# Leveraging Social Media Data Analytics for Tourism Marketing Policies in West Java, Indonesia

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### ABSTRAK

*Setelah pemerintah tidak merilis pembaruan data terkait penanganan COVID-19, status pandemi COVID-19 di Indonesia telah ditetapkan berakhir dan beralih menjadi penyakit endemi. Keputusan ini telah memperoleh respons yang beragam dari masyarakat, termasuk sektor pariwisata. Oleh karena itu, tujuan dari penelitian ini adalah untuk mendapatkan pemahaman mendalam mengenai persepsi publik terhadap isu pariwisata selama periode endemi dengan mengamati interaksi dan komunikasi masyarakat melalui media sosial, khususnya platform Twitter. Metode yang digunakan dalam penelitian ini melibatkan pengumpulan data percakapan Twitter mulai dari tanggal 2 Februari 2023 hingga 30 Maret 2023 menggunakan sistem DEA (Data Envelopment Analysis) dengan memanfaatkan layanan API (Application Program Interface) dari Twitter. Hasil penelitian menunjukkan bahwa mayoritas tweet, yaitu sebanyak 1823 tweet atau 77% dari total tweet yang dianalisis, mencerminkan sentimen positif terhadap pariwisata, sementara 394 tweet (17%) menunjukkan sentimen negatif, dan hanya 140 tweet (6%) yang menunjukkan sentimen netral. Temuan ini memberikan peluang bagi pemerintah Provinsi Jawa Barat untuk memanfaatkan Twitter sebagai sumber informasi yang berharga dalam pengambilan keputusan dan evaluasi kebijakan selama periode endemi.*

### ABSTRACT

After the government failed to release updated data on the handling of COVID-19, the status of the pandemic in Indonesia has been declared to have ended and transitioned into an endemic disease. This policy has received various responses from the public, including the tourism sector. Therefore, the objective of this research is to gain a comprehensive understanding of the public perception regarding the issue of tourism during the endemic period by examining how people communicate through social media, particularly Twitter. The research method employed is the collection of Twitter conversations from February 2nd, 2023, at 12:00 PM WIB until March 30th, 2023, at 11:59 PM WIB using the DEA (Data Envelopment Analysis) system through Twitter's API (Application Programming Interface). The research findings indicate that out of a total of 1823 analyzed tweets, 77% of them demonstrate a positive sentiment towards tourism, while 17% or 394 tweets exhibit a negative sentiment, and only 6% or 140 tweets show a neutral sentiment. These findings present opportunities for the West Java provincial government to utilize Twitter as a valuable source of information for decision-making and policy evaluation during the endemic period.

## INTRODUCTION

According to statistics published in 2023, Facebook (2.958 billion users), YouTube (2.514 billion), WhatsApp (2000 billion), Instagram (2,000 billion), WeChat (1.309 billion), TikTok (1.051 billion), and Facebook Messenger (931 million) are the social networks with the most active users worldwide. Despite having 556 million users globally, Twitter is the fifteenth most popular social networking site for political engagement. Twitter is referred to as a democratic

network for political communication in the field of communication studies (Weismueller et al., 2022; Antypas, Preece, and Camacho-Collados, 2023; Del Valle and De La Fuente, 2023; Dellmuth and Shyrokykh, 2023; Gallagher and Topinka, 2023). This network is capable of bringing public issues to the attention of politicians and the media.

Global communication has been significantly altered by social media. Citizens who have access to the internet can communicate with people around the globe and express their thoughts (Lee, 2021; Amini et al., 2022; Zeng et al., 2022). The impact that social media users have on others through social networks is now being studied by academics. Additionally, they are investigating whether users of social media might generate asymmetric power that can affect social institutions and public opinion. Odeo, a podcasting firm with headquarters in San Francisco, introduced Twitter for the first time in 2006. Twitter wasn't always the 330 million monthly active user social networking site that it is today; instead, it was a short messaging service (SMS) for groups. In the beginning, Twitter users had a character limit of 140 (which was later expanded to 280 in 2017). Using hashtags, which are word combinations, abbreviations, or sets of words, users can search for subjects since 2007 (Padilla-Castillo and Rodrguez-Hernández, 2023).

