



Utilization Of Voice Of Customer From Online Patient Reviews On Google Maps As A Source Of Business Intelligence In The Evaluation Of Rata.Id Clinic Services In 2025

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ABSTRACT

This study examines the use of Voice of Customer data from online patient reviews on Google Maps as a source of business intelligence for evaluating the service quality of Rata.id Clinics. Using a Natural Language Processing (NLP)-based text analytics approach, this study applied sentiment analysis, bigram-based thematic analysis, and SERVQUAL mapping to analyze 390 patient reviews collected from 3 Rata.id Clinic branches. The results showed that the quality of services had been generally rated positively by the patients, especially at the Branch of Bandung. The relatively high negative sentiment at the Rata Clinic Center (RCC) and Gading Serpong branches, however, indicates disparities in the quality of service provided at the branches. The results of SERVQUAL mapping provides that all the clinic branches possess the following strengths: empathy, tangibles, and the main area for improvement is responsiveness. The main concerns that were identified are response time, service communication, lack of clarity regarding costs and service consistency. The results show that customer insights and business intelligence can be gained from patient online reviews, which are useful for the assessment and enhancement of healthcare services.

INTRODUCTION

Digital technology is evolving further and is altering behaviour when accessing information and assessing health care services. If they are considering going into a clinic, they'll first look for reviews and check out recommendations on Google Maps. Google Maps reviews is one of the processes under Voice of Customer (VoC), this means the voice of Customers is the voice of their own experiences, needs, expectation, and perceptions on the services provided to them. However, Voice of Customer plays a vital role in enabling businesses to understand

customer needs to a higher level of detail, and in real-time. Online reviews are considered more spontaneous, unstructured, and can reflect direct customer experiences (Wang et al., 2021). Thus digital review data could well be used as a source of business intelligence for making business decisions based on customers.

Service quality is one of the important determinants of the customer or patient satisfaction and loyalty in the healthcare industry. While treatment outcomes are a primary patient concern, so are the characteristics of services received including staff friendliness, professionalism of staff, comfort of facility, quick service, communication ease and disclosure of costs. Research shows that healthcare service quality significantly impacts patient satisfaction and contributes to increased patient loyalty to healthcare facilities (Evandinnartha et al., 2023). Therefore, healthcare businesses need to understand the patient experience holistically to improve service quality and maintain business competitiveness.

One approach frequently used to evaluate service quality is SERVQUAL developed by Parasuraman, Zeithaml, and Berry. The SERVQUAL model consists of five main dimensions tangibles, reliability, responsiveness, assurance, and empathy (Parasuraman et al., 1988). This model was chosen to show the patient's perception of service quality because it represents the comprehensive service experience. While the components of SERVQUAL can be surveyed in the same manner during the digital age, another important component that can also be surveyed is patient reviews printed online by patients who have experienced a patient-service incident. Many previous studies have demonstrated how far the information supplied via online reviews of patients which appear on Google maps can be utilized to assess the high quality of healthcare services. Machine learning-based patient reviews can identify key factors influencing patient satisfaction, such as the friendliness of medical personnel, communication quality, and waiting time (Wang et al., 2021). Other research has also shown that reviews and ratings on Google Maps can provide real-time information on the quality of healthcare facilities based on patient experiences and serve as a source of evaluation for improving service quality (Permatasari & Rajebta, 2025).

While some previous studies have shown that online patient reviews can be leveraged to assess the quality of healthcare services, most studies primarily considered the sentiment classification or rating analysis of online patient reviews. There are few studies that combine data from Voice of Customer, business intelligence, and thematic text analysis and the framework of service quality (SERVQUAL) to provide the useful managerial insights from the patient reviews on the Internet, especially on the dental healthcare service in Indonesia.

