets, of which the two most active users had posted >300 times. The median tweet activity for voicing #TaiwanCanHelp was one...
Figure 4. Daily distribution of different hashtags in response to key events in the first half of 2020.
Table 1. Characteristics of Users and Tweets by Geographical Distribution as of June 2020.

|                     | Total | Taiwan/RoW | Taiwan | RoW     | UNK    |
|---------------------|-------|------------|--------|---------|--------|
| Users (%)           | 11,365| 75 (0.7%)  | 2,632 (23.2%) | 3,170 (27.9%) | 5,488 (48.3%) |
| Verified users      | 118   | 1          | 43     | 60      | 14     |
| Tweets (%)          | 27,552| 217 (0.8%) | 6,363 (23.1%) | 8,604 (31.2%) | 12,368 (44.9%) |
| Tweets from verified users | 1,271 | 1          | 916    | 330     | 24     |
| Average tweets per user | 2.4   | 2.9        | 2.4    | 2.7     | 2.3    |

RoW: rest of the world; UNK: unknown.

Table 2. Top Countries with Most Tweets Mentioning #TaiwanCanHelp as of June 2020.

| Country              | User count | Tweet count | % of geo-referenced tweets, n = 15,184 | % of total tweets, N = 27,552 |
|----------------------|------------|-------------|----------------------------------------|--------------------------------|
| Taiwan               | 2,657      | 6,555       | 43.3                                   | 23.9                           |
| Rest of the world    |            |             |                                        |                                |
| USA                  | 713        | 2,369       | 15.6                                   | 8.6                            |
| Hong Kong SAR        | 719        | 1,975       | 13.0                                   | 7.2                            |
| Canada               | 196        | 724         | 4.8                                    | 2.7                            |
| UK                   | 216        | 594         | 3.9                                    | 2.2                            |
| India                | 303        | 485         | 3.2                                    | 1.8                            |
| Australia            | 132        | 430         | 2.9                                    | 1.6                            |
| Philippines          | 73         | 294         | 2.0                                    | 1.1                            |
| Japan                | 186        | 276         | 1.8                                    | 1.0                            |
| France               | 41         | 176         | 1.2                                    | 0.6                            |
| Germany              | 49         | 132         | 0.9                                    | 0.5                            |
tweet. The $p$-value of <.001 indicates that the levels of user activity differ significantly by geography (unknown, RoW, Taiwan, Taiwan/RoW). Furthermore, in Figure 8, we examined whether the voices were represented by diverse users or a small cohort of extremely active users. Around two-thirds (17,984, 65.3%) of the tweets were made by users who had posted 1 to not more than 10 tweets. Highly active users (>100 tweets mentioning #TaiwanCanHelp) only accounted for 9.8% of the total tweets.

**Social Influence and Engagements**

The relative influence and effectiveness of the hashtags by tweet engagements, which were defined by the sum of retweets, replies, and likes, were inspected in this study. Likes represent a direct reflection of user attitudes and appreciation toward the tweets mentioning #TaiwanCanHelp. Replies indicate a direct two-way interaction with other users. Retweets are one of the most important indicators of tweet influence as the numbers translate to a broader audience reach that goes far beyond immediate followers (Soboleva, 2018). As demonstrated in Figure 9, tweets containing #TaiwanCanHelp drove many users to join the public conversation with a total of 895,484 engagements (77% likes, 18.6% retweets, 4.2% replies). Although almost half of the tweets were not geo-referenced, the engagements received by tweets of users who reported profile locations were far greater. Unsurprisingly, tweets from Taiwan received the most public engagements across the Twittersphere.
Among all tweets in Figure 10, 77.7% of the tweets received a minimal public response (less than five retweets/likes/replies), while 661 (2.9%) tweets gained more traction (more than 100 retweets/replies/likes). Among the latter, 136 tweets (0.5%) exerted a widespread influence (more than 1,000 retweets/replies/likes), and 12 tweets received an overwhelming public response with user engagement activities surpassing 10,000. Taiwan’s President Tsai Ing-wen posted the most influential tweet of all time on 15 April 2020, in which she shared a link to the column that she wrote for Time Magazine explaining how Taiwan handled COVID-19. Table 3 features the top influential users worldwide that drove the most engagements with their tweets. Tsai Ing-wen was unquestionably the most influential advocate of #TaiwanCanHelp. Her total of 55 tweets advocating #TaiwanCanHelp had effectively mobilized people to participate in the public conversations and amplified their voices, garnering a total of 263,173 engagements across the Twittersphere. Other prominent advocates included Taiwanese officials and embassies, representatives of Taiwan, global leaders, and activists. We also discovered that tweets by the influential people from RoW, in general, had a higher ratio of total engagements-to-tweets.