Each user has the capacity to go viral and gain influence by disseminating the message. Authors can gain penetration and engagement without a sizable following thanks to hashtags (Udanor, Aneke, and Ogbuokiri, 2016; Joseph et al., 2017; Gkritzali, Mavragani, and Gritzalis, 2020). The idea of opinion leaders, who can spread information and views that have an impact on others, has also been democratized and broadened through activism on Twitter. Twitter and social networks also have a significant emotive component since they enable parasocial interactions and the widespread expression of feelings. Twitter users are developing as a new prosumer paradigm that decentralizes opinion formation and allows teenagers and young adults to take the lead in and shape new climate change messaging. According to Cant et al. (2017), Cherichi and Faiz (2019), Utku, Can, and Aslan (2023), the success of any global movement in today's society must be seen as the interaction between global and local dimensions, as well as between virtual social networks and individual and group interaction processes.

The creation of ad hoc networks like communities or publics and the facilitation of continuing dialogues are both made possible by hashtags (Graham et al., 2021; Kountouri and Kollias, 2023; M O'Regan and Choe, 2023). Conversations, people, and movements can connect and come together by using hashtags. Without centralized control, political collaboration and group action may result from the development, propagation, and amplification of hashtags.

These networks are frequently connected to current affairs, politics, and incidents where prompt and efficient governance is urgently required. The effects of networks like #SWJAmbassador on people, programs, initiatives, policies, strategies, and collaborations are extensive.

One of the community initiatives sponsored by the West Java tourism office is #SWJAmbassador, which highlights posts from 108 carefully chosen tourism ambassadors who will serve for eight months, from April to November 2022, in order to promote tourism, culture, and e-commerce in West Java. The ambassadors will tour and advertise 108 West Java tourism hotspots during the term of the contract. Selain liputan media ada, gerakan ini menjadi trending topic di Twitter dan jejaring sosial lainnya berkat berbagai tagarnya: #smilingwestjavaambassador, #DiJabarAja, #JabarJuara dan #IndonesiaJuara.The initiative gained attention from the media as well as social media thanks to its several hashtags, including #smilingwestjavaambassador, #DiJabarAja, #JabarJuara, and #IndonesiaJuara.

Based on the aforementioned, this article tries to provide research-related answers to the following questions:

1. In terms of size, connections, membership, or the number of communities they comprise, what are the features of Twitter social networks on the days after ambassadors are chosen to promote tourism, culture, and e-commerce in West Java using the hashtag #swjambassador?

2. Who are the key voices in the conversations that follow?

3. What are the conversations that Twitter users are most interested in having about the #swjambassador movement?

4. Is there a connection between the tweets' format and the level of engagement they produce?

The following goals were defined for this study in order to produce novel findings that may be used in different social settings and media to promote awareness of tourist attractions in West Java:

1. Examining the network structure created on the Twitter social network as a result of user interactions using the hashtag #swjambassador in relation to West Java tourism.

2. Using Social Network Analysis (SNA) to determine the users who are most pertinent to the conversation based on centrality and intermediation metrics.

3. Determining the #swjambassador movement's most significant and popular conversational themes on the Twitter social network.

4. Determine whether the usage of links or audio-visual content has a direct impact on the message's level of engagement.

### Literature review

### Hashtag

After becoming an essential component of human connection, social media has altered how people initiate group actions (Cleaver, Lawas, and Marshall, 2023; Liu et al., 2023; Sun and Liu, 2023). In order to influence social, institutional, civic, organizational, and political change through various narratives, activists, social movements, marginalized groups, and organizations use social media to create and share content, disseminate information, establish credibility, gather support, network, and interact with key actors like the news media and policymakers (Bergquist et al., 2017; Adeola, Boso, and Adeniji, 2018).

No account owner permission is necessary to follow other users on Twitter unless the account is protected (Padilla-Castillo & Rodrguez-Hernández, 2023). Twitter has a non-reciprocal following system. Tweets can be used for a number of purposes, such as updating followers, disseminating links, or communicating with other users in the open. When followed by a keyword and the '#' character, a search phrase is indicated, whereas the '@' sign denotes another user's account. Initiated by users, hashtags were later incorporated into Twitter's architecture as metadata to assist organize discussions, make searches easier, follow and list messages with a particular theme, and more (Michael O'Regan and Choe, 2023).