Text data is key to assessing services in the digital age. Sentiment analysis, categorization of main themes in the services offered, complaints trend and patient satisfaction and dissatisfaction reasons can be detected using text analytics. In business intelligence, exploring customer review data is crucial because it can help businesses understand customer needs more accurately and support strategic decision-making based on actual customer data (Chen et al., 2022).

Google Maps is almost the sole digital space in which Rata.id Clinic, a dental health and aligner provider has an active account. The different user reviews include patient experience scores, staff and doctor friendliness, comfort in the clinic, consultation, treatment results, and the cost of services to the patient. Therefore, the purpose of this study is to use the Voice of Customer (VoC) data obtained from online customer reviews through Google Map as a source of business intelligence to analyze Rata.id Clinic services.

Text mining, sentiment analysis and bigram thematic analysis approach was utilized in order to discover key themes in patients experience. Next, the analysis results were plotted on the SERVQUAL framework to generate an overall service quality assessment, as viewed by the actual customers. This study would be expected to have practical implications for the management of Rata.id Clinic related to understanding patients' needs and experiences and

academic implications for developing studies of "Voice of Customer" and for business intelligence in the "digital" review-based healthcare industry.

This study is a contribution to the literature that will help bring an added value to the use of Voice of Customer data found from online patient reviews in order to turn them into Business Intelligence insights using an application of sentiment analysis, bigram analysis and SERVQUAL mapping. In real world, the study offers data-based approach for assessment and continual quality enhancement of health services.

LITERATURE REVIEW

Service Quality

The theory of service quality was first introduced by Parasuraman, Zeithaml, and Berry in 1988. Service quality is defined as the gap between expected service and perceived service (Parasuraman et al., 1988). When the service that the customers receive is as per or above his/her expectations, customers will rate the service quality as good. If the quality of the service received is below the satisfactory level of customer expectations, however, then the service quality is perceived as poor (Parasuraman et al., 1988). Service quality is frequently said to be a five-part SERVQUAL model, which refers to the various features of service—reliability, tangibles, responsiveness, assurance, and empathy. Therefore, SERVQUAL is the most popular way to collect all the factors affecting the patients' perceptions of service quality in healthcare studies. Rahim et al. (2021) demonstrated that SERVQUAL dimensions can be used to evaluate patient satisfaction and hospital service quality through digital data obtained from social media. Other studies have also found that good service quality significantly influences patient satisfaction and loyalty to healthcare facilities (Evandinnartha et al., 2023; Wulandari et al., 2024). In this research, SERVQUAL was used as an analytical framework, which is applicable to derive the patient experiences in terms of service quality, from Google Maps reviews. The use of this method is able to assess the quality of the services provided by Rata.id Clinic based on the Voice of the Customer that has arisen spontaneously in online social networks, to obtain a more holistic understanding of the strength and weaknesses of the services provided by Rata.id Clinic.

Voice of Customer

Voice of Customer is a systematic approach to discovering what customers want and need as a basis for product development and strengthening service offerings. Voice of Customer is a concept that places a customer as the main source of information in the business assessment and development process. Voice of Customer can be obtained through various sources, such as surveys, interviews, complaint handling, social media, and online customer reviews (Griffin & Hauser, 1993). Digital technology has greatly increased the Voice of Customer (VoC) resource. Nowadays, customers go out of their way to leave reviews and ratings for services on online tools such as Google Maps, social media, and marketplaces. The value of this user generated content is due to its real-time, spontaneous nature and because it captures the customer experience more naturally than traditional survey approaches (Dellarocas, 2003). In modern business, Voice of Customer is closely linked to customer experience and business intelligence. Businesses can use customer data to understand consumer needs, identify pain points, improve service quality, and support strategic decision-making based on actual customer data (McColl-Kennedy et al., 2018). Therefore, Voice of Customer is a crucial element in developing a customer-centric business strategy. The digital industry is also fostering a growing trend for customers to post online reviews and experiences of services, in an active manner. Online reviews are a type of "Voice of the Customer" that can have a large impact on customer perception and decision to use the service. Previous research has shown that online reviews can provide insights into service quality, medical professionalism, facility comfort, wait times, and even patients' emotional experiences during healthcare (Wang et al., 2021).