**Word Clouds**

The word clouds in Figure 11a reveal that keywords are most predictive of the specific tweet sentiment. Each keyword has been colored corresponding to the labeled sentiment and scaled according to the computed LLR score. Figure 11b shows that the keywords “thank,” “support,” “help,” “proud,” and “bottomless” were highly predictive of a positive sentiment tweet, whereas “revenge,” “shame,” “fighting,” “stop,” and “evil” were predictive of a negative sentiment tweet. From the comparison word clouds in Figure 12a, we discerned no obvious differences between the top common words in tweets from Taiwan and the rest of the world. The word size indicates how relatively frequent a word (unigram) is voiced in the tweets. With reference to Figure 12b, it appears that “world,” “health,” and “help” were the words most commonly expressed across the globe, apart from the most frequently cited “Taiwan.” The next most popular terms include “country,” “China,” “right,” “human,” “thank,” “spread,” “believe,” “prevent,” “mask,” and “support.” Interestingly, “human,” “right,” “China,” “spread,” “believe,” and “prevent” were more prominently voiced by the users from the rest of the world.

**Discussion**

The present study examined the public response toward #TaiwanCanHelp via time-series analysis, sentiment analysis, and spatial analysis and provided insights into public opinion by investigating the patterns of text via word clouds. The temporal patterns of the #TaiwanCanHelp hashtag (Figures 2 to 4), as with others such as #MeToo and #BlackLivesMatter, often connect with real-world events (Pew Research Center, 2018). We identified two notable spikes in tweets volume in May 2018 and 2019, which correspond to the month in which the WHA is held in Geneva annually. The Taiwan government and the Taiwanese President had used the hashtag to reiterate Taiwan’s plight and pledge to the international community. This once again brings attention to Taiwan’s continuous exclusion from WHA and revoking of its observer status in 2018 under pressure from the PRC government, which sparked an increase in debate by the domestic and overseas publics on Twitter, evidenced by a drastic increase in the usage of the hashtag as compared to months before and after May.
Table 3. Top Influential Users (Highest Engagements) from Taiwan and the Rest of the World as of June 2020.

| User               | Verified | Geo-location | Total tweets, T | Total engagements, E | E/T ratio |
|--------------------|----------|--------------|-----------------|----------------------|-----------|
| Tsai Ing-wen       | Yes      | Taiwan       | 55              | 263,173              | 4,785.0   |
| MOFA, Taiwan       | Yes      | Taiwan       | 249             | 172,352              | 692.2     |
| Audrey Tang        | Yes      | Taiwan       | 39              | 32,699               | 838.4     |
| MOHW, Taiwan       | Yes      | Taiwan       | 95              | 23,579               | 248.2     |
| Bartosz Ryś        | No       | Taiwan       | 4               | 19,933               | 4,983.3   |
| Luke de Pulford    | Yes      | UK           | 2               | 9,846                | 4,923.0   |
| Cory Gardner       | Yes      | USA          | 7               | 8,986                | 1,283.7   |
| Taiwan in the US   | Yes      | USA          | 110             | 8,842                | 80.4      |
| Filip Grzegorzekski| Yes      | USA          | 1               | 8,163                | 8,163.0   |
| Wen Liu            | No       | USA, Taiwan  | 1               | 7,572                | 7,572.0   |

MOFA: Ministry of Foreign Affairs; MOHW: Ministry of Health and Welfare.

