

Service Quality and Customer Satisfaction: Text Mining of Online Hotel Reviews

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Abstract— In present, the smart phones are utilized increasingly because users can connect to the mobile network from every area. Therefore customer decisions are often influenced by online reviews which other people provide about their experiences, especially the hotel review. This research paper aims to investigate the relationship between service quality and customer satisfaction in the hotel industry by analyzing online hotel reviews using text-mining techniques. A total of 15,493 reviews from 27 hotels in Chiang Mai were collected from TripAdvisor, a leading online travel platform. The reviews were analyzed using a combination of natural language (NLP) processing to classify the service quality (SERVQUAL) dimensions from customer reviews. The result shows that customers are mostly satisfied with the responsiveness and unsatisfied with the tangibility dimension of the service quality.

Keywords— Service quality, SERVQUAL, customer satisfaction, customer dissatisfaction

I. INTRODUCTION (HEADING 1)

Nowadays, the internet has been one of the most transformative and fast-growing technologies. Over 3.4 billion people used the Internet worldwide in 2016, up from only 413 million in 2000 and the one-billion threshold was broken in 2005. Due to the advent of the internet, customers' preferences and decision-making have changed. With the reliability of internet connectivity, customers can connect to the mobile network from every area within the signal coverage range, so the customers can conveniently use their smartphones all the time. The increase in the usage of the smartphone is behind the change in the method customers receive information about products and services. Moreover, consumer decisions are often influenced by online reviews which other people provide about their experiences. Therefore, it has been more prevalent to rely on online data sources for service information.

Customer service is critical to the success of the organization since it is a base of customer satisfaction and purchase intention, especially in the online environment. Marketers in the current days must emphasize customer satisfaction and customer loyalty. Researchers have shown that businesses may offer personalized, high-quality services at competitive pricing by utilizing technology innovation [1].

Therefore, it is important for the organization to evaluate the perceived service, customer satisfaction, and loyalty retention. Before the internet invent, organizations struggled to gather reliable and valid data when they attempt to measure customer satisfaction. But now, customers spontaneously and voluntarily share their service experiences on review platforms and social media [2], [3]. Organizations could access a massive amount of reliable data owing to user-generated content (UGC), which allows organizations to get reliable customer satisfaction and service quality measurement.

In the past decade, tourism plays an important role in the economic development of Asia countries including Chiang Mai in Thailand. Due to the growth of the tourism industry, the need for infrastructure and hotels has also increased. Hotels of all types and sizes continually face changing situations [4]. There might not be a significant change, but there is an urgent need to deal with it. The ability to effectively deal with these uncertainties in external and internal environments and achieve the expected level of performance is a real challenge. By analyzing the customers' reviews, organizations might examine all the important aspects to determine the most appropriate decisions and actions to satisfy the customers with the aim to retain them.

In this research paper, we propose to use text mining techniques to measure the SERVQUAL dimensions and their impact on customer satisfaction based on online reviews. By analyzing customer reviews from online platforms, we aim to identify the SERVQUAL dimensions in customer perceptions of service quality. The results of this study will provide valuable insights for companies and organizations in improving their service quality and enhancing customer satisfaction.

II. LITERATURE REVIEW

A. Service quality and Customer Satisfaction

The current business era has been called the "Quality Era" because perceived product quality is the most important competitive aspect in the organization [5]. Almost three decades ago, Parasuraman, Zeithaml and Berry defined service quality as "the overall evaluation of a specific service firm that results from comparing that organization's

performance with the customers' general expectations of how organizations in that industry should perform" [6]–[9]. Service quality is "the gap between the customers' expectations about a service and their perceptions of the way the service was delivered" [10]. Poor-quality service produces customer dissatisfaction, and customers may not return to the establishment in the future or even immediately move their business dealings to other providers [11], [12].

According to a research paper by Wu in 2014, the perceptions and expectations need to be measured to evaluate service quality [12]. In 2013, the paper by Mauri further defines service quality as "a multidimensional concept, assessed and perceived by consumers, according to a set of essential parts, grouped in five categories which are tangibility, reliability, responsiveness, assurance, and empathy" [13]. Rauch indicates that the concept of service quality was initially used as part of a framework of marketing strategies, by making customers the focal point [6]. This strategy became popular after a growing concern with quality assurance. Furthermore, after investigating the development of service quality, Lovelock states that the confirmation-disconfirmation concept of service quality is the basis for its development [14]. The confirmation and disconfirmation concepts are explained as a comparison of the customers' perceived (experience) with their expectations of the service.