Voice of Customer can be utilized in health care research by translating patient experiences into each of the SERVQUAL dimensions—tangibles, reliability, responsiveness, assurance, and empathy. Businesses can leverage text mining, sentiment analysis, and thematic analysis to analyze online reviews and determine which themes are important to the customer experience, which can then be used to assess clinical services. This approach is considered more effective than conventional surveys because it captures customer experiences more spontaneously and naturally (Chen et al., 2022).

A number of studies conducted in different areas have shown that Voice of Customer is an essential source of information for understanding the needs, expectations and experiences of customers, even in the healthcare sector. When using customer information from online reviews, companies can get information faster, more spontaneously and sustainably than traditional survey data. Different studies have revealed the potential of online patient reviews in determining patient satisfaction, service quality, professionalism among medical staff members, and a number of other elements that impact patient experiences. So far, however, most earlier studies have been done separately on sentiment analysis, patient satisfaction measures or service quality evaluation. Very little research combines the concept of Voice of Customer and business intelligence methods and SERVQUAL to provide more holistic, more useful and more actionable insights for managers in the healthcare sector. Thus, research is needed to convert patient review data into strategic information that can be utilized as a platform for evaluation and decision making in enhancing healthcare quality.

Online Patient Reviews and Google Maps Reviews

As digital technology has evolved, patients are redefining the way they assess healthcare services. One of the most popular sources of information is to check out Google Maps patient reviews. Online review is a type of electronic word of mouth (e-WOM), which is a communication between consumers that can affect the perception and decision of other consumers. (Dellarocas, 2003). Patient reviews can provide insights into how well the patient was treated by the medical staff, the quality of the medical facility, patient experience, and the efficiency of administrative procedures.

Various studies have shown that online patient reviews can be used to evaluate the quality of healthcare services. Wang et al. (2021) identified that online reviews of patients can be used to uncover aspects contributing to the satisfaction of patients, such as communication, friendliness of medical staff and waiting times. In addition, the ratings and reviews on Google Maps can be used as an evaluation tool for healthcare providers to gauge their patients' experience (Permatasari & Rajebta, 2025). As text mining and Natural Language Processing (NLP) improve, patient reviews are now being more and more used as a source of business intelligence online. Content from patient reviews can be helpful in determining patient needs, pinpointing service-related problems, and providing data to help with decisions (Chen et al., 2022). Most of the previous studies have concentrated on the individual aspects of patient sentiment or patient satisfaction. Based on the above, the use of patient reviews on Google Maps that exist in the clinic Rata.id was considered as a Voice of Customer (VOC) tool and coupled with a business intelligence approach and SERVQUAL framework is used to assess the service quality of the Rata.id Clinic.

METHODS

The unit of analysis in this study was patient reviews on Google Maps from the 3 Rata.id Clinic branches, namely Rata.id Bandung, Rata Clinic Center and Rata.id Gading Serpong. This study involved all reviews on the Google Maps pages of the three branches. This study employed a total sampling that included all the reviews which fulfilled the research criteria. Textual comments about patient experiences in reviews were written in 2025 will be included in the

analysis and those with ratings only, duplicate reviews, and irrelevant comments were excluded. Out of the 390 patient reviews, 390 were obtained, which were used as research data, according to the data selection process. The reviews on Google maps were scraped between January 2026. Processing of data such as cleaning data, normalizing text, removing stopwords, and tokenization were done after data collection to prepare the data for further analysis. Google Maps was selected as the data source because reviews from Google Maps capture patients' experiences and perceptions of clinic services.