A single hashtag or a group of hashtags used together can have a variety of outcomes. Hashtags can be used as affective reinforcement (such as #happy) or as reflective meta-commentary to explain the context of a communication. Using hashtags makes it possible to share unfiltered, instantaneous, and quick images, feelings, and ideas with a wide audience in previously unheard-of ways (Michael O'Regan and Choe, 2023). However, hashtag use also incorporates ambient affiliation, in which a user of a hashtag might not be acquainted with or regularly communicate with other users (Rahmanti et al., 2021).

Currently, hashtags are being used extensively in a wide range of contexts, such as presidential initiatives, celebrity branding (Downing and Brun, 2022; Demirdis, Vicari, and Reilly, 2023), and social movements (Cao et al., 2022). Hashtagged words, phrases, or sentences can drive action and test widely accepted socio-cultural norms, dominant frameworks, and the influence of relevant actors while also increasing awareness of new themes, concerns, political, or social claims (Man, Palmer, and Qian, 2022). According to Nenjerama (2022) "people both on the periphery and at the center engage in socio-political debates and create meaning" in different ways depending on how hashtags are used.

This hashtag acts as a point of reference for Twitter users who may not already be friends, enabling them to exchange information, experiences, worries, images, and activities pertaining to tourism-related topics. Additionally, it enables them to have discussions regarding the subject. The existence of this hashtag restricts the determination of ideological, political, critical, or viewpoint stances surrounding tourism because the term has very near negative and positive meanings. Users can boost visibility, reach new audiences, and build solid relationships with them through tweets that use certain hashtags (Demirdis, Vicari, and Reilly, 2023).

By utilizing #SWJAmbassador, one can build a social network that links people to online communities, movements, publics, identities, and information hubs. The hashtag may assist people from many cultures and backgrounds bring up issues of global importance and affect change in their own nations, cities, or regions. It may also improve the visibility of unique experiences in well-known tourist destinations. The West Java Provincial Tourism Office's use of the hashtag #SWJAmbassador in this context attempts to promote West Java as a tourist destination on social media. With the assistance of chosen tourism ambassadors who are qualified in digital marketing, this can be accomplished and planned.

### Ambassador

The designation of an 'ambassador' traditionally pertains to a governmental official, situated within an embassy, diligently executing diplomatic responsibilities that bridge the gap between their native and host nations (source: www.merriam-webster.com). Such an ambassador is entrusted with the vital role of not only representing but fervently safeguarding the interests of a sovereign entity or nation within the confines of the foreign territory. However, over time, this term has undergone a metamorphosis, extending its reach to encompass individuals who wield their influential networks and interpersonal bonds to champion distinct products, brands, events, or noble causes. This contemporary interpretation of an ambassador involves fostering collaboration, enabling the exchange of knowledge, and pursuing shared objectives through synergistic efforts, which may encompass diverse initiatives including training initiatives, targeted campaigns, and strategic programs

(Chancellor, Townson and Duffy, 2021).

> Certain ambassadors identified within the literature (such as those representing place, citizen brand, tourism, and volunteering) may share a common purpose with destination ambassadors: the promotion of a specific location. However, there are also other ambassadors who do not act on behalf of the destination itself. For instance, volunteer ambassadors might be focused on specific organizations or programs, such as those associated with non-profit organizations like 1 Day Sooner/medical trials (www.1daysooner.org), Elder Helpers/free elder care (www.elderhelpers.org), and Paul's Place, Inc./youth homelessness elimination (www.paulsplaceoutreach.org). Furthermore, the concept of ambassadors can extend to encompass representations of both a destination and an organization simultaneously.

> As an illustration, within the Omaha Performing Arts Society, ambassadors assume the role of dedicated volunteers entrusted with representing not only performers and the theater scene but also the vibrant essence of Omaha, nestled in the heart of Nebraska, USA. Beyond considerations of personal motivation or tangible gains, these ambassadors extend warm greetings to visitors, offer exceptional customer service, contribute to fostering a delightful atmosphere, and actively champion the allure of the destination. (Chancellor, Townson and Duffy, 2021).

Within the realm of tourism, a compelling illustration emerges through the presence of tourism ambassadors, often embodied by individuals like tour guides. In this context, the lines delineating whether their advocacy revolves solely around the destination or extends to other elements like adventure activities (rafting or rock climbing) remain intricately woven. As destination managers strategically harness the potency of tourism ambassadors to bolster the allure of a locale for economic gains, the motivations propelling these ambassadors might delve into more intimate and personal realms, less tethered to organizational or place-based agendas. The spectrum of identities assumed by these ambassadors encompasses roles as gracious hosts, fervent advocates of the destination's charm, and reliable sources of information, either in isolation or as a harmonious blend. This vivid tapestry of roles, however, unfurls against a backdrop of distinct motivations, wherein each ambassador's impetus becomes a unique narrative, diverging from their counterparts (Salvador-Almela, 2023; Wang et al., 2023).

The delineation of distinct categories of ambassadors is meticulously drawn from an extensive array of literary sources. It is imperative to acknowledge that certain ambassadorial roles have remained relatively underexplored within the realm of scientific inquiry, thereby residing on the fringes of scholarly examination. In certain instances, the landscape reveals a captivating interplay, where boundaries between these ambassadorial archetypes tend to meld, presenting a panorama where clarity sometimes yields to a captivating fusion.

## RESEARCH METHODS

### Overview

The Drone Emprit Academy (DEA) developed by Media Kernel Indonesia (https://dea.uii.ac.id/) was used to collect data from Twitter using the Twitter Crawling approach. Drone Emprit is a big data system that collects and monitors social media and online platform talks. We examined the frequency and trend of tourism-related terms such as "#SenyumJawaBarat, #SWJAMbassador, #DiJabarAja, #VisitWestJava, #JabarJuara." Twitter data mining, training and learning, analysis, reporting, demographic analysis, and other functions are available through DEA (Rahmanti *et al.*, 2021).

**Data collection and processing**

From February 2, 2023 from 12:00 p.m. through March 30, 2023 at 11:59 p.m., we collected Twitter discussions. The DEA system use the Twitter platform's Application Program Interface (API) service to collect real-time discussions via the streaming technique. The Twitter development team provides the Twitter Search API, which allows us to access a collection of the most recent tweets published in the previous seven days by applying specified query filters. We narrow the tweet search by using the keyword "Bahasa Indonesia" as our monitoring subject, and the tweet query is sent to the DEA search API for collection. The DEA Big Data Architecture Framework (Figure 1) receives data from Twitter Streaming and Twitter Crawl and processes it on a server that indexes it using the SOLR system.

**Data analysis**

All processed tweets, including mentions, retweets, and responses, were plotted using cumulative search volume to investigate public perception of "#SenyumJawaBarat, #SWJAMbassador, #DiJabarAja, #VisitWestJava, #JabarJuara". By analyzing word frequency and sentiment (positive, negative, or neutral), as well as identifying dominant tweets using emotion analysis based on Plutchik's Wheel of Emotions (excitement, fear, anticipation, anger, disgust, sadness, surprise, and trust), the DEA engine identified public attention. DEA sentiment analysis is developed utilizing a machine learning approach and supervised learning, and is then assessed using probabilistic classifiers. This classifier decides whether to use the Nave Bayes (Adaptive Multiple Model) or Maximum Entropy approach to classify words as positive, negative, or neutral. However, a comparison of the performance of DEA classifiers reveals that Nave Bayes has the highest accuracy of 90.26%. Furthermore, we used social network analysis to develop a Twitter conversation map visualization.

## RESULTS AND DISCUSSIONS

**Trend analysis**

We collected 2357 tweets from 989 active users during the study period, with a 2.02 interaction rate. There were 781 mentions (33.14%), 609 replies (25.84%), and 967 retweets (41.03%) in this sample of tweets. Figure 1 depicts the number of daily tweets regarding "tourism, travel, #SmilingWestJava, #SWJAMbassador, #DiJabarAja, #VisitWestJava, #JabarJuara" on Twitter. The result shows that public interest in the development of tourism in West Java is a popular topic among netizens. The quantity of tweets and amount of involvement during the research period demonstrate this. This research demonstrates that social media has the capacity to introduce West Java tourism sites to people of all demographics. Overall, it can be stated that public attention on Twitter can be influenced by the transmission of information about tourism destinations in West Java.