Although the terms service quality and customer satisfaction are sometimes used interchangeably, some researchers argue that service quality is a component of customer satisfaction that also reflects trade-offs as well as personal and situational factors [15]. Customer satisfaction is defined by Olivier as "a consumer's fulfillment response and a judgment that a product or service feature, or product or service itself, provided (or is providing) a pleasurable level of consumption-related fulfillment, including levels of under or over-fulfillment as being consistent with the conceptual and empirical evidence". However, "fulfillment is not necessarily restricted to the case of met needs, since over-fulfillment can be satisfying if it provides additional unexpected pleasure; and under-fulfillment can be satisfying if it provides more than one anticipates in a given situation" [16]. Agbor mentions that while it is typically displeasure or under-fulfillment that is understood to be dissatisfying, over-fulfillment may be just as dissatisfying if it is unpleasant — a case of too much of a good thing" [17]. defines customer satisfaction as "an attitude-like judgment following the customer experience, its essential determinants being the confirmation or disconfirmation of pre-consumption expectations" [14], while Aron describes it as "an attitude like judgment following a purchase act or a series of consumer product interactions". In this regard, the confirmation-disconfirmation theory, which stipulates expectations to be an important factor in determining satisfaction, has been used as the basis for a variety of service-marketing studies [16], [17]. This implies that customers have certain service standards in mind (their expectations) prior to consumption, that they observe service performance and compare it with their standards, and that they then form satisfaction judgments based on their comparison. The resulting judgment, according to Lovelock, is labeled negative disconfirmation if the service is worse than expected, positive disconfirmation if it is better than expected, and simple confirmation if it is as expected.

González reconfirmed the above assertions by arguing for a "positive relationship between perceived service quality and satisfaction" [18]. Other researchers also found that service quality is a factor of customer satisfaction through product quality and price can have an influence on customer satisfaction [15]. Parasuraman declared that higher perceived service quality leads to the realization of higher customer satisfaction. In agreement with Parasuraman [19], many researchers recognized that the level of customer satisfaction is based on the level of service quality [4], [12], [20]–[22]. According to the aforementioned, customer satisfaction is predicted by the level of service quality because service quality is calculated based on the level of expectations met by the perceived service of service providers. The relationship between service quality and customer satisfaction has been further demonstrated by many researchers in the past [16], [17]. Daniel and Berinyuy [23] state that customer satisfaction and service quality are related variables. The aforementioned researchers indicated that due to the fact that service quality is affected by experience or perception, it is abstract, while many customers' satisfaction is the feelings of customers on service encounters and experiences.

Considering the relationship between customer satisfaction and service quality, Oliver first suggested that service quality would be an antecedent to customer satisfaction, regardless of whether these constructs were cumulative or transaction specific. Some researchers [11], [20], [24], [25] have found empirical support for the above-mentioned perspective. Even though service quality and customer satisfaction have certain things in common, satisfaction is seen to be broader [7].

Bennett and Barkensjo stated that the relationship quality and actual service quality induced beneficiaries to want to recommend a charity to other people and to engage in positive word-of-mouth [26]. Gera investigated the link between service quality, value, satisfaction, and behavioral intentions in a public sector bank in India, and one of his findings revealed that "service quality was found to significantly impact customer satisfaction and value perceptions" [27].

From the above, it shows that there is a relationship between service quality and customer satisfaction. To explore this further in the hotel industry context, it is hypothesized that Hotel customers' service quality perceptions are associated with their satisfaction with the hotel service.

III. METHODOLOGY

In this research paper, we have extracted the data from tripadvisor.com, the online travel information, and the booking website about hotels in Chiang Mai since Chiang Mai is the largest city and the most popular travel destination in the north of Thailand for travelers to visit. Tripadvisor is selected due to its availability for data scraping. The data has 15,493 online reviews on 27 hotels which can separate into 1,354 reviews on 2-star hotels, 3,745 reviews on 3-star hotels, 4,885 reviews on 4-star hotels, and 5,509 reviews written between 2010 and 2023. The dataset has the customer satisfaction score of the reviewers measured on a scale ranging from one to five and it also had textual reviews written in the English language. Therefore, this study will use text-mining techniques to measure the service quality (SERVQUAL) dimensions and their impact on customer satisfaction based on customers' reviews by using two attributes from the dataset which is

customer reviews to find the service quality (SERVQUAL) dimensions and the rating from customers referred to their satisfaction. The service quality (SERVQUAL) model focuses on the gap between the expectations of the customer before receiving and their perceptions of the actual service delivered. The five dimensions of service quality (SERVQUAL) model represent in this paper are as the following: [28]

- Tangibility: the impression of the physical facility, personnel, communication materials on the buyer and equipment
- Reliability: accuracy of the service
- Responsiveness: willingness to provide prompt service and quick response to customer questions or complaints
- Assurance: the knowledge and behavior of workers which generates trust and credibility for customers
- Empathy: provision of care, and individualized attention that the organization provides to its buyers

Before analyzing data, we have done the pre-processing data and transformed data into the proper form to analyze by using Microsoft Excel. We have gathered data from each hotel following the hotel star ratings which are an internationally-accepted indicator of a hotel's quality, cleanliness, and standards. The hotel star rating helps customers understand the quality of the hotel which also makes it easier for customers to compare hotels and make booking decisions and understand what they could reasonably expect when staying at a hotel which leads to customer satisfaction. In this research paper, the star rating is classified according to Giata [29]. After that, we have randomly selected 300 reviews from each hotel star rating to eliminate the bias from hotels in that hotel class to be the representative of each hotel rating class. The 300 reviews are divided into 3 categories which are as the following:

- The reviews which a rating score from customers equal to 4 to 5 as positive reviews to represent customer satisfaction 100 reviews: the customers are satisfied with the hotel
- The reviews which a rating score from customers equal to 3 as neutral reviews to represent customer neutral 100 reviews: the hotel is equal to the customer expectations.
- The reviews which a rating score from customers equal to 1 to 2 as negative reviews to represent customer satisfaction 100 reviews: the customers are dissatisfied with the hotel

In data analysis, this study brings the customer textual review to an analysis by using the zero-shot classification model, the facebook/bart-large-mnli model, which is the natural language processing (NLP) model. This model is a pre-trained language model which is used to classify the text from customer reviews into the dimensions of service quality (SERVQUAL) which are reliability, assurance, tangibility, empathy, and responsiveness which have an effect on customer satisfaction. This paper will use the model as a single-class classification to find what dimensions of the service quality (SERVQUAL) customers concern about the most for their satisfaction and dissatisfaction. Therefore, this study uses will analyze the relationship between service

quality and customer satisfaction by separating the reviews with a rating score from customers: a rating score equal to 4 to 5 as customer satisfied with 100 reviews, a rating score equal to 3 as neutral with 100 reviews, and a rating score equal to 1 to 2 as customer unsatisfied with 100 reviews, so we have analyzed 4 hotel classes including 2-star hotels, 3-star hotels, 4-star hotels and 5-star hotels which use 1200 customer reviews in total. Therefore, the organizations could improve their services which can increase their customer satisfaction enhancing.

- Extract the customer reviews from the online platform
- Do the preprocessing and transform data into the proper form to analyze
- Identify the SERVQUAL dimensions by using zero-shot classification: the facebook/bart-large-mnli model as a single class classification
- Analyze the relationship between service quality and customer satisfaction by hotel classes

IV. RESULTS

As a result, the zero-shot classification model, facebook/bart-large-mnli model classifies the reviews from customers and shows that the service quality dimension which customers mention the most in the reviews is responsiveness 59.33%, followed by tangibility 38.75% as the graph shows in figure 1.

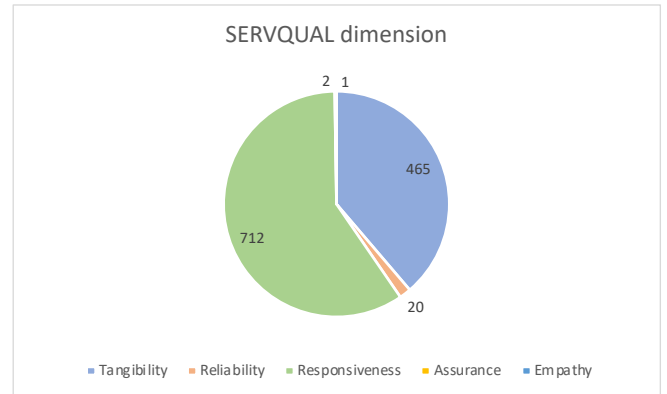


Figure 1 The ratio of SERVQUAL dimension

The result of the 2-star hotel shows that customers who rate 4 to 5 score are satisfied with a responsiveness dimension of 75%, tangibility dimension of 19%, and reliability dimension of 6%. The customers who rate 3 score mention about a responsiveness dimension of 64%, tangibility dimension of 34%, and reliability dimension of 2%. The customers who rate 1 to 2 score are unsatisfied with a tangibility dimension of 54%, and responsiveness dimension of 46% as shown in table 1.

SERVQUAL dimensions	2-Star Hotel		
	Satisfied	Neutral	Unsatisfied
Tangibility	19	34	54
Reliability	6	2	0
Responsiveness	75	64	46
Assurance	0	0	0
Empathy	0	0	0
Total	100	100	100

Table 1 The result of service quality (SERVQUAL) dimensions of the 2-star hotel

The result of the 3-star hotel shows that customers who rate 4 to 5 score are satisfied with a responsiveness dimension of 82%, tangibility dimension of 13%, and reliability dimension of 5%. The customers who rate 3 score mansion about a responsiveness dimension of 68%, tangibility dimension of 31%, and reliability dimension of 1%. The customers who rate 1 to 2 score are unsatisfied with a tangibility dimension of 62%, and a responsiveness dimension of 38% as shown in table 2.

SERVQUAL dimensions	3-Star Hotel		
	Satisfied	Neutral	Unsatisfied
Tangibility	13	31	62
Reliability	5	1	0
Responsiveness	82	68	38
Assurance	0	0	0
Empathy	0	0	0
Total	100	100	100

Table 2 The result of service quality (SERVQUAL) dimensions of the 3-star hotel

The result of the 4-star hotel shows that customers who rate 4 to 5 score are satisfied with a responsiveness dimension of 78%, tangibility dimension of 19%, and reliability dimension of 2%. The customers who rate 3 score mansion about a responsiveness dimension of 58%, tangibility dimension of 41%, and reliability dimension of 1%. The customers who rate 1 to 2 score are unsatisfied with a tangibility dimension of 72%, and a responsiveness dimension of 28% as shown in table 3.

SERVQUAL dimensions	4-Star Hotel		
	Satisfied	Neutral	Unsatisfied
Tangibility	19	41	72
Reliability	2	1	0
Responsiveness	78	58	28
Assurance	1	0	0
Empathy	0	0	0
Total	100	100	100

Table 3 The result of service quality (SERVQUAL) dimensions of the 4-star hotel

The result of the 4-star hotel shows that customers who rate 4 to 5 score are satisfied with a responsiveness dimension of 84%, tangibility dimension of 13%, and reliability, assurance, and empathy dimensions each 1%. The customers who rate 3 score mansion about a responsiveness dimension

of 58%, tangibility dimension of 40%, and reliability dimension of 2%. The customers who rate 1 to 2 score are unsatisfied with a tangibility dimension of 67%, and a responsiveness dimension of 33% as shown in table 4.

SERVQUAL dimensions	5-Star Hotel		
	Satisfied	Neutral	Unsatisfied
Tangibility	13	40	67
Reliability	1	2	0
Responsiveness	84	58	33
Assurance	1	0	0
Empathy	1	0	0
Total	100	100	100

Table 3 The result of service quality (SERVQUAL) dimensions of the 5-star hotel

V. CONCLUSIONS

In the conclusion, the customers are satisfied with the responsiveness dimension for the 2-star hotel of 75%, the 3-star hotel of 82%, the 4-star hotel of 78%, and the 5-star hotel of 84%. Therefore, the hotels should keep continuing their goodness as good service quality in the responsiveness dimension. The customers are unsatisfied with the tangibility dimension for the 2-star hotel of 54%, the 3-star hotel of 62%, the 4-star hotel of 72%, and the 5-star hotel of 67%. Therefore, hotels should improve their service quality in the tangibility dimension.

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