Sentiment analyses of multilingual tweets on halal tourism

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ARTICLE INFO

ABSTRACT

Halal tourism is a fast-growing segment of the tourism market, thus a study of its trends is warranted. This paper examines halal tourism trends by analysing posts (known as 'tweets') on the social networking service Twitter. A total of 85,259 tweets were examined. Nineteen keywords (English and Bahasa Malaysia) were used in the extraction process. Using the extracted tweets, the study (1) examined the origins of tweets among the global population related to halal tourism, (2) identified the major populations around the world that are engaged in halal tourism tweets, (3) analysed the sentiment valence in relation to halal tourism, and (4) identified the popular destinations that appear in tweets. The findings showed that Japan is the most-tweeted-about halal tourist destination, followed by Malaysia and Indonesia. The findings can be used by the various halal tourism stakeholders to plan their future strategies in relation to halal tourism.

1. Introduction

The travel and tourism industry is an important source of income in most countries around the world. According to the World Travel and Tourism Council, the direct contribution of travel and tourism to gross domestic product was USD2.5 trillion (3.2% of total GDP) in 2017 (World_Travel_and_Tourism_Council, 2018). This figure was forecasted to rise by 4.0% in 2018 and by 3.8% per year to USD3.8 trillion (3.6% of total GDP) by 2028. Within the tourism market, the halal tourism segment has been continually growing. According CrescentRating (2019), this segment is growing due to the increase in the Muslim population, the rise of a middle class with disposable income, an increasing younger population, increasing access to travel information, and the availability of Muslim-friendly services and facilities. It is forecasted that 156 million Muslims will participate in tourism by the year 2020 (CrescentRating, 2019). As El-Gohary (2016) stated halal tourism is one of the fastest-developing segments in the tourism market.

To date, there is no one definition that can be used to describe Muslim tourists' activities. In their paper, Boğan and Sarıışık (2019) drew a distinction between halal tourism and Islamic tourism. They conducted a review of literature on the subject and concluded that Islamic tourism is a tourism type that has emerged as a result of individual preferences to travel with the purpose of gaining the consent of God, while halal tourism focuses on how the given tourist activities,

products, and services comply with Islamic rules and principles. Mohsin, Ramli, and Alkhulayfi (2016) defined halal tourism as the provision of a tourism product or service that meets the needs of Muslim travellers to facilitate worship and accommodate the dietary requirements that conform to Islamic teachings. Meanwhile, Battour and Ismail (2016) stated that any attempt to make the tourism experience enjoyable to Muslim travellers and allowing them to perform religious duties can be considered an element of halal tourism. Thus, it can be concluded that halal tourism is a product that allows travellers to enjoy themselves (in leisure and relaxation) and perform activities permissible under Islamic teaching, such as eating halal food. This study uses halal tourism and Islamic tourism interchangeably, as many previous studies have done so (Battour & Ismail, 2016; Khan & Callanan, 2017).

Halal tourism has previously been studied in different contexts by different researchers. Mohsin et al. (2016), for example, focused on awareness and the needs of the growing halal tourism market segment. On the other hand, some other research works explored the concept and components of halal tourism and illustrated examples of best practices of halal tourism worldwide (Akyol & Kilinç, 2014; Battour & Ismail, 2016; Boğan & Sarıışık, 2019). El-Gohary (2016) also examined the halal tourism concept, in addition to whether halal tourism is applicable only to Muslim families. Generally, most studies focused on halal tourism's concepts and principles, as well as the applications of halal

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tourism in various countries such as Tunisia (Carboni, Perelli, & Sistu, 2017), Jordan and Egypt (Qaddahat, Attaalla, & Hussein, 2017), and Malaysia (Battour & Ismail, 2016). There are also studies that look into the profile, perceptions, and behaviour of tourists (Vargas-Sánchez & Moral-Moral, 2019). However, there are no studies that have analysed the contents of social media with regard to halal tourism.

This paper attempts to close this gap. Moreover, it was found that social media sentiment analysis has been applied in many application areas, such as the financial sector (Li & Meesad, 2016), sports (Schumaker, Jarmoszko, & Labedz Jr, 2016), politics (Ceron, Curini, Iacus, & Porro, 2014), hospitality and tourism (Philander & Zhong, 2016), and halal food (Mostafa, 2018, 2019), but not in halal tourism.

Hence, the paper aims to answer four research questions: (1) What are the geographical origins of tweets among the global population related to halal tourism? (2) What are the major populations around the world that issue halal tourism tweets? (3) What is the trend of sentiment valence in relation to halal tourism? (4) What are the popular destinations that appear in tweets? This paper proceeds by reviewing the literature pertaining to halal tourism and social media sentiment analysis. This is followed by a description of the methodology used to collect the data and the results of the analysis on the data extracted. Finally, the limitations of the study and suggestions for future researchers are highlighted in the conclusion.

2. Review of literature

2.1. Halal tourism

There is a mixed reaction towards the term 'halal tourism', and thus many have used it interchangeably with terms such as 'Islamic tourism', 'Muslim-friendly tourism', and 'sharia tourism' among others (Battour & Ismail, 2016; Khan & Callanan, 2017). Boğan and Sarıışık (2019), as mentioned in the introduction, distinguish between 'halal tourism' and 'Islamic tourism'. Nevertheless, both terms refer to tourism activities that adhere to Islamic teachings in relation to the halal principle, a term covering all matters that are not prohibited and are in compliance with Islamic rule (Mohsin et al., 2016).

Halal tourism has been recognised by many, (Bastaman, 2018; Carboni & Idrissi Janati, 2016) among others, as an emerging segment within the tourism market, and the opportunities associated with it would bring tremendous economic benefits to the countries that embrace it.

According to Vargas-Sánchez and Moral-Moral (2019), the factors that may have contributed to this growth are the increase in the world's Muslim population (expected to rise to 2.2 billion by 2030); more favourable economic conditions; and the increasing desire to travel and to know other places. El-Gohary (2016) also noted that the Muslim population is projected to increase faster than other groups of religions, and a large percentage of the Muslim population are at an age that allows them to travel extensively. The CrescentRating January 2018 report, as summarised by Vargas-Sánchez and Moral-Moral (2019), identified 10 halal travel trends. They are the halal digital economy, the rise of Muslim female travellers, the primacy of Asian destinations, the development of a halal travel ecosystem, the halal authentication of tourist services, content discovery and halal experience, spreading travellers' visual stories, the role of artificial intelligence in the development of halal travel solutions, brand empathy to connect with Muslim travellers, and sustainability and community initiatives (Vargas-Sánchez & Moral-Moral, 2019).

According to El-Gohary (2016), halal tourism is important to all countries, not only Muslim ones, as it is being embraced by countries with a non-Muslim majority, such as Japan and Thailand. Japan promotes itself as a halal tourism destination, as Japan recognises that halal tourism represents an important tourism segment with immense growth potential. On Japan's national tourism website, a search for 'halal' and 'Muslims' produces links to food, tours, prayer facilities, and

other halal-related information. Similarly, the website of the Tourism Authority of Thailand (TAT) provides a free mobile app (in English, Thai, Arabic, and Bahasa Indonesia) on Muslim-friendly Thai destinations. The destination app provides information about mosque locations, halal restaurants, and so on. The TAT has also a website dedicated to Thai halal tours: Thailand Muslim Package Tours.[1]

2.1.1. Popular destinations for halal tourism

El-Gohary (2016) listed the top 10 countries in terms of outbound halal-tourism expenditure as Saudi Arabia, Iran, the United Arab Emirates (UAE), Qatar, Kuwait, Indonesia, Malaysia, Russia, Turkey, and Nigeria. On the other hand, Khan and Callanan (2017) placed destinations into two distinct categories: members of the Organisation of Islamic Cooperation (OIC) and non-members. Malaysia, the United Arab Emirates, Turkey, Indonesia, Qatar, Saudi Arabia, Oman, Jordan, Morocco, and Bahrain were the top halal tourism destination countries that were OIC members, while Singapore, Thailand, the United Kingdom, South Africa, Hong Kong, France, Taiwan, Japan, Sri Lanka, and the United States were the top halal tourism destination countries that were non-OIC members. It must be noted here that although Saudi Arabia, the United Arab Emirates, Qatar, Bahrain, Oman, and Kuwait's total outbound tourism expenditure is 31%, they represent only 3% of the Muslim population. This indicates that they have a relatively large purchasing power, thus representing a large segment of the tourism market (Mohsin et al., 2016).

According to Mohsin et al. (2016), countries with a sizable Muslim population, such as Malaysia and Indonesia, are preferred as destinations for halal tourism by Muslims all over the world. This is because the tourists assume these countries will have sharia-compliant facilities.

2.2. Social media sentiment analysis

In the 21st century, the world's population has embraced social media as the main mode of communications (Lassen, Madsen, & Vatrapu, 2014). Many have also used it as a platform to express their personal opinions and views (Arora, Li, & Neville, 2015). Traditionally, personal opinions and views on a particular issue are collected via a survey or census, which is a very time-consuming and costly process. Moreover, much of the time, the person being surveyed cannot express his or her opinions and views openly, for fear that any negative opinions and views may be taken out of context. With social media such as Twitter, everyone is free to express his or her opinions and views, thus creating an immense set of data. This allows sentiment analysis to be carried out. Generally, sentiment analysis is a field of study that analyses people's opinions, evaluations, attitudes, and emotions, usually from written language (Liu, 2012). In most cases, the main objective of sentiment analysis is to uncover people's opinions and views regarding a particular product, service, issue, or topic. Normally, opinions and views are categorised as positive, negative, or neutral sentiments (Yang & Yu, 2013). According to Mostafa (2018), sentiment analysis aims to identify and extract subjective information from large volumes of unstructured data by combining data mining techniques, machine learning, natural language processing, information retrieval, and knowledge management.

Sentiment analysis has been studied in different contexts (Shayaa, Al-Garadi, Piprani, Ashraf, & Sulaiman, 2017). One of the most popular types of usage is in the financial sector, particularly in predicting stock prices. Guo, Sun, and Qian (2017), for example, studied Chinese investors' sentiment, while another work focused on US stock market investors (Rao & Srivastava, 2014). Mostafa (2018, 2019) conducted at least two studies pertaining to sentiment analysis and halal food. He clustered halal food consumers using Twitter sentiment analysis (Mostafa, 2018) and mapped them based on geo-located Twitter

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[1] www.thaihalaltour.com

opinion polarity analysis (Mostafa, 2019).

Sentiment analysis is also widely used to analyse brand preference. For example, Hornikx and Hendriks (2015) analysed Dutch tweets on 24 different brands, while Mostafa (2013) used tweets to analyse consumers' sentiment towards 16 brands using an expert-predefined lexicon. Researchers have also used sentiment analysis in the hospitality and tourism sector. For example, Prameswari, Surjandari, and Laoh (2017) used sentiment analysis to analyse the trends of Indonesia's priority tourist destinations. Philander and Zhong (2016) also applied this method to study trends in a Las Vegas resort using sentiment-lexicon methodology. The discussion above illustrates that little research has been done on the halal industry except in the area of halal food; hence, this study focuses on halal tourism.

3. Methodology

This study focuses on Twitter as the source for data collection. This platform provides users' opinions in 140 characters, a feature that enables us to analyse the data more effectively than longer texts and those containing multiple photos. The data for this study was collected from Twitter using keywords related to halal tourism over a period of 10 years (October 2008 to October 2018). We started our analysis for a period of two years, then extended it to five years. Based on our observation, 10 years is the right timeframe for this study, as we gathered many opinions and tweets, we aimed to be as comprehensive as possible, and we covered the formation of halal tourism nineteen keywords were used to extract data from the tweets, as shown in Table 1. Five keywords were in Bahasa Malaysia, and the remainder were in English. The keywords were identified based on Khan and Callanan's analysis (Khan & Callanan, 2017). Nevertheless, not all their terms were used in this study; this study's terms were chosen after a brainstorming session among the researchers.

The common method for collecting tweets from Twitter is through the website's application programming interface (API), which allows developers and researchers to collect data. However, the API has many limitations; it returns tweets only from the last seven days and allows only a limited number of requests to the Twitter server. To overcome these obstacles, we opted to collect data through the search feature of the Twitter website, using a Python script.

The search function returns data with features listed in Table 2. Using these features, users' locations were extracted by developing a Python script. Additionally, in order to identify duplicate tweets, the MD5 value of each tweet is calculated. MD5 is a hash function that returns a unique value for a given text (Wang & Yu, 2005).

A slight change in the text changes the hash value; thus, it enables us to identify duplicate tweets. It is considered a one-way encryption method, as shown in Fig. 1. It is widely used in the field of computer security.

The dataset includes tweets that are not duplicated and are related to the tourism topic based on the keywords mentioned earlier. The final dataset includes 85,259 tweets related to tourism in English and Bahasa Malaysia. In order to ensure the relevance of the tweets, we randomly sifted through the dataset and analysed 100 tweets' text manually. We observed that the tweets can be grouped into three categories: the promotion of tourism within a given location, praise of a tourist attraction, and comments on the tourism of a given location. Detailed

Table 2
List of features returned from twitter.

| Feature	Description
Full name	Name of the user
HTML	HTML code of the returned tweet
ID	ID of the tweet in the Twitter database
Likes	Number of likes received for the tweet
Replies	Number of replies for the tweet
Retweets	Number of retweets for the tweet
Text	Main body of the tweet
Timestamp	Time and date of the tweet
URL	URL of the tweet
User	Username of the user who tweets
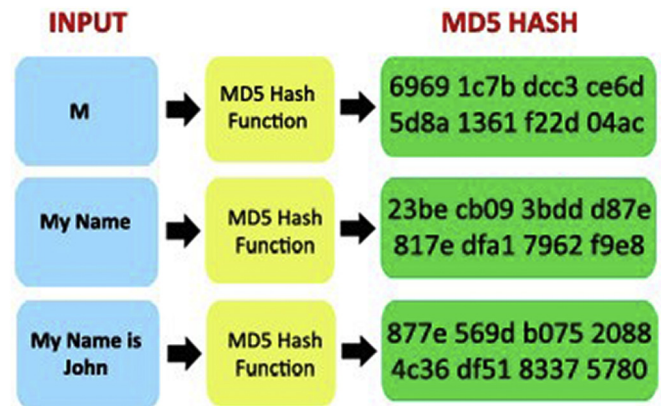
Fig. 1. Mechanism of the MD5 hash algorithm (Jacob, 2016).

analysis of the content is currently being carried and will be reported elsewhere in future.

4. Discussion of findings

The results of the analysis are discussed based on the research questions stated in the introduction.

4.1. Origins of tweets among the world population that relate to halal tourism

One of the most common analyses for text-based datasets is an illustrative wordcloud, which shows the words that are used most frequently. It shows graphically which words are most popular and provides a quick way of summarising tweet content. Fig. 2 is a wordcloud representation of the tweets in the halal tourism database.

In the wordcloud, the larger the word, the more frequently it is used. As can be seen in Fig. 2, 'halal' is the most-used word in tweets, followed by 'hotel', 'Muslim', and 'Indonesia'. It is clear that Indonesia is the centre of halal tourism, with places like Lombok, Aceh, and Bali appearing in the wordcloud. It is not surprising that Lombok appears in the wordcloud, as the Indonesian regional government of Lombok, West Nusa Tenggara, has declared Lombok an Islamic tourism destination (Bastaman, 2018). Peace, inclusiveness, and universality are the key themes in the branding of Lombok's Islamic tourism, along with the

Table 1
Twitter keywords related to halal tourism.

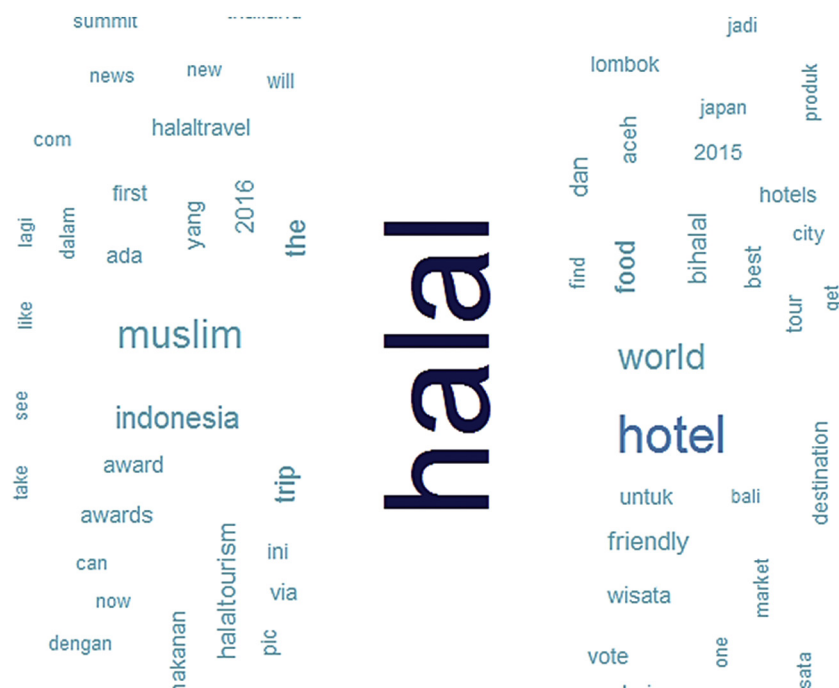| Halal tourism	Halal travel	Halal accommodation	Halal trip
Muslim-friendly tourism	Muslim-friendly travel	Muslim-friendly hotel	Muslim-friendly accommodation
Muslim-friendly trip	Sharia-compliant accommodation	Sharia-compliant hotel	Sharia-compliant tourism
Sharia-compliant travel	Sharia-compliant trip	Pelancong halal	Pelancongan halal
Hotel halal	Lawatan halal	Penginapan halal	

Fig. 2. Wordcloud for halal tourism tweets.

island's beauty and cultural heritage. Meanwhile Aceh has inspired many tweets, because in the World Halal Tourism Awards 2016, Aceh won two awards: 'World's Best Airport for Halal Travelers: Sultan Iskandar Muda International Airport, Aceh' and 'World's Best Halal Cultural Destination'. Moreover, Aceh is the only place in Indonesia where sharia or Islamic law has been implemented, thus increasing curiosity among Twitter users. Meanwhile, although Bali's population is not predominantly Muslim and thus may not offer many halal tourism packages, it is the most popular holiday destination in the Indonesian archipelago and is thus expected to be the subject of more tweets.

Japan is another country that appeared in the wordcloud. As mentioned earlier, Japan has put tremendous effort into promoting halal tourism despite not being a Muslim country. Clearly, the Japanese market realises the great rewards of catering to Muslim tourists. It publicises the existence of Islamic practices in certain Japanese hotels and the provision of comfortable hospitality that Muslims can get staying in those hotels (El-Gohary, 2016). There were also many tweets that mentioned 'halal travel', 'food', and 'hotel'. This is not surprising, as all three terms are part of the halal tourism as mentioned earlier in the Introduction. It is expected that halal tourism will entail travelling using halal transportation and facilities. This means, for example, that the tour bus will stop to allow tourists to perform their daily prayers. Food is an essential part of halal tourism, and hence it had a higher number of tweets. Travellers, especially Muslims, would like to know, for example, where they can get halal food.

4.2. Geo-location of major populations around the world that are engaged in halal tourism tweets

Among the important information gathered from Twitter is the location of the users that are engaged in tweets on halal tourism. It must be noted that this analysis is possible only for users who reveal their locations; hence, it does not represent the entire extracted dataset discussed earlier. Fig. 3 shows that the United Kingdom has the highest number of tweets, with 15.72% of the total, followed by Indonesia with 14.61%. This result indicates that halal tourism is not confined to Muslim countries. It was also found that only three of the top 10 countries (Malaysia, Indonesia, and the United Arab Emirates) were Muslim countries. Although a higher percentage of tweets on halal

tourism came from non-Muslim countries, there is no indication that the tweets were coming from Muslim individuals. It may be because there are more Twitter users in these countries than in the Muslim countries. Moreover, there are many Muslims living in these seven countries, particularly in the United Kingdom (Saniotis, 2012).

Based on the top 10 locations, further analysis was carried out to examine the sentiment of the tweets from these 10 countries (Fig. 4). Generally, there are more positive tweets than negative ones. This signifies positive feedback from users. Nevertheless, there are more negative tweets from United Kingdom than from other countries. Further analysis of the tweets revealed that users are concerned about finding halal food, and some of them are not satisfied with the food choices at certain fast-food chains in the United Kingdom. Examples of negative tweets are as follows:

"*There is a halal sign, but when I asked, one of the items contained bacon*".

"*Watch out for marketing tricks to get you to buy halal meat…*".

These incidents take place because there is no requirement for the food industry in the United Kingdom to obtain halal certification for food products (Parker, 2018). It is a voluntary exercise, and thus many businesses do not bother. It may also be due to the fact that some businesses that have put up the halal logo to attract Muslim customers do not actually have halal certification (Fuseini, 2017). These negative sentiments may be higher in the United Kingdom because it is not a Muslim country, and thus many principles of sharia are not enforced, causing many to doubt that the tourism practices are genuinely halal. Meanwhile, in countries such as Indonesia, whose population is predominantly Muslim, the sentiments are more positive, as the Twitter users believe Indonesia's halal tourist services are likely to be sharia-compliant.

4.3. Trends of the sentiment valence in relation to halal tourism

Based on the 10-year dataset, a relationship can be identified between events and an increase in the number of tweets over a period of time. Fig. 5 illustrates that, before the end of each year, there was a spike in the number of tweets related to halal tourism. This could contribute to the fact that the end of the year coincides with holidays (such as school breaks and the Christmas and/or New Year's holiday) in
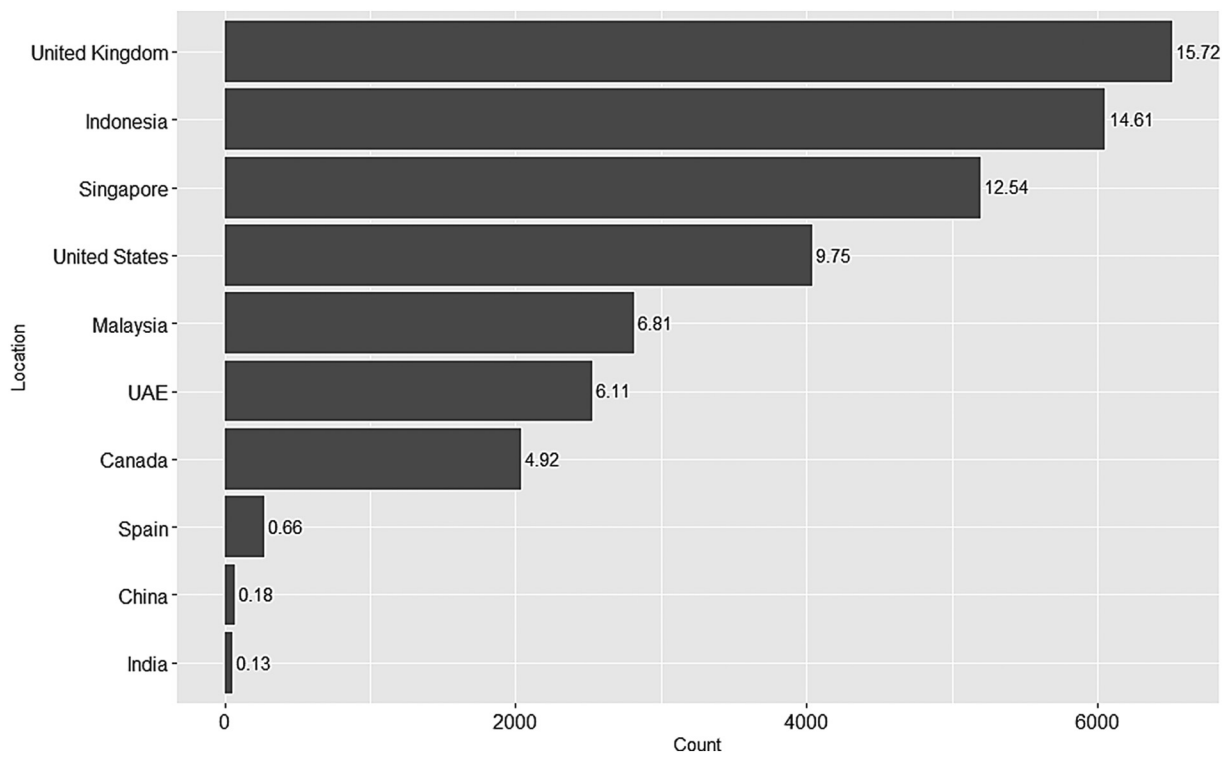
Fig. 3. Top 10 locations with the highest number of tweets (percentage of total tweets).

most countries worldwide. Hence the demand for travel increases and creates an increase in halal tourism tweets. Tweeters may be looking for last-minute bargains. In some countries, such as the United Kingdom, many year-end sales take place, which may also increase the number of

tweets, as affluent Muslim travellers, especially from the Middle East, may be looking for bargains and also to enjoy the cooler weather during that period.

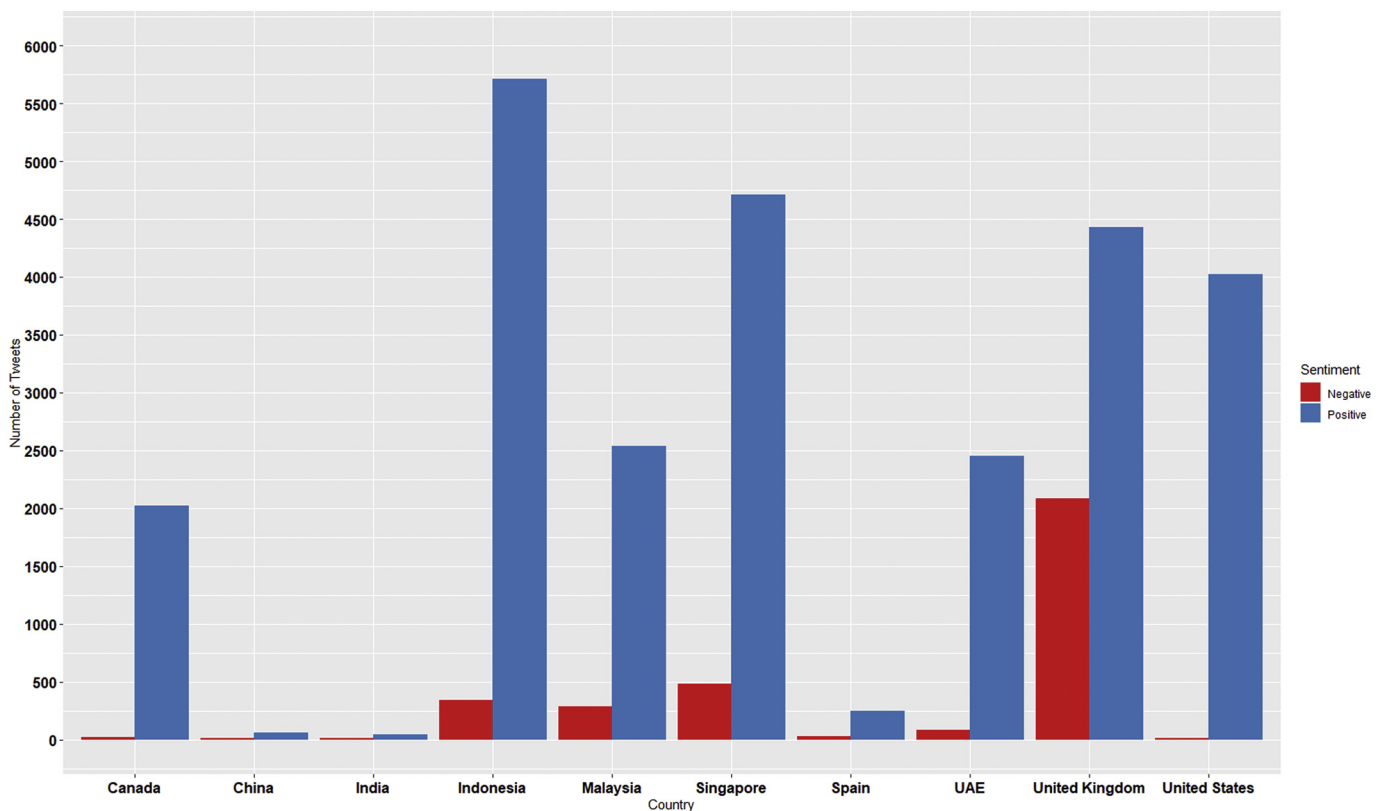Within the 10-year period, Fig. 5 shows that the highest spike in the

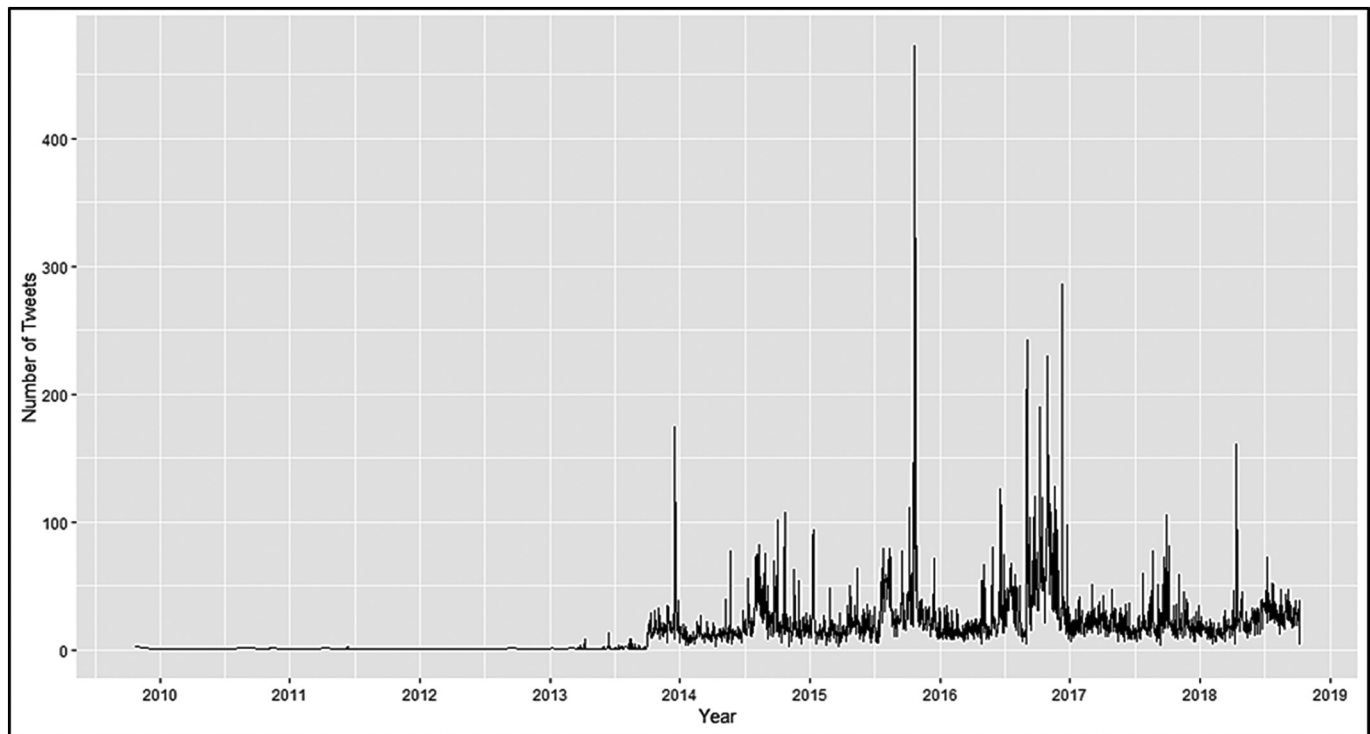**Fig. 4.** Sentiment in the top 10 countries.

Fig. 5. Trend of halal tourism tweets in 10 years.

number of tweets occurs in the second half of 2015. One factor that may have caused an increase in tweets was that Lombok was named the 'World's Best Halal Tourism Destination' and the 'World's Best Halal Honeymoon Destination' at the Abu Dhabi World Halal Travel Awards 2015. Lombok was not previously a popular tourist destination, and thus this announcement may have spawned Muslims to find out more about it, thus increasing the number of tweets.

In 2016, the spikes are higher on average than in other years. This could be connected to the fact that the halal tourism awards were held in 2016, thus leading to an increase in the number of tweets on the subject. In addition, the fact that Indonesia won 12 awards out of the total 16 categories at the World Halal Summit 2016 may have led to a spike in the number of tweets, as users became interested in learning more about halal tourism in Indonesia. Moreover, several other events related to halal tourism were held in 2016, such as the Halal Tourism Conference in Turkey (held on 3–5 May), Halal Expo Japan in Tokyo 2016 (held on 22–23 November), and Halal In Travel – Asia Summit in Singapore 2016 (held on 19 October).

4.4. Popular destinations that appear in the tweets

Further analysis was performed on the 85,259 tweets related to halal tourism. It is interesting to note the details of tweets in terms of popular destinations. This analysis focused on the destinations mentioned in tweets and not on the location of the user. Surprisingly, the destination mentioned most often is Japan. Some users raised concerns about finding halal food before travelling to Japan, while others were surprised to see halal food in that country. There were also travellers who had visited Japan multiple times who mentioned that they found halal food and halal restaurants more readily during more recent trips. Furthermore, a couple of tweets expressed joy with the availability in Japan not only of halal food but also of prayer rooms, such as in the following tweet: 'On my first trip to Japan in 2010, halal restaurants were almost rare. Now I'm so happy that food & praying areas are slowly being made available for Muslims'. This shows that Japan understands the value of the halal tourism market and has invested in

providing Muslims with halal products to ensure that their stay is enjoyable and allows them to adhere to Islamic principles.

On the other hand, perhaps it is not so surprising that 'Japan' as a term has the most tweets. After all, the government of Japan and agencies related to tourism in Japan have been extensively promoting halal tourism for the last three years. According to the Japan National Tourism Organisation (JNTO), nearly 271,000 Indonesians travelled to Japan in 2016, up from just 63,000 in 2009. Similarly, more than 394,000 Malaysians arrived in 2016, up from 89,000 in 2009. One of the main reasons why Indonesians and Malaysians travel to Japan is because of the ease with which Muslim travellers can have their specific needs met (Ryall, 2017). Among JNTO's efforts is a dedicated page for Muslim travellers on its website.[2] This will definitely increase the searches for and tweets on Japan as a halal tourism destination among Muslim travellers. Many travellers also share their experiences of travelling in Japan.

In addition to Japan, the other non-Muslim country that has appeared among the most-mentioned destinations in tweets is South Korea, as halal food is widely available in most big cities there. One user was happy to have found halal duck rice in Seoul and shared his experience on Twitter. Other users generally mentioned that halal food is widely available in South Korea, which in turn increases the likelihood of Muslim tourists visiting that country, thus expanding the halal tourism market there. This is interesting, as Khan and Callanan did not mention South Korea among the top 10 destinations listed for halal tourism (Khan & Callanan, 2017).

The dataset revealed that Japan and South Korea are among the countries that received a higher percentage of tweets. This implies that halal tourism is not restricted to Muslim countries. Japan and South Korea, as non-Muslim countries, have put in place several initiatives to ensure that halal tourism will flourish and contribute substantially to their economic growth. Many travellers see non-Muslim countries offering halal tourism as alternative places to visit for leisure and relaxation, and not for spiritual reasons alone. This could indicate that

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[2] https://www.jnto.org.my/for-muslim-travellers/

travellers are curious about what Japan and South Korea have to offer them in terms of halal tourism.

Malaysia and Indonesia were second- and third-highest, respectively, among the most talked-about destinations. Penang was the most-mentioned place in Malaysia, followed by Johor, Ipoh, and Kelantan. The tweets illustrated that users are concerned about halal food and halal hotels, which are part of halal tourism. The Malaysian government, through the Islamic Tourism Centre,[3] has been promoting Malaysia as a halal tourism hub. In Indonesia, Bandung was the place mentioned most often by tweeters, as they expressed interest in finding halal foods in that city. Bali is another place that generates interest due to its natural beauty; however, many are hesitant to visit because Islam is not the main religion there, and thus halal food is not readily available. Lombok and Aceh are other places that have received attention from tweeters. The findings that identified Malaysia and Indonesia are top destinations for halal tourism are similar to the findings of (El-Gohary, 2016; Khan & Callanan, 2017; Mohsin et al., 2016) in their respective studies.

5. Conclusion

Halal tourism has lately received significant attention from academics as well as practitioners. This study analysed the tweets related to halal tourism. The findings of this study can help various stakeholders, such as marketers who wish to target the halal tourism market. In addition, the study has contributed to the existing knowledge on tourism in general and halal tourism in particular. In this paper, we found that halal-tourism-related tweets about non-Muslim countries outnumber those about Muslim countries. This shows that halal tourism is becoming popular and is growing in countries such as the United Kingdom, Canada, and Spain. This paper also found that tweets on halal tourism spike at the end of each year, which is the holiday season. Halal tourism has gained popularity as Muslims become more interested in international travel.

As with any research experiment, there are some limitations to this study. The choice to analyse data from the Twitter platform was justified in Section 3. It would be beneficial to cover other social media platforms, such as Facebook; this can be incorporated into future work. This study extracted data from Twitter over a 10-year period, and future studies can use 2019's data. The main limitation of this study is that only 19 keywords related to halal tourism were used to extract the tweets. Future studies should incorporate a wider range of keywords. Finally, this study focused only on halal tourism; future studies should study other sectors of the halal industry, such as food, pharmaceuticals, and cosmetics, as well as Islamic finance and banking.

Author contribution

Sulaiman Ainin: Funding acquisition; Project Administration; Conceptualization; Writing – original draft, review and editing.

Ali Feizollah: Methodology; Software; Formal analysis; Writing – original draft.

Nor Badrul Anuar: Conceptualization; Software, Methodology; Formal analysis; Writing – original draft.

Nor Aniza Abdullah: Conceptualization; Writing – original draft,

Acknowledgments

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