It has adopted a text analytics method with Natural Language Processing (NLP) and Python programming language for this study. Sentiment analysis was used for identifying positive, negative and neutral sentiments, and bigram analysis was used to identify the most frequently occurring word pairs in patient reviews. The results of the analysis were subsequently allocated to service themes and related to the five dimensions of SERVQUAL: Tangibles, Reliability, Responsiveness, Assurance, and Empathy. Sentiment Analysis, Bigram Analysis, Thematic Grouping and SERVQUAL mapping helped identify the strengths of the service, the points of pain and the priorities for service improvement from the Voice of Customer found in patient reviews on Google Maps.

RESULTS

Sentiment Analysis

Table 1 shows the sentiment analysis results for 390 reviews from the three branches of the Rata.id Clinic.

Table 1. Sentiment Analysis Result

Sentiment	Rata.id Bandung	Rata Clinic Center	Rata.id Gading Serpong
Positive	78.24%	60.87%	59.76%
Negative	4.17%	25.00%	23.17%
Neutral	17.59%	14.13%	17.07%

Source: Data Processed, 2026

In general, the results of the sentiment analysis show that there is a positive perception of service quality received by the patients of the 3 branches of Rata.id clinics, especially at Bandung branch. The relatively high percentage of negative sentiment observed at the Rata Clinic Center and Gading Serpong branches, however, suggests that there are differences in the extent of satisfaction with the services received by the branches, which also need to be considered when assessing the quality of clinic services. Sentiment scores at Rata Clinic Center and Gading Serpong are little bit negative, which may signal potential threats to customer satisfaction and the clinic's online image. In business intelligence, this situation can affect patient word of mouth and the perception of the service quality of the clinic by potential customers.

Bigram Result

Following sentiment analysis, data processing proceeds with the formation of bigrams (word pairs) which can be used to describe customer service. An example of bigram formed is showed in Figure 1.

Figure 1 Bigram Result



The wordcloud above presents the frequency of words as phrases (bigrams) in online reviews from the patients visiting Rata.id Clinic. The larger the bigram, the more frequently the phrase is mentioned by patients in reviews. Thus, the wordcloud can be utilized to determine important topics that help to form the patients' perceptions of the quality of the service provided by the clinic.

Overall, the word cloud displays the prevalence of positive bigrams like friendly_doctor, good_service, friendly_service, friendly_staff, good_result, satisfactory_result, clean_clinic, and quick_response. These findings suggest that patients value friendly attitudes of the medical personnel and staff, service quality and treatment outcomes.

Other than that, the word cloud also reveals several prominent negative bigrams, such as `slow_response`, `long_waitingtime`, `disappointing_service`, `difficult_refund`, and `poor_customerservice`. These phrases reveal concerns about the speed of service, administrative procedures, and the visibility of information from the patient. These findings show the important place of the communication dimension in clinic management.

One of the most noticeable negative phrases in the word cloud is `slow_response`. This means that there were delays in customer service and clinic communication with some patients. In addition, the negative perceptions about the administrative process and the transparency of the service can be seen from the presence of `difficult_refund`, and some negative bigrams about customer service, which can affect the patient satisfaction.

Thematic Grouping and SERVQUAL Mapping

The resulting bigrams will be clustered according to certain themes and then mapped according to the dimensions of SERVQUAL. The outcome of the bigram mapping and grouping is shown in Table 2.

Table 2. Thematic Grouping and Mapping SERVQUAL Dimension Result

Thematic Grouping	Clinic	Positive Bigram/Strength	Negative Bigram/Pain Point	Dimensi SERVQUAL
Friendliness and Service Attitude	Bandung	friendly_doctor (34), friendly_sercive(27), friendly_staff (20), friendly_nurse(4)	-	Empathy
	Clinic Center	riendly_doctor (7), friendly_staff (3), friendly_sercive (3), friendly personnel (2)	poor_customerservice (1), cunreachable_ustomer service (1)	Empathy