**Figure. 1.**
**Daily Twitter mentions of "tourism, travel, #SmilingWestJava, #SWJAMbassador, #DiJabarAja, #VisitWestJava, #JabarJuara"**
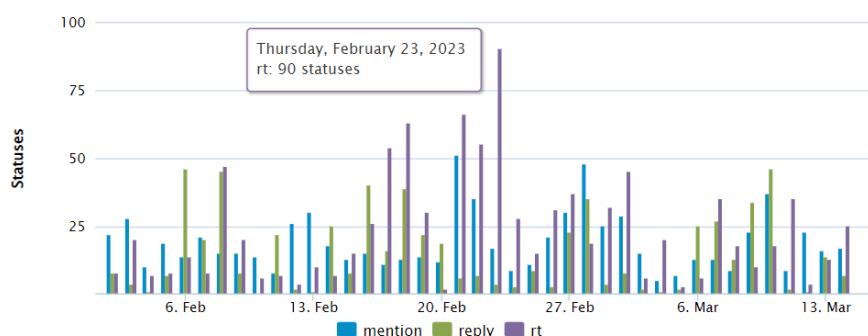
**Sentiment Analysis Implementation**

According to our sentiment analysis, 1823 tweets, or 77% of all tweets, had a "positive" sentiment. This demonstrates that people have a favourable attitude toward "tourism, travel, #SmilingWestJava, #SWJAMbassador, #DiJabarAja, #VisitWestJava, #JabarJuara". However, 394 tweets (17%) suggested a "negative" emotion, while only 140 tweets (6%) indicated a "neutral" sentiment. This finding corresponds to the pattern observed in the tweet graph (Fig. 2).

**Figure. 2.**
**Sentiment analysis on Twitter related to "tourism, travel, #SmilingWestJava, #SWJAMbassador, #DiJabarAja, #VisitWestJava, #JabarJuara".**
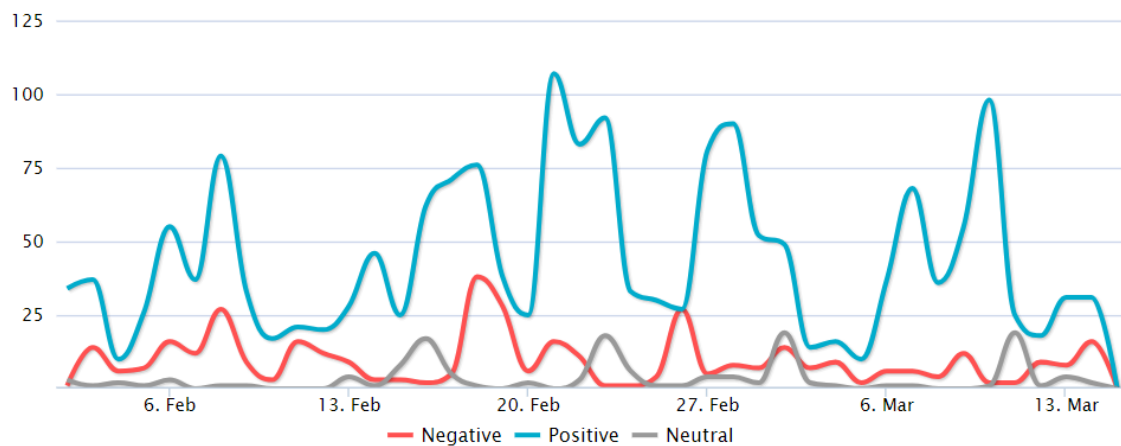


**Tweet exposure and engagement**

The majority of all tweets gathered were dominated by accounts with between 101 and 500 followers. These accounts provided 758 tweets (32.16%), which were posted by 83 active users and had the potential to reach 28,939 individuals. Meanwhile, 161 active users contributed around 361 tweets (15.32%) posted by accounts with 0-3 followers, having the potential to reach more than 236 users.

**Figure. 3.**
**Tweet exposure and engagement on Twitter related to "tourism, travel, #SmilingWestJava, #SWJAMbassador, #DiJabarAja, #VisitWestJava, #JabarJuara".**

**Hashtag And Social Network Analysis**

Based on our research, we found some of the most frequently used hashtags in tweets on tourism in West Java, as illustrated in Figure 4. The most dominant hashtag was #JabarJuara with a total of 1. 101 tweets, followed by #BersamaJuara with 405 tweets, #Jabar with 318 tweets, #RidwanKamil with 260 tweets, #IndonesiaJuara with 196 tweets, #JawaBarat with 113 tweets, #KemenkumhamJabar with 98 tweets, #RAndikaDwiPrasetya with 98 tweets, #DiJabarAja with 61 tweets, #RKGolkar with 58 tweets, #LapasCirebon with 52 tweets, #smilingwestjava with 51 tweets, and #VisitWestJava with 45 tweets. During the research period, these hashtags demonstrate strong public interest and attention to tourism in West Java.

**Figure. 4.**
**Hashtag and Social Network Analysis on Twitter related to "tourism, travel, #SmilingWestJava, #SWJAMbassador, #DiJabarAja, #VisitWestJava, #JabarJuara".**
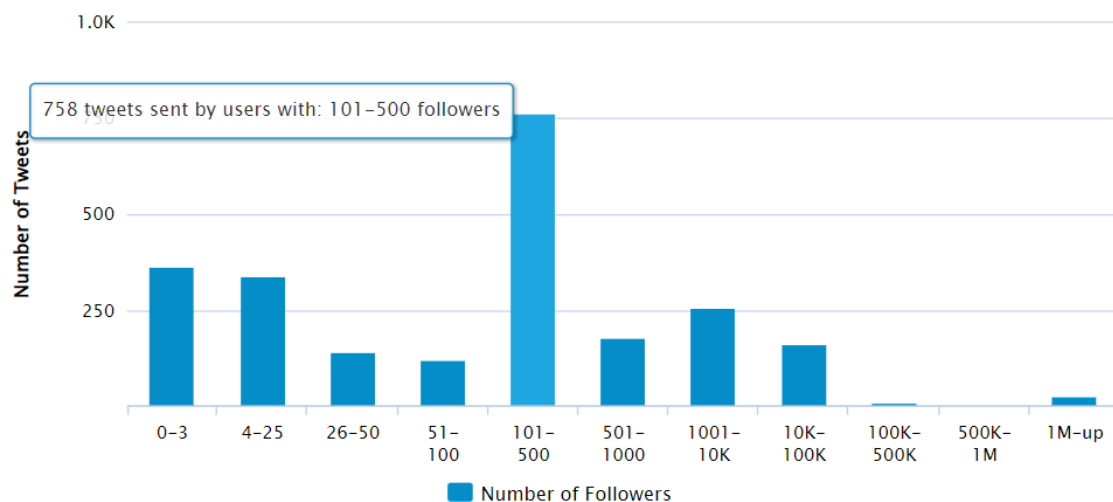


**Social Network Analysis**

The hashtag wars that occurred, as shown in Figure 5, mirrored netizen debates on Twitter about "tourism, travel, #SmilingWestJava, #SWJAMbassador, #DiJabarAja, #VisitWestJava, #JabarJuara". SNA (Social Network Analysis) maps provided from the DroneEmprit server were used to examine this data. talks among netizens were classified into nine broad groups that were linked by nodes and edges, with talks reflecting both negative and positive feelings. This polarization occurred as a result of differing preferences among netizens for tourist locations in West Java. As a result, netizens recognized as opinion leaders within each group disseminated information as a sort of citizen journalism relating to the larger public interest. It is crucial to highlight, however, that there are disparities in netizen perceptions and preferences that may or may not reflect the broader public interest.

**Figure. 5.**
**Social Network Analysis on Twitter related to "tourism, travel, #SmilingWestJava, #SWJAMbassador, #DiJabarAja, #VisitWestJava, #JabarJuara".**



Twitter, for example, has enormous potential as a tool for gauging public interest in responding to tourism developments in West Java, as well as a way of disseminating tourism-related information and regulations. Inappropriate or poor use of social media, on the other hand, might stymie the government's efforts to expand the tourism sector. Based on our findings regarding the shifting patterns of public perceptions stated by Twitter users over time, it suggests that the existing government approach to providing effective tourism communications is insufficient.

To counter this, more proactive social and media communication is required in dealing with public uncertainty and perceptions. This stage attempts to improve public trust and community participation in tourism development. As a result, the government must step up efforts to successfully use social media platforms as a tool to communicate accurate, transparent, and engaging information to the public in order to improve West Java's tourism image and boost active community participation in the tourism sector.

## CONCLUSIONS

This paper separates its conclusions according to the aims stated above:

**1. What are the features of Twitter social networks in terms of size, connections, number of members, or number of communities that form them on the days after ambassadors are selected to promote Tourism, Culture, and Ecraf in West Java using the hashtag #swjambassador?**

According to the findings, the core group consisted of 989 influencers who actively promoted their tweets, primarily by self-retweeting. Retweeting was the most commonly repeated activity, followed by mentioning in retweets. It is crucial to remember, however, that retweets do not guarantee success because the amount of dialogue among users is defined by the reply volume indication. Furthermore, the study discovered that the interaction rate between users was 781 (33.14%), with 609 (25.84%) answers and 967 (41.03%) retweets out of a total of 2,357

chats. As a result, the interaction rate was 2.02. Overall, this category consists of a wide and geographically dispersed number of communities from all over the world. Accounts that are relevant to these communities are the most successful.

**2. Who is the opinion leader in the ensuing discussion?**

The most influential Twitter account, according to the study's findings, was @ridwankamil, who constantly retweeted all tweets with the hashtags tourism, tourism, #SmilingWestJava, #SWJAMbassador, #DiJabarAja, #VisitWestJava, and #JabarJuara. With a total volume of 327 Retweets and Replies, this account managed to achieve a greater level of engagement duplication. Following these accounts are four more influential influencers: @PaUuRuzhanul, @Ekomaung, @rkrijuara, and @txtdaribandung. @ridwankamil and @PaUuRuzhanul are West Java's governor and deputy governor, respectively, who are active on social media and concisely present information about tourism in West Java, garnering widespread support from their followers. This demonstrates that the activities carried out by these accounts are genuine and not the consequence of platform manipulation, and that certain individuals can reach virality without becoming influencers.

**3. What are the most popular subjects of discussion on Twitter for the #swjambassador movement?**

According to the findings, tweets about West Java tourism were the most successful and had the biggest impact. There were 1101 tweets with the hashtag #jabarjuara and 405 tweets with the hashtag #BersamaJuara. Both hashtags played an important role in bringing together various personalities who helped promote West Java tourism, particularly by using the hashtags #DiJabarAja and #smilingwestjava. The two hashtags became the primary hashtags for the West Java tourism marketing initiatives investigated.

**4. Is there a link between the format of a tweet and the level of interaction it generates?**

The interaction rate of the tweets in this study reached 7.85, indicating a fairly high level of engagement and the presence of some tweets with a very high level of engagement. When we examined the posts with the highest engagement, we discovered that they were all about West Java tourism on Saturday, February 18, 2023. The most popular posts included activist leaders, such as Ridwan Kamil (@ridwankamil) and Pa Uu (@PaUuRuzhanul), putting up posters or speaking to groups about tourist sites and marine tourism education in Pangandaran. Based on these data, we can conclude that public personalities, influencers, and netizens play a positive role in enhancing the viewability of a tweet by using popular photographs and hashtags with a community of followers.

**Limitations and Prospectives**

Given that this work takes a multidimensional approach to social networks, it is vital to discuss some of the limits observed as well as potential or future research opportunities. The first limitation in this scenario is connected to the use of hashtags in the study corpus. While the scope of this study requires that the research corpus be constrained, future research could include examining the use of the same hashtag in two or more languages. This could lead to a better understanding of geolocation as well as variances in hashtag usage by continent, country, and culture. For instance, if hashtags are more effective in countries with higher or lower levels of pollution.

This study also demonstrates how social media platforms, like as Twitter, can be a useful tool for governments and tourist managers in monitoring public attention to risk communication

and tourism management strategies, notably those linked to "West Java tourism." Twitter can assist governments in sending the proper messages in decision-making to encourage people to return to tourism following the COVID-19 pandemic. According to this survey, the majority of tweets on "West Java tourism" exhibited favorable attitudes such as "trust", "anticipation", and "excitement". Negative emotions such as "fear", "sadness", "disgust", and "anger" were only mildly exhibited. As a result, it may be inferred that the majority of Indonesians had favourable impressions of "West Java tourism" following the pandemic.

Overall, this study sheds light on the utilization of social networks in the context of tourism and risk communication. Future research should look into the comparative use of hashtags across languages and cultures, as well as their impact on people's perspectives. Furthermore, while examining the efficiency of hashtag use in nations with varying levels of pollution, it is critical to consider geographical and environmental circumstances. The government and tourist attraction managers can maximize tourism communication and management efforts by better understanding the use of social networks and public perception.

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