Figure 11. (a) Sentiment word cloud showing keywords predictive of specific tweet sentiment. Size of word corresponds to calculated LLR score and color based on tweet sentiments (green = positive sentiment; purple = neutral; red = negative). (b) Comparison of keywords predictive of positive and negative sentiment.

LLR: log-likelihood ratio.
In early 2020, the hashtag usage spiked again, and we attributed it to the debate and campaign pertaining to Taiwan’s continued exclusion from the WHO and the ICAO amid the then-emerging COVID-19 global public health crisis. In March and April 2020, as the COVID-19 pandemic swept the world, Taiwan received international recognition for its then-successful containment of the virus and donations of medical equipment, including millions of face masks (Aspinwall & Rauhala, 2020; Summers et al., 2020; Taiwan Can Help, 2020).

One particular spike observed on April 9 can be attributed to the debate surrounding WHO Director-General, Dr Tedros Adhanom Ghebreyesus’ allegation that he was a victim of racist attacks from Taiwan on 8 April 2020. The Taiwan government issued a response the following day on various social media platforms denouncing Dr Tedros’ accusations and reiterating Taiwan’s willingness to be a reliable ally in the fight against the COVID-19 pandemic using the hashtag. This response was captured by domestic and international publics and further engagements were observed, therefore accounting for the spike in volume for the next few days.

Another spike observed on April 15 can be attributed to the full-page advertisement in the New York Times that was placed a crowdfunded grassroots campaign on April 14, in which wide media coverage was given to the advertisement and Taiwan’s pleas for inclusions and promise of cooperation once again captured the attention of the international publics.

Often, hashtags associated with an event or cause emerge instantaneously, spread virally, and then subsequently fade from public prominence (Pew Research Center, 2018). Similarly, the volume of #TaiwanCanHelp hashtags faded dramatically in June 2020.

By scrutinizing user and tweet characteristics, we have shown that the #TaiwanCanHelp hashtags not only trended at a domestic level but also garnered much response from the international community (Tables 1 and 2; Figures 5 to 8). It has been reported that a large majority of tweets come from a small minority of users, such as in the United States, where the top 10% of most active tweeters are responsible for 80% of all tweets (Pew Research Center, 2018). Our findings, in contrast, show that the positive voices for #TaiwanCanHelp was represented by a large and diverse number of users from all over the world, instead of merely domestic users or a small cohort of extremely active users.

The engagement observed in our study signifies that the public not only paid attention to but also actively expressed their opinions and perceptions toward #TaiwanCanHelp. Despite the official disclaimer “retweeting does not mean endorsement,” a meta-analysis concluded that retweeting indicates not merely an interest in a message, but also trust, agreement or even endorsement with the message content for users other than reporters (Metaxas et al., 2014).

Taiwan’s President Tsai Ing-wen posted the most influential tweet of all time on 15 April 2020, in which she shared a link to the column that she wrote for Time Magazine explaining how Taiwan handled COVID-19, which was of high interest internationally as Taiwan was one of the places where the COVID-19 is kept under containment with minimal impact on the local population. She was also the most influential advocate with a total of 55 tweets advocating #TaiwanCanHelp, garnering a total of 263,173 engagements across the Twittersphere. Other prominent advocates included Taiwanese officials and embassies, representatives of Taiwan, global leaders, and activists. For example, Taiwan’s MOFA posted 249 tweets during the study period as seen in Table 3, which also garnered significant engagements from the local and international publics.

Emphasis is placed on identifying users who have the most engagements as compared to users who had posted the most tweets in this study. For example, the two most active voices, that is, users with more than 300 tweets in the study period, mainly posted tweets of repeated content with minimal engagements. Since we cannot exclude the possibility of bots in our data, we prefer to discuss and focus our analysis on users with the most engagements instead of the volume of tweets.

Strong voices from key government officials and public figures, such as politicians, celebrities, and activists, have spread the #TaiwanCanHelp hashtags and expanded their social reach, thus amplifying the collective sentiment (Table 3). The civic community further undergirds the power of hashtags by translating their participation from online communications to offline actions. For instance, many inspired Taiwanese immigrants voluntarily donated food and medical supplies to hospitals, associations, and people in need (Fuchs, 2020), and many Taiwanese citizens also dedicated their mask quota to the “Mask Donation for Humanitarian Assistance” program launched by the government. The concerted effort of public diplomacy—from governmental organizations to civil society—has demonstrated that this hashtag-supported advocacy has been a prolific catalyst for both online and offline civic engagement with real-world collective impact.

This is in comparison with less-assertive alternatives such as #TaiwanCares and #TaiwanShares, which are less assertive and more passive, from the literal meaning of “care” and “share.” We reasoned that these two hashtags show Taiwan’s desire to be included but lack the assertion and action-taking urgency that #TaiwanCanHelp implies. This may be why #TaiwanCanHelp managed to capture the attention of the domestic and international publics. In addition, #TaiwanCanHelp also implies that Taiwan and the domestic public want to take control and have their voices heard, especially when responding to Dr Tedros’ allegations of racist attacks. The hidden meaning of the hashtag matches the sentiment of the domestic public and generated more engagement.

Our examinations of textual patterns within the tweets mentioning #TaiwanCanHelp have revealed further insights
into the user perception and trending topics on Twitter (Figures 11 and 12). Positive sentiments were closely associated with (1) appreciation toward the humanitarian aid offered by Taiwan’s government and citizens, (2) Taiwan’s response to the coronavirus pandemic, (3) gratitude for frontline workers, (4) raising national pride in the average Taiwanese, and (5) Taiwanese citizens’ gratitude for international support. Associations are identified based on the key terms in the word clouds.

As for the negative sentiments, our findings suggest that the underlying emotions were not against the message of “Taiwan can help” but were responses to other trending topics or backlashes. For instance, negative sentiments were found to be distinctively associated with criticism for Taiwan’s exclusion from the WHA and emergency meetings on the pandemic, China-Taiwan conflict, controversies over China’s propaganda, and the grave implications of the COVID-19 pandemic. This is similar to the findings by J. D. Yin (2021) in which he discussed that the international public focused on criticism and distrust of other countries or international organizations while promoting Taiwan. We reasoned this may be a result of Taiwan packaging of its COVID-19 stories as a triumphant public health narrative, a stark contrast to WHO’s management of the pandemic.

Negative sentiment tweets, while climaxing in April 2020 (Figure 2), were largely correlated with the response toward accusations of racist slurs against Dr Tedros (J. D. Yin, 2021) as well as the transnational meme war titled #MilkTeaAlliance led by young netizens from Thailand, Hong Kong, and Taiwan, which further extended to Myanmar, the Philippines, and India (Bernal, 2020).

Our comparisons of the top common words in tweets from Taiwan and the rest of the world revealed no obvious regional differences in public opinion (Figures 11 and 12). It appears that the majority who tweeted #TaiwanCanHelp likely favored the words of Taiwanese President Tsai Ing-wen (2020), “I believe that health is a human right, and #TaiwanCanHelp the @WHO in preventing the spread of #COVID19.”

Limitations and Future Work

Social media analytics is a highly complex interdisciplinary research area where the involved tasks of data collection,
data preparation, and data analysis remain both technically and analytically challenging (Anderson et al., 2019; Stieglitz et al., 2018). The limitations of our study, as is typical with social media research, inherently come from the data collection process (Kim et al., 2020).

First, Twitter data retrieval is usually conducted via three primary types of API—Search, Streaming, and Firehose, with each returning a varying amount of overlapped and unique tweets over time and by topic (Kim et al., 2020). The tweet amount also varies by query parameters and query timing. For example, Streaming returns a random sample of 1% of all tweets in near-real time, while Firehose allows a more comprehensive coverage of all historical tweets that match the query but is prohibitively expensive. Hence, every researcher is ultimately working with a different dataset (Anderson et al., 2019). In this article, our data collection was based on Twitter Search, in which the percentage of total tweets returned is considered a black box, and is not meant to be an exhaustive source of tweets, as not all tweets will be indexed or made available via the search interface, and the methods used by Twitter to sample these tweets remain unknown. This implies that the tweet volume is undercounted in this article and should be considered as a sample of all public tweets matching the hashtags.

Second, we only included tweets in English—the lingua franca across the globe, due to technical reasons in multilanguage processing. Our preliminary search without the language filter returned a larger number of tweets, therefore revealing public engagement spanning multiple languages. Future work can be expanded to include tweets in other languages, such as Chinese and Spanish, or multilanguages. Chinese is of interest as it is the official language of Taiwan and would provide insight to the domestic public while Spanish is noteworthy because many of Taiwan’s remaining diplomatic allies are Spanish-speaking countries. This will provide insight into how official diplomatic relationships with certain countries does or does not translate into support for Taiwan as a contested state that is banned from participation in the United Nations.

Third, hashtag usage is not adopted by all Twitter users; therefore, there are definitely tweets that mentioned “Taiwan can help” without the usage of hashtag. While hashtags are extremely useful in capturing relevant content, data collection based solely on hashtags may result in the omission of a significant portion of relevant content.

Fourth, geo-location inference for tweets, typically by isolating or combing information about user’s home location, tweet location, and mentioned location in the tweet, remains a major technical challenge despite extensive research efforts. Geo-tagged locations of tweets were nearly unavailable, while the mentioned location is not applicable to our study, since mentioned locations are more closely related to geopolitical interests. Therefore, we relied on self-reported strings in profile locations for location inferences. However, location information at the account level may be frequently modified by the users, though generally it is not. Similarly, location information does not necessarily represent the user was from or at that location, but could potentially be interested in that location by the user (TD, 2020a). In addition, the inference may not be accurate in all cases due to factors such as different places having similar names.

Fifth, our datasets may not be representative of the general population and may contain embedded population biases, owing to the nature of Twitter data, resulting in sampling bias due to restricted data collection, as well as potential contextual biases associated with text analytics, including geo-location inference and sentiment analysis (Anderson et al., 2019; Davis et al., 2017; Pew Research Center, 2018). Future research can be expanded to other popular social platforms such as Facebook, YouTube, and Instagram for a more comprehensive picture of public response and opinion.

In addition, we cannot exclude the possibility of bots in this body of tweets, which may undermine the authenticity of public responses to this hashtag.

Finally, since the development of a refined and sophisticated text mining was beyond the scope of this research, the study could have benefited from the application of a more customized and integrated algorithm which could have incorporated all of the nuances in social media text and allowed further analysis at the finer grained level. For example, the advanced topic modeling technique can be used to uncover common themes in the tweets.

Conclusion

Our findings have demonstrated that a mixed-methods analytical approach can be meaningfully used to uncover empirical insights into public response and opinions from the online conversations taking place under advocacy hashtags. Our study shows how Taiwan uses this hashtag to take advantage of its COVID-19 story’s intrinsic dual nature as a political jab, packaged and presented as a triumphant public health narrative, while continuing to gain goodwill through its international cooperation efforts. Similar to previous studies that have used Twitter to measure public response, we found substantial changes in the hashtag usage in relation to key events. Our findings also reveal that #TaiwanCanHelp has reverberated beyond Taiwan and has received positive support from a wide range of users across the globe.

#TaiwanCanHelp is more than a just a slogan, it represents Taiwan’s diplomatic campaign for inclusion and space to express its identity, and Taiwan’s ambition to gain a foothold in its sovereignty battle with the PRC government amid stronger opposition and isolation measures from Beijing. The success of #TaiwanCanHelp helps Taiwan to increase the exposure of its plight and increase international goodwill, which is of value to the Taiwan government as they continue to contemplate and navigate the underexplored area of digitalization of diplomacy to advance Taiwan’s interests.
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The datasets were derived from sources in the public domain: https://twitter.com.

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