	Gading Serpong	friendly_doctor, friendly_staff, friendly_service, friendly_personel	-	Empathy
Service Quality and Patient Satisfaction	Bandung	good_service (33), satisfactory_service (10), satisfactory_result (5), nice_service(4)	disappointing_service (1), not_recommended (1)	Reliability
	Clinic Center	good_service (9), good_result (5), satisfactory_result (2), nice_service(2)	bad_service (2), disappointing_service (2), poor_service (2), bad_experience (2)	Reliability
	Gading Serpong	good_service, nice_service, good_result, neat_result, satisfactory_service	bad_service, disappointing_service, poor_result, refund_complicated	Reliability
Service Speed and Response	Bandung	fast_service (6), fast_process (3), fast_response (2)	slow_response (1), slow_scheduling (1)	Responsiveness
	Clinic Center	fast_service (3), fast_response (2), fast_process (1)	slow_response (12), slow_customerservice(1), slow_process (2), lack_appointment (1), complicated_scheduling (1)	Responsiveness
	Gading Serpong	fast_service, fast_response, fast_process, fast_progress	slow_response, lack_booking, complicated_scheduling	Responsiveness
Professionalism and Competence of Medical Staff	Bandung	Professional_doctor (3), professional_detail (3), informative_doctor (2), clear_explanation (2)	not_transparant (2)	Assurance
	Clinic Center	nice_doctor (3), detail_doctor (2), helpful_doctor (2), good_doctor (2), clear_explanation (2)	Complicated_doctor (1)	Assurance
	Gading Serpong	professional_doctor, detail_doctor, informative_doctor, clear_explanation	Marketing_trapping, added_cost, not_transparant, misleading_information	Assurance
Clinic Comfort and Facilities	Bandung	clean_clinic (3), comfortable_clinic (3), complete_facility (1), modern_equipment (1)	-	Tangibles
	Clinic	clean_clinic (7),	Disappointing_location	Tangibles

	Center	clean_room (3), good_facility (2), calm_place (2)	(1)	
	Gading Serpong	clean_clinic, comfortable_place, calm_place, good_facility, strategic_location	-	Tangibles

Source: Data Processed, 2026

Based on the bigram analysis results, the five main themes which were identified from the 3 Rata.id Clinic branches were as follows: Hospitality and Service Attitude, Service Quality and Patient Satisfaction, Service Speed and Response, Medical Staff Professionalism and Competence, and Clinic Comfort and Facilities. The dimensions of SERVQUAL were then matched and the service aspects that were identified as strengths and areas that needed improvement were identified at each branch for each theme. Displaying positive and negative bigrams together helps to identify a richer set of positive patient experiences and pain points captured in online patient reviews.

Comparative Business Intelligence

The comparison on business intelligence of each clinic is mapped in Table 3.

Table 3. Comparative Business Intelligence

Aspect	Rata.id Bandung	Rata Clinic Center	Rata.id Gading Serpong
Sentiment Dominant	Very Positive	Positive moderate	Positive moderate
Dominant Bigram	friendly_doctor, good_service, friendly_service	slow_response, good_service, clean_clinic	friendly_doctor, friendly_service, slow_response
Main Strength	Empathy and Reliability	Tangibles and Empathy	Empathy and Tangibles
Main Pain Point	Inconsistent service responsiveness	Slow response of service and customer service	Service transparency and responsiveness
Patient Experience Characteristics	Friendly, comfortable, and professional	Comfortable but service response is relatively slow	Friendly but operational quality is not yet fully consistent
The Strongest SERVQUAL Dimension	Empathy	Tangibles	Empathy
The Weakest SERVQUAL Dimension	Responsiveness	Responsiveness	Reliability and Responsiveness
Dominant Negative Issues	slow_response	slow_response, slow_customerservice, chat_robot	ddded_cost, marketing_trapping, refund_complicated

Source: Data Processed, 2026

The three branches of Rata.id Clinic have different patient experience characteristics as determined by sentiment analysis, bigram analysis and SERVQUAL mