

# Exploring crucial social media marketing factors for improving customer satisfaction and customer loyalty in bed and breakfast sectors in Taiwan

Venkateswarlu Nalluri, Kai-Fu Yang, Long-Sheng Chen and Tzung-Yu Kevin Yang

## Abstract

**Purpose** – The Bed and Breakfast (B&B) enterprises generally lack sufficient human resources and time to conduct research on important social media marketing factors for visitors' satisfaction and visitors' intentions. Therefore, this study aims to provide crucial social media marketing and factors and service quality elements for improving customer satisfaction and customer loyalty in B&B sectors. This study also provides some recommendations for attracting more visitors and increasing customer satisfaction and customer loyalty through social media.

**Design/methodology/approach** – First, social media marketing factors and service quality elements were identified through the systematic literature review. Then these identified factors and elements were used to design a survey questionnaire for collecting data. The research data included responses of 64 B&B enterprises and 625 customers. The collected data was analyzed by feature selection approaches including Decision Tree algorithm and Information Gain to identify the key factors for improving customer satisfaction and customer loyalty.

**Findings** – The findings of this study determined that featured choice is an important social media marketing factor, and assurance is the common service quality element for both B&B enterprises and their customers in terms of satisfaction and loyalty.

**Originality/value** – This study adds a value to the growing literature on customer satisfaction and loyalty in B&B sectors by exploring key social media marketing factors and service quality elements. The study reveals several implications for theories and practices. The findings hopefully help B&B enterprises better social media marketing with less workforce and budget.

**Keywords** Social media marketing, Service quality elements, B&B enterprises and customers perspectives, Feature selection, Bed and breakfast sectors

**Paper type** Research paper

Venkateswarlu Nalluri is based at the Department of Information Management, Chaoyang University of Technology, Taichung, Taiwan. Kai-Fu Yang is based at the Department of Applied English, Chaoyang University of Technology, Taichung, Taiwan. Long-Sheng Chen and Tzung-Yu Kevin Yang are both based at the Department of Information Management, Chaoyang University of Technology, Taichung, Taiwan.

Received 4 October 2022  
Revised 15 January 2023  
17 February 2023  
23 February 2023  
Accepted 24 February 2023

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This study was partially supported by National Science and Technology Council, Taiwan (Grant No. MOST 111-2410-H-324-006).

*Declaration of competing interest:* The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## 1. Introduction

In recent decades, tourism is one of the global major service industries and has made significant contributions to the worldwide economy (Parvin, Tavakolinia, Mosammam, & Razavian, 2022). For this reason, many governments in general, and Taiwanese in particular, are actively promoting the growth of this so-called “chimney-free industry” (Chen, Lin, & Kuo, 2013). However, the COVID-19 pandemic had a significant impact on the growth of the tourism sector (Parvin et al., 2022) because people preferred staying in congested areas such as towns and metropolitan cities for safety during the COVID-19 pandemic. Recently, when the COVID-19 pandemic is controlled, tourism has returned to normal (Biju & Kumar, 2022), and Bed (i.e. sleeping for a night) and Breakfast (i.e. a meal in the morning) (B&B) services, provided by guest houses and hotels (Zhang, Li, Huang, & Hua, 2022a, Zhang, Williams, Li, & Liu, 2022b), are becoming popular.

In addition, the rapid development of social networking websites has become popular social media on the internet. Social networking websites, such as Facebook, TripAdvisor and Twitter, have become the main platforms for communicating, discussing and exchanging information among social site members (Dehghani & Tumer, 2015). On these websites, online users transmit information and interact with each other through available characteristics of media. Consequently, these social networking websites could be called "social media" (Adeola, Hinson, & Evans, 2020). Community websites have become an important source of information for many people. Tourists can share their travelling experiences with others and respond to related comments. This many-to-many interaction spread through the internet can be called electronic word of mouth (e-WOM) (Chen, Shang, & Li, 2014). The forms of e-WOM include one-to-one emails, one-to-many distributed emails, instant messages, Web pages, blogs, discussion forums, chat rooms and online communities (Sigauke & Erdis, 2018).

Such information sharing has created strong relationships among community members. In addition, many companies have started interacting with customers and understanding customer needs through social media. So, the rapidly growing popularity of social networking sites has changed traditional marketing content (Parra-López, Bulchand-Gidumal, Gutiérrez-Taño, & Díaz-Armas, 2011). The 2022 report of the Taiwan Tourism Bureau also shows that the internet has become one of the important sources of tourist information in Taiwan (representing 56.2% of information sources). Therefore, the emergence of social media has changed the marketing management ways of the travel business (Zahay, 2021).

According to the report of 2021 social media marketing industries (Parra-López et al., 2011), the most frequently used social media is Facebook (81%), followed by Twitter (79%), LinkedIn (64%), Blog (47%) and YouTube (46%). In the current status of the use of social media marketing, 58% of marketing companies integrate social media into traditional marketing. Recently, clicking "check in" on Facebook when traveling has become a common marketing practice. Customers can share their locations and experiences anytime and anywhere. The customers "check-in" messages can enhance exposure, spreading by e-WOM, and then attract other potential visitors for the B&B sectors. As the B&B travel community sites have continuously grown, they convey positive images and advice that can help potential customers when searching for travel information (Chen et al., 2013). Related research has shown that tourists will choose a tourist destination by searching others' experiences via Facebook to compare features of different B&B services. Thus, interactions with customers through social media and in the field of tourism including the B&B sector have increasingly become important (Liao, Widowati, & Cheng, 2022).

However, limited by firm size, the B&B enterprises are generally lacking sufficient human resources and time for communicating with customers, cultivating potential customers and conducting social media marketing activities. Therefore, understanding the important social media marketing factors and key service quality elements can help B&B enterprises make precise decisions on social media marketing and obtain the voice of the customers.

To achieve the above objectives, this study identified the social media marketing factors and Service Quality Elements (SQEs) by conducting a systematic literature review. Then, we designed a different set of questionnaires to survey opinions of the B&B enterprises and their customers. The collected data were analyzed by applying a feature selection approach including the Information Gain (IG) and Decision Trees (DT) to recognize the key factors and SQE's in terms of satisfaction and loyalty, respectively. This study contributes to the social media marketing literature from the following perspectives. First, this study identified key factors of social media marketing and SQEs in the B&B sectors. Second, it provided a dynamic perspective on the importance of social media marketing factors for customers and B&B enterprises. B&B enterprises and customers can make informed decisions about how to communicate or market more effectively via social media. B&B

enterprises can use their limited resources to do effective marketing and improve service quality. This research also provided suggestions and references for improving mobile advertisements for relevant companies or scholars in related fields.

## 2. Literature review

### 2.1 Social media marketing

The purpose of social media is to achieve distribution goals through interaction. Social media allows users to share information and make comments, develop a circle of friends, maintain relationships and communicate with others (Zhou & Wang, 2014). Unlike one-to-one communication in traditional marketing, social media can establish many-to-many communication. This trend has continuously increased due to the growth of web 2.0 services, such as Blog, Twitter (information exchanging and sharing), YouTube (video and photo sharing) and Wikipedia (knowledge sharing) (Di Virgilio, Soliman, & Anwar ul Haq, 2022). Chawla and Chodak (2021) compared four kinds of media (blogs, forums, Twitter and conventional news) and discovered that social media outperforms conventional media. Andersen (2005) reported that tourists have been using virtual communication platforms to exchange ideas and experiences for more than ten years. Tourists will obtain information, learn from the experiences of others and compare tourism-related services before traveling or during the trip. Alalwan (2018) mentioned that there are three motivating factors for searching travel-related information, the exchange of information, entertainment and social networking. As tourists use the internet to communicate with each other and share travel-related information, they can make detailed travel plans by understanding tourism destinations through others' sharings (Andersen, 2005; Alalwan, 2018).

We can divide related literature into two groups. The pieces of literature in the first group are to study the effectiveness of using social media marketing. For example, Kim, Sung, and Moon (2020) developed a model to explain how the social media community strengthens the relationship between brands and customers. Lin, Lai, and Morrison (2019) evaluated the differences in visitor behavior when purchasing mementos between websites that posted photographs and those that did not provide pictures. This study's findings help website owners develop strategies to stimulate the effectiveness of their marketing. Biju and Kumar (2022) used a modified balance scorecard to evaluate the hotel websites during the COVID-19 pandemic. They confirmed that the hotel website can build long-term customer relationships through the hotel's policy. Chen (2015) used "hotel stars" and "hotel facilities (restaurant, business center, gym, free wireless internet)" to predict roads and destination types. They also used social media to evaluate customer satisfaction. Zhou and Wang (2014) discussed the current development status of Chinese social media. They said that companies can use social media to market themselves. Compared with traditional media, social media provides a convenient, participatory, open, transparent and interactive dialog platform.

The studies in the second group discussed customers' motivations for influencing their trip and accommodation decision-making by using social media. For instance, Chawla and Chodak (2021) compared the two major social networking sites such as Facebook and Twitter to determine whether personality selection affected the selection of social media by using structural equation model and factor analysis approaches. Nasir et al. (2021) investigated the impact of social media on staying in touch with customers to resolve complaints and queries from visitors seeking feedback, and to assist potential customers in making travel decisions. In this work, the factors used were pictures posting, discussions, contests and games, community events, film appreciation and motivation factors. Zahay (2021) mentioned that travelers made their destination decision by using social media under uncertain situations. They used cluster analysis to analyze the travel behaviors of different groups. The used variables were urban, age, gender, household size, full-time work, part-time employment, retirement, homemakers, car and walking. Sun and Wang (2019)

mentioned that there were six travel motivations, including relaxation, socializing and learning, family gatherings, novelty and excitement. They also found that tourists enhanced their tourism destination choices through social networking site photographs or pictures. [Parvin et al. \(2022\)](#) showed that pictures of tourist destinations will affect tourists thinking and feelings. Other scholars discussed the importance of the “culture” of the field of tourism because the picture made tourists decide vocational spots ([Chen et al., 2013](#)).

In summary, social media marketing needs to develop a persuasive narrative through the sharing of expertise and quality to influence customer loyalty and preserve long-term customer relations ([Andersen, 2005](#)). However, the available research has not specifically addressed the B&B sector context. Additionally, they lacked the necessary resources in terms of time, money and human capital to instruct businesses on how to use social media marketing and which social marketing strategies are important. For tourism businesses, it is critical to identify the key factors that influence customers behaviors.

## *2.2 Identification of factors for social media marketing and service quality*

This section attempts to identify the social media marketing factors and SQEs through a systematic literature review in the context of B&B sector. [Dehghani and Tumer \(2015\)](#), [Di Virgilio et al. \(2022\)](#) and [Ding, Choo, Ng, and Ng \(2020\)](#) found that factors in designing customized advertisements for social media marketing, namely, communities and interactive quality, novelty, market, socializing and learning, interactive quality and other five important factors, the research results can be suitable for social media marketing related sectors and make related enterprises more vigorously develop. [Chawla and Chodak \(2021\)](#) and [Wang, Ding, Chan, and Qi \(2022\)](#) found important factors that drive young people to have a positive attitude toward the B&B sector on weekends. These are fan pages, beacons and polls and altruism. [Lu, Chen, and Law \(2018\)](#) and [Liao et al. \(2022\)](#) found that a few factors, including application, featured choice and esthetic and visual quality can affect customers’ decisions through online comments on social media. Advertisements generate more brand preferences, and it is also believed that placing advertisements on highly relevant websites or appropriate venues can attract customers’ attention more ([Alalwan, 2018](#)). [Park and Yoon \(2009\)](#) and [Dehghani and Tumer \(2015\)](#) collected data from Taiwanese customers and found that four factors, including relaxation, events, featured choice and markets can predict the effectiveness of rural tourism context. [Tan and Chang \(2011\)](#) showed that recreation will influence the customer satisfaction of the young generation. [Di Virgilio et al. \(2022\)](#) and [Kourtesopoulou, Kehagias, and Papaioannou \(2018\)](#) found that socializing and learning, altruism and information exchange are the main reasons for improving consumer satisfaction in the B&B sector and based on these four potential factors to build a prediction model and apply it to social media marketing ([Adeola et al., 2020](#)).

In addition, another part of the systematic literature review found a few studies related to SQEs. In this study, we used famous SERVQUAL dimensions in the work of [Parasuraman, Zeithaml, and Berry \(1988\)](#) to determine our SQEs. Current literature has correlated the customer’s perceptions of performance and service quality elements with their socioeconomic characteristics in the B&B sector. [Tichaawa and Mhlanga \(2015\)](#) used data from China’s B&B sector to weigh the SERVPERF method and analyze perceived quality and customer satisfaction. They have grouped five dimensions with 21 factors, such as assurance, empathy, reliability, tangible and responsiveness in the customer’s context. In addition, the relevance of these factors were supported by [Priporas, Stylos, Vedanthachari, and Santiwatana \(2017\)](#). They used entropic weighting to determine each quality element’s relative weight. [Chen and Wu \(2016\)](#) used the well-known fuzzy TOPSIS analysis to identify each explanatory factor’s satisfaction index. More than ten elements were explained, and the quadrant approach was used to mix the two dimensions and analyze the findings. Based on this approach, the academics suggested the improvement

of elements related to assurance, empathy and reliability in the B&B enterprise context. [Keshavarz and Jamshidi \(2018\)](#) also mentioned the importance of responsiveness as a significant service quality element for improving customer loyalty in social media marketing. Hence, the present literature is confusing the B&B enterprises with different perspectives and SQEs for effective decision-making on customer satisfaction and loyalty. The systematic literature review ended with two lists. One list is the factors for social media marketing and one list is SQEs. We summarized all identified factors and SQEs related to the B&B sector as shown in [Tables 1](#) and [2](#), respectively.

### 2.3 Feature selection

Feature selection aims to find the optimal variable set from many features to reduce the dimension space and save computation time ([Chen, Chang, Chen, & Hsu, 2022a](#); [Chen, Chang, Chen, & Shen, 2022b](#)). By removing irrelevant and redundant attributes, we can both reduce the number of input variables and improve the classification performance

**Table 1** List of social media marketing factors

No.	Factors	Definition	Source
F1	Fan page	You can enjoy any discount by joining the fan page and can get other information through the fan page	<a href="#">Dehghani and Tumer (2015)</a> , <a href="#">Kim et al. (2020)</a> , <a href="#">Chawla and Chodak (2021)</a>
F2	Communities	A group of people with common ideas come together to participate in discussions to share the specific benefits for niche markets	<a href="#">Dehghani and Tumer (2015)</a> , <a href="#">Adeola et al. (2020)</a> , <a href="#">Zahay (2021)</a>
F3	Events	Events can be sponsored or promoted and shared by users	<a href="#">Dehghani and Tumer (2015)</a> , <a href="#">Harb, Fowler, Chang, Blum, and Alakaleek (2019)</a> , <a href="#">Ding et al. (2020)</a>
F4	Advertisements	Spread the B&B website through advertisements, communities, portals, provide some special prizes and competitions to attract users' attention toward the B&B services	<a href="#">Dehghani and Tumer (2015)</a> , <a href="#">Alalwan (2018)</a> , <a href="#">Liao et al. (2022)</a>
F5	Market	Platforms for exchanging messages or trading featured products	<a href="#">Dehghani and Tumer (2015)</a> , <a href="#">Kim et al. (2020)</a> , <a href="#">Adeola et al. (2020)</a>
F6	Beacons and polls	Users follow the event page to show their attention and vote	<a href="#">Sigauke and Erdis (2018)</a> , <a href="#">Rogerson and Rogerson (2021)</a> , <a href="#">Wang et al. (2022)</a>
F7	Application	Get some relevant information and promotions through the applications (APPs)	<a href="#">Lu et al. (2018)</a> , <a href="#">TÜRKCAN (2020)</a> , <a href="#">Di Virgilio et al. (2022)</a>
F8	Featured choice	It can provide basic information, including traffic, location, contact numbers, website links, etc.	<a href="#">Parra-López et al. (2011)</a> , <a href="#">Ding et al. (2020)</a> , <a href="#">Liao et al. (2022)</a>
F9	Aesthetic and visual quality	Covers, mugshots and event photos on social media (e.g. Facebook) affect initial customer impressions	<a href="#">Sigauke and Erdis (2018)</a> , <a href="#">Kourtesopoulou et al. (2018)</a> , <a href="#">Liao et al. (2022)</a>
F10	Interactive quality	Communicate with other users by leaving comments on fan pages or societies	<a href="#">Parra-López et al. (2011)</a> , <a href="#">Adeola et al. (2020)</a> , <a href="#">Di Virgilio et al. (2022)</a>
F11	Information exchange	Post the latest news for other users to discuss and express opinions through the latest news	<a href="#">Andersen (2005)</a> , <a href="#">Tan and Chang (2011)</a> , <a href="#">Di Virgilio et al. (2022)</a>
F12	Recreation	The enterprises can use the social platform to build a small game/puzzle to introduce B&Bs	<a href="#">Tan and Chang (2011)</a> , <a href="#">Ding et al. (2020)</a>
F13	Altruism	Benefits earned by B&Bs help the relief group	<a href="#">Parra-López et al. (2011)</a> , <a href="#">Kourtesopoulou et al. (2018)</a>
F14	Socializing and learning	It can find partners with the same interests as you through the community, exchange information with each other and learn about the unique local culture	<a href="#">Park and Yoon (2009)</a> , <a href="#">Chawla and Chodak (2021)</a> , <a href="#">Di Virgilio et al. (2022)</a>
F15	Relaxation	It is relaxing to enjoy pictures of fan groups or societies	<a href="#">Park and Yoon (2009)</a> , <a href="#">Sun and Wang (2019)</a> , <a href="#">Zhang et al. (2022a, 2022b)</a>
F16	Novelty	It uses photographs to present the local food, scenery and style of the accommodation experience	<a href="#">Sun and Wang (2019)</a> , <a href="#">Ding et al. (2020)</a> , <a href="#">Zahay (2021)</a>

Source: Created by author

**Table 2** List of service quality elements

No.	Service quality elements	Definition	Source
Q1	Assurance	If you feel discomfort with the accommodation or have questions about this place, you can reply and deal with it in time	Tichaawa and Mhlanga (2015); Priporas et al. (2017); Keshavarz and Jamshidi (2018)
Q2	Empathy	The B&Bs can give people the feeling of family and have an impression on the tourists who come in and go out	Priporas et al. (2017); Sun and Wang (2019); Ding et al. (2020)
Q3	Tangibility	The overall facilities of the B&Bs include basic equipment, the appearance of the B&Bs and the scenery (specific building)	Tichaawa and Mhlanga (2015); Priporas et al. (2017); Ding et al. (2020)
Q4	Reliability	For the tourist to deposit things in the homestay, we can promise to take care of the things for the customer	Tichaawa and Mhlanga (2015); Chen and Wu (2016); Priporas et al. (2017)
Q5	Responsiveness	The B&Bs can deal with customers' problems in a timely manner when there is a lack of mechanisms during accommodation	Tichaawa and Mhlanga (2015); Priporas et al. (2017); Ding et al. (2020)

Source: Created by author

(Hsiao, Tsai, Lockyer, Sung, & Kuo, 2018). Chen et al. (2022a, 2022b) mentioned that there were three types of feature selection approaches, such as filters, wrappers and embedded approaches. This study used IG with entropy index and DT due to their purpose and low computational cost. IG with entropy index can be employed to compute and rank the importance of input variables (Rodríguez Lopez, Alvarez Rodríguez, & Amador Rodríguez, 2022). Chen et al. (2022a, 2022b) found that IG could determine those attributes which have a high correlation. Rodríguez Lopez et al. (2022) mentioned that IG was successfully applied to many nonmedical areas, including active learning strategies, design contest optimization and forecasting market activities. These studies showed IG can have a good performance in the feature selection.

The decision tree is one of the most popular supervised machine learning methods (Chen et al., 2022a, 2022b). It belongs to the embedded feature selection approach. When using the DT method as a feature selection tool, the nodes in the constructed tree are considered important, and other features will be removed. The DT method has been used in tourism research. For example, Tyrväinen, Uusitalo, Silvennoinen, and Hasu (2014) studied travelers' preferences and select tourist destinations. This study used DT to find the factors that influence tourists' selection to develop overall planning of resorts to enhance eco-efficiency and sustainable development. Sun and Wang (2022) used a DT (C4.5) in a restaurant to accurately predict financial distress. Sun and Wang (2022) also used the DT model (CART) to predict the internet marketing performance of ski resorts. These studies have shown that the DT method can be successfully used for feature selection. Therefore, this study used the DT for feature selection approach to achieve the study objectives. The following section will clearly explain the process of the present study methodology.

### 3. Used approach

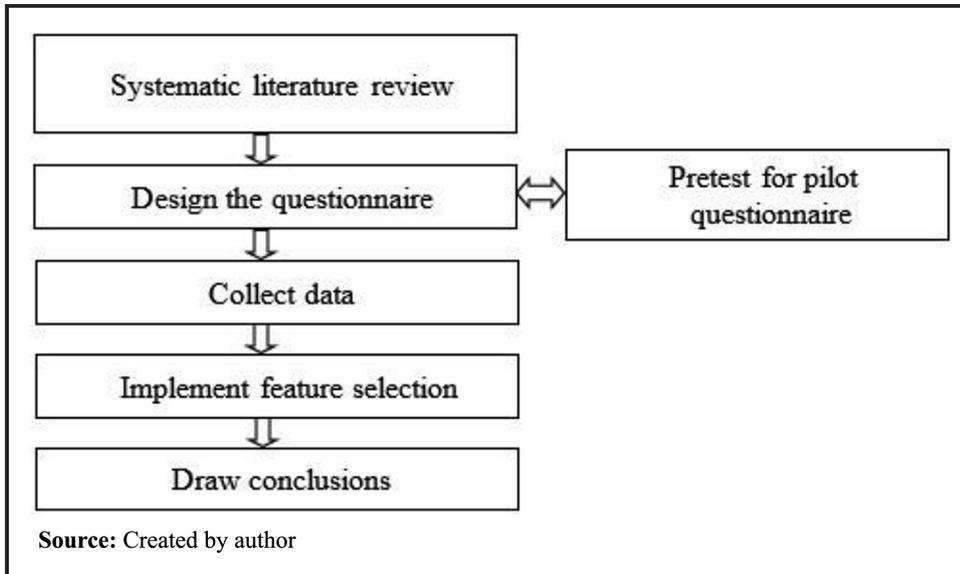
This section will describe the research methods and procedure of this study. The implementation procedure is illustrated in Figure 1.

#### *Step 1 Systematic literature review.*

From the available published literature, we conducted a literature review to identify and define the potential social media marketing factors and the traditional SQEs for the B&B sector. These are constituting factors investigated in this study.

#### *Step 2 Design the questionnaire.*

**Figure 1** The implemental procedure of used approaches



A set of questionnaires was used as a measurement technique in this study. We prepared the questionnaire based on the 16 factors (Table 1) and 5 SQEs (Table 2) identified in Step 1. This questionnaire will be used to survey respondents' perspectives on the relevance of each factor and element. The questionnaire was divided into four sections: basic respondent data, opinions on social media marketing factors and SQEs and general comments.

#### *Step 3 Pretest for pilot questionnaire.*

A pilot questionnaire was pretested before issuing a formal questionnaire to minimize misinterpretation of the respondents and to determine the validity of the questionnaire. We conducted one-by-one interviews with respondents who had the experience of living in the B&Bs and participating in social media. There are two major steps: first, the participating respondents filled out questionnaires without any reminders. They can ask whether they found question items are unclear. Second, after respondents complete the questionnaires, the researchers explain the items one by one to the respondents and confirm that respondents understand the meaning of the item content to be expressed. Thus, there is no misunderstanding in the semantic aspects.

#### *Step 4 Data collection.*

This study used the questionnaire method for data collection. A total of determined factors and SQEs of social media marketing based on a systematic literature included 16 factors and 5 SQEs. We collected the data from both B&B enterprises and their customers using different sets of questionnaires to achieve the research objectives.

To collect the data from the B&B enterprises, a few steps were undertaken as follows. First, the list of B&B enterprises was identified by the Taiwan Tourism Bureau. Second, the B&B enterprises were conducted to collect the e-mail addresses of the operational managers. Third, e-mails were sent to the operational managers of all the B&B enterprises, and permission for data collection was sought. As it was found that the operational managers were responsible for the service quality management and customer handling activities at the B&B firms, and the permission for research in the B&B firms was under the authority of the managers.

To collect the data from the B&B customers, none of the B&B enterprises were not given permission to meet their customers inside the hotel due to their rules and regulations. We met the B&B customers through social media and during checkout time at the B&Bs. Initially, two questions were asked as the screening question by the researcher: Are you using the B&B services during your trip? Are you willing to help with our research study? If the replies to two questions from the respondents were yes, the main questionnaires were given to them.

We prepared different set of questionnaires for social media factors (16) and SQE (5). The questionnaires were sent through e-mails (to the B&B enterprises) and social media platforms (to the customer) to avoid unauthorized samples in Taiwan, including the northern, central, south and east of Taiwan during January and June 2022. These respondents and places were chosen randomly and 761 questionnaires were sent based on 1.16 rate, suggested by [Izogo and Mpinganjira \(2021\)](#). The sample size was for customers (625) and B&B enterprises (64). As it was demonstrated in the published studies that the response rate of tourists from public platforms or places such as social media and hotels was around 75% ([Keshavarz & Jamshidi, 2018](#)), the distribution rate of questionnaire was selected as 1.16, and 761 ( $421 \times 1.16$ ) questionnaires were sent to collect at least 421 valid samples.

*Step 5 Implement feature selection.*

In this step, we selected important factors from the collected data. We used the data of the important items (defined social media marketing factors and SQEs) as our input data (factors) and the labels “satisfaction level if B&B fulfills the important factors which respondents answered in Parts 2 and 3 of questionnaire” and “the probability of revisiting if B&B fulfills the important factors which respondents answered in the questionnaire” as our output data, respectively. Then, we constructed DTs and computed IG for selecting the important factors. The detailed implemental process could be found in the following sub-steps.

Step 5.1 Data preparation for build DTs.

Using a fivefold cross-validation experiment and construct a DT for each fold of data. Besides the test set, we will use the other four sets as our training set to build DTs. Therefore, we will have five trees.

Step 5.2 Determining the input and output factors.

Step 5.3 Constructing DTs following the C5.0 algorithm for each fold data set.

Step 5.3.1 Creating an initial rule tree.

Step 5.3.2 Pruning this tree.

Step 5.3.3 Processing the pruned tree to improve its understandability.

Step 5.4 Picking a tree which performance is the best among all constructed trees.

Step 5.5 Computing IG.

The IG of factor  $x$  could be defined as [equation \(1\)](#):

$$IG(x) = -\sum_{i=1}^{|C|} P(c_i) \log P(c_i) + P(x) \sum_{i=1}^{|C|} P(c_i|x) P(c_i|x) + P(\bar{x}) \times \sum_{i=1}^{|C|} P(c_i|\bar{x}) \log P(c_i|\bar{x}) \quad (1)$$

where  $c_i$  means the  $i$ th category;  $P(c_i)$  represents the probability of the  $i$ th category;  $P(x)$  and  $P(\bar{x})$  are the probabilities that the factor  $x$  appears or not in the collected examples,

respectively;  $P(c_i|x)$  represents the conditional probability of  $i$ th category given that factor  $x$  appeared; and  $P(c_i|\bar{x})$  is the conditional probability of  $i$ th category given that factor  $x$  does not appears.

*Step 6 Draw conclusions*

Finally, from the results of Step 5, we identified the important factors of social media marketing and SEQs in the context of satisfaction and loyalty for the B&B sector. Then, we compared all results of the used methods in this study and draw conclusions.

**4. Experimental results and discussion**

**4.1 Sample characteristics**

This study divided samples into operators and customers for comparison to discover whether customers and B&B firms have different social media marketing methods for homestays. The samples of this study, which separates customers (625) and B&B enterprises (64) for comparison, are displayed in [Table 3](#).

**Table 3** Comparison of the basic data of customers and B&B enterprises

<i>Variables</i>	<i>Customers (%)</i>	<i>B&amp;B enterprises (%)</i>
	<i>Proportion</i>	
<i>Gender</i>		
Male	42	31
Female	58	69
<i>Age</i>		
<18	1	0
18–30 years old	65	23
31–40 years old	16	38
>40	18	38
<i>Income per month</i>		
<20 K NTD	49	8
20 K–50 K NTD	40	69
50 K–100 K NTD	8	23
>100 K NTD	3	0
<i>Place of residence</i>		
Northern	56	15
Central	22	23
South	20	38
East and outlying islands	2	23
<i>Information source of B&amp;B</i>		
Keyword advertisements	13	15
Print media	25	23
Netizens share	51	62
Other	12	0
<i>Motivation to stay</i>		
Discount price	30	15
Feature	41	69
Word of mouth	15	15
Landscape	11	0
Other	3	0
<i>Daily time spent on social networking sites</i>		
3 h	46	85
4–6 h	42	15
7–9 h	7	0
>10 h	4	0

Source: Created by author

There were 761 samples of data recovered in total for the customer data set. This study used 625 valid questionnaires for analysis after eliminating individuals who had never resided in a homestay and other faulty questions. According to Table 3, men account for 42% of the samples, while women account for 58%. The samples' average age is 18–30 years old (65%), and the majority have a monthly income of less than 20,000 New Taiwan Dollars (NTD) (49%). The information is based on netizens sharing (51%), the main reason for living is the characteristics of homestays (41%) and the time spent browsing social networking sites is approximately 3 h (46%).

Where the B&B enterprise data set was a total of 64, the majority of them are female (69%), the main age of the samples is 31–40, and more than 40 (38%), most of them came under the 20k to 50k NTD income group (69%) and 38% of the enterprises are located in South of Taiwan.

## 4.2 Results of feature selection

**4.2.1 Information gain.** As customers and B&B enterprises have different perceptions on social media marketing and B&B service quality, this study divided 21 aspects into two sets. To effectively evaluate the relevance of social media marketing, the experiment was divided into satisfaction and loyalty (revisit), distinguishing which factors are considered important by customers and B&B enterprises.

In Table 4, we have provided the ranks in the context of satisfaction from customers and B&B enterprises are listed, respectively. We are considering factors greater than the average value of all factors as important. From this table, it can be seen that customers think that information exchange (F11) is the most important in social media marketing, but the B&B enterprises are considered that featured choice (F8) is the main purpose. In addition, it is found that customers and B&B enterprises consider events (F3), socializing and learning (F14) and beacons and polls (F6) to be important characteristics that are indispensable for each other. Moreover, there are different opinions among the customers and B&Bs, the customers are more concerned about relaxation (F15), whereas the B&B enterprises are considered that market (F5), altruism (F13) and aesthetics and visual quality (F9) are important.

Next, we compared the SQEs in Table 5. We can understand that there are different opinions among the customers and the B&B enterprises. Both groups indicated that

**Table 4** Factors ranked by IG for social media marketing (satisfaction)

Rank	Customers Factors	IG	Rank	B&B enterprises Factors	IG
1	F11	0.559566	1	F8	0.109635
2	F3	0.557225	2	F6	0.092808
3	F14	0.550086	3	F5	0.084886
4	F15	0.549738	4	F3	0.079279
5	F6	0.54745	5	F13	0.079279
6	F1	0.546347	6	F14	0.079279
7	F10	0.546282	7	F9	0.069748
8	F7	0.546053	8	F2	0.056944
9	F2	0.545959	9	F4	0.049022
10	F13	0.545818	10	F1	0.043066
11	F5	0.545501	11	F10	0.043066
12	F4	0.544635	12	F15	0.043066
13	F8	0.543312	13	F12	0.036067
14	F16	0.54164	14	F7	0.032375
15	F12	0.540834	15	F11	0.032375
16	F9	0.53943	16	F16	0.032182

Source: Created by author

**Table 5** Service quality elements ranked by IG (satisfaction)

<i>Customers</i>		<i>B&amp;B enterprises</i>			
<i>Rank</i>	<i>Elements</i>	<i>IG</i>	<i>Rank</i>	<i>Elements</i>	<i>IG</i>
1	Q3	0.54519	1	Q3	0.038416
2	Q1	0.544684	2	Q4	0.038416
3	Q5	0.542781	3	Q5	0.038416
4	Q4	0.542022	4	Q1	0.036067
5	Q2	0.54006	5	Q2	0.029999

Source: Created by author

tangibility (Q3) is necessary, and customers are more satisfied while assurance (Q1) is fulfilled. However, the B&B enterprises believed that reliability (Q4) and responsiveness (Q5) are important for improving satisfaction.

The customer revisit is essential for B&B enterprises. We then used loyalty (revisit) as the class attribute and IG was applied for feature selection. Table 6 presents the customer and B&B enterprise perceptions of key social media marketing factors in the context of loyalty. The experiment found that customers and B&Bs agreed that beacons and polls (F6) are important factors for revisiting. Both agreed that featured choice (F8), socializing and learning (F14) and events (F3) are critical. Customers also believed that fan page (F1), relaxation (F15), communities (F2), novelty (F16) are the factors that affected their revisiting, while the B&B enterprises believed that altruism (F13), and market (F5) are the main factors for customers' revisiting.

Table 7 shows the list of important factors that attract customers to revisit B&Bs. It can be seen from this table that the customers are thinking assurance (Q1) of B&B is the main SQE, followed by responsiveness (Q5) which is the main factor in attracting customers to revisit B&B enterprises

4.2.2 *Decision trees*. In this study, a fivefold cross-validation experiment was performed, and five DTs were constructed. The classification results are shown in Table 8. We selected the DT with the highest classification performance as the basis for the subsequent selection of important factors.

**Table 6** Social media marketing factors ranked by IG (revisit)

<i>Customers</i>		<i>B&amp;B enterprises</i>			
<i>Rank</i>	<i>Factors</i>	<i>IG</i>	<i>Rank</i>	<i>Factors</i>	<i>IG</i>
1	F6	0.3143	1	F6	0.164136
2	F3	0.314183	2	F8	0.150196
3	F8	0.313343	3	F13	0.150196
4	F1	0.311436	4	F5	0.147295
5	F14	0.310992	5	F3	0.109635
6	F15	0.310992	6	F14	0.109635
7	F2	0.310815	7	F9	0.069748
8	F16	0.310325	8	F1	0.062963
9	F4	0.310114	9	F10	0.062963
10	F10	0.309809	10	F11	0.062963
11	F11	0.30904	11	F15	0.062963
12	F7	0.308412	12	F2	0.056944
13	F9	0.308114	13	F4	0.036067
14	F13	0.307505	14	F16	0.032375
15	F12	0.307155	15	F7	0.032182
16	F5	0.306917	16	F12	0.02982

Source: Created by author

**Table 7** Service quality elements ranked by IG (revisit)

<i>Rank</i>	<i>Customers Elements</i>	<i>IG</i>	<i>Rank</i>	<i>B&amp;B enterprises Elements</i>	<i>IG</i>
1	Q1	0.314049	1	Q1	0.049022
2	Q5	0.309809	2	Q3	0.038416
3	Q4	0.308673	3	Q4	0.038416
4	Q2	0.307838	4	Q5	0.038416
5	Q3	0.307188	5	Q2	0.029999

Source: Created by author

**Table 8** Classification results of fivefold cross validation experiment in decision trees

<i>Experiment</i>		<i>Fold #1 (%)</i>	<i>Fold #2 (%)</i>	<i>Fold #3 (%)</i>	<i>Fold #4 (%)</i>	<i>Fold #5 (%)</i>
Satisfaction	Customers	79.2	70.8	70.8	66.7	66.7
	B&B enterprises	25	100	100	100	100
Revisit	Customers	52.2	34.8	65.2	39.1	43.5
	B&B enterprises	100	75	25	100	100

Source: Created by author

The important factors selected by DTs are shown in [Table 9](#). Based on DT analysis, customers were considered the most important social media marketing factors and SQEs in terms of satisfaction to be assurance (Q1), advertisements (F4), tangibility (Q3), aesthetic and visual quality (F9), beacons and polls (F6). The B&B enterprises considered that application (F7), featured choice (F8), and novelty (F16) can satisfy their customers. For the importance of social media marketing to enhance customer loyalty (revisit), customers believe that application (F7), assurance (Q1), aesthetic and visual quality (F9), tangibility (Q3), events (F3), recreation (F12), market (F5), novelty (F16) are the reasons for presence. As per the B&B enterprises, featured choice (F8) and relaxation (F15) are the main reasons to attract customers for revisiting.

We summarized the two methods of IG and DT. For the part of improving satisfaction, the summary results are shown in [Table 10](#). We can see that customers consider beacons and polls (F6), assurance (Q1) and tangibility (Q3) are the most important factors for their satisfaction. However, there is a clear difference between the perception of B&B enterprises and their customers. They are considering that the featured choice (F8) is the way to improve the satisfaction of their customers.

For improving customer revisit rate (loyalty), the results are shown in [Table 11](#). Customers believed that assurance (Q1), events (F3) and novelty (F16) are essential for revisiting B&Bs. And the B&B enterprises are obviously unable to capture their customers. They are

**Table 9** Extracted elements by decision trees

<i>Output variable</i>	<i>Extracted elements</i>	
Satisfaction	Customer	Fold#1 Q1(100%), F4(69%), Q3(31%), F9(23%), F6(6%)
	B&B enterprises	Fold #2 F7(100%), F8 (100%), F16(100%)
		Fold #3 F7(100%), F8 (100%), F16(100%)
		Fold #4 F7(100%), F8 (100%), F16(100%)
		Fold #5 F7(100%) F8 (100%) F16(100%)
Revisit	Customer	Fold#3 F7(100%), Q1(100%), F9(88%), Q3(79%), F3(64%), F12(32%), F5(13%), F16(7%)
	B&B enterprises	Fold #1 F8(100%), F15(100%)
		Fold #4 F8(100%), F15(100%)
		Fold #5 F8(100%), F15(100%)

Source: Created by author

**Table 10** Summary of selected key factors and service quality elements (satisfaction)

Rank	IG	Customers		Rank	IG	B&B enterprises	
		DT	Selected			DT	Selected
F6	X	X	V	F8	X	X	V
Q1	X	X	V	F6	X		
Q3	X	X	V	F5	X		
F15	X			F3	X		
F11	X			F13	X		
F3	X			F14	X		
F4		X		Q3	X		
F14	X			Q4	X		
F9		X		Q5	X		
				F7		X	
				F16		X	

Source: Created by author

**Table 11** Summary of key factors and service quality elements (revisit)

Rank	IG	B&B enterprises		Rank	IG	Customers	
		DT	Selected			DT	Selected
Q1	X	X	V	F8	X	X	V
F3	X	X	V	F6	X		
F16	X	X	V	F13	X		
F1	X			F5	X		
F14	X			F3	X		
F15	X			F14	X		
F2	X			F15		X	
F8	X			Q1	X		
F5		X					
F9		X					
F6	X						
Q5	X						
F7		X					
Q3		X					
F12		X					

Source: Created by author

considering that the important feature is the featured choice (F8) that makes the customers come back again. Because the current generation relies on social networking sites to find information, we can see from [Table 3](#) that the time spent by B&B enterprises on social networking sites is obviously not much compared to that customers. They do not spend time running social community websites and then cannot understand what customers think.

### 4.3 Discussions

This study considered B&B enterprises perceptions of three different advertising marketing methods, including social media marketing, keyword advertising and in-app advertising. This study used Kano analysis as shown in [Table 12](#). As per this analysis results, all respondents are believing that in-app advertising is the most important, social media marketing, followed by keyword advertising, which shows the popular trends of the three online marketing methods. In addition, the keyword advertising, and in-app advertising marketing all require payment, only social media marketing no need any payment for the marketing activities. Therefore, for B&B enterprises who lack marketing funds and a specialized workforce, social media marketing is still a more suitable marketing method.

**Table 12** Results of Kao analysis

Rank	Factor	Categorization	CSI	DDI	Importance (wi)
1	In-app advertising	Indifferent (57%) Attractive (31%)	0.384615	0.059829	0.001183
2	Social media marketing	Indifferent (59%) Attractive (33%)	0.369748	0.033613	0.001094
3	Keyword advertising	Indifferent (66%) Attractive (23%)	0.279661	0.050847	0.000626

Source: Created by author

For customer satisfaction, the feature selection results (Tables 10 and 11) indicated that from the identified 16 factors and 5 SQEs, customers thought beacons and polls (F6) is the key social media marketing factor for increasing customer satisfaction supported by Sigauke and Erdis (2018). The factors assurance (Q1) and tangibility (Q3) have been considered important from the customer side supported by Tichaawa and Mhlanga (2015). However, B&B enterprises considered featured choice (F8) was an important social media marketing factor.

To build customer loyalty and encourage customers' revision intention, assurance (Q1), events (F3) and novelty (F16) are very critical for B&Bs. But the B&B enterprises are considering the featured choice (F8) to be important. Therefore, the B&B sector should spend more time operating social media and interacting with online users to make improvements. The results of this study provide the key factors and SQEs, if the B&B enterprises could focus on those factors in their service process there is a chance to improve customer loyalty of customers. Those actions will lead to high customer satisfaction and an understanding of the buying behavior of customers.

## 5. Conclusions

The present study's main objective is to identify factors of social media marketing and SQEs in the B&B sector. We used two feature selection methods, IG and DT, to recognize the key factors for increasing satisfaction and building loyalty, respectively. This study provided the set of social media factors and SQEs to the B&B enterprises and customers. In addition, the findings are useful for both enterprises to improve customer satisfaction and customers when they will choose B&B services. The contributions of this study to social media marketing research are, first, the traditional conceptualization of customer loyalty was successfully applied in the social media marketing context; second, our methodology contributing to theory, could be applied in different sectors or on issues to generate different dimensions in a single study; and third, this is the first study to determine the key social media factors and SQEs in terms of customer satisfaction and loyalty based on the customers and B&B enterprises opinions in the B&B sector.

### 5.1 Theoretical implications

For theoretical contributions, this study offered a list of key factors and SQEs for social media marketing to improve customer satisfaction and customer loyalty in the context of B&B. These factors and SQEs for improving customer satisfaction and loyalty in a single study were relatively new. This study also proposed different feature selection methods, such as the IG and DT which have not been found in previous studies in B&B sector literature. Next, our study conducted empirical research on perspectives of both customers and B&B enterprise. Finally, prior research has shown that B&B enterprises consider featured choice (F8) to be an important social media marketing factor. This demonstrates

the significance of value as a strategic goal from a managerial perspective. The importance of using the IG and DT feature selection methods was further highlighted by the empirical results. We successfully used feature selection methods to replace conventional qualitative analysis using questionnaires. We believe this approach result could be useful for improving customer satisfaction and customer loyalty.

### ***5.2 Managerial implications***

The findings of this study have important implications for the owners/operators of B&Bs. Together with the varying identified key factors for social media marketing, several practical implications for B&B enterprises are presented as follows. First, for building customer loyalty and improving customers' revisit intention, the factors assurance (Q1), events (F3) and novelty (F16) are very critical for B&Bs. Accordingly, to increase customer loyalty (revisit decisions), B&B enterprises and managers must concern the past experience of customers and need to consider customers' expectations in their trips as these factors could improve customer satisfaction. Second, the service quality element: assurance affects customer loyalty from the B&B enterprise's perspective. Although many previous studies concluded that the effects of service quality on customer loyalty have been found, they did not consider customer perspectives and did not compare between customer perspectives with B&B enterprises perspectives. In practice, policymakers and experts must know all the dimensions of service quality and social media marketing factors from both sides (customers and B&B enterprises) to improve Taiwanese tourism, especially city tourism, after COVID-19 pandemic. Finally, the study findings would be useful for local governments and policy makers to restart urban tourism post-pandemic. The urban economy has witnessed a tremendous transition toward a service-based economy (Parvin et al., 2022). Many cities in Taiwan, such as Taipei and Taichung, have been considered so-called "chimney-free industry" cities and the service sector has become a key pillar of the urban economy. City tourism, an extremely customer-oriented and service-based sector, has played a booster role through B&B enterprises. Many local urban planning authorities and governments began to develop policies for encouraging city tourism and travelling for national financial benefits by encouraging B&Bs and liberalizing the COVID-19 pandemic regulations to restart city tourism in Taiwan.

### ***5.3 Limitations and future research***

Despite this research's contributions, there are several limitations. First, this study considered the list of factors (16) and SQEs (5) for analysis; there is a chance to miss other aspects. Second, this study generated results with samples from Taiwan using feature selection methods. Therefore, this study result could not be effective if we apply the same methods with samples from other countries or sectors. Third, this study's findings were generated based on the limited sample size and subjectivity of the respondents. Possible method for addressing this limitation in future studies is to use in-depth interviews for small powerful stakeholder groups and mass quantitative surveys for the tourists. Fourth, the findings and implications of this study were obtained from a single study. As a result, when generalizing our findings and discussion to other types of offline ads or in user groups, future researchers must proceed with caution. Hence, the future research directions are that readers can find a new feature selection to analyze sample data and then compare the difference between customers and B&B enterprises. Discovering real customers thinking about social media marketing can bring financial benefits. In addition, the investigation can be conducted in different types of sector and social media. Finally, this study only investigated the effects of customer satisfaction and loyalty on revisit intention. Future studies can measure the effects of the B&B experiences on customers' willingness to revisit B&Bs by incorporating revisit intentions into customer behavior intention.

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### Corresponding author

Long-Sheng Chen can be contacted at: [lschen@cyut.edu.tw](mailto:lschen@cyut.edu.tw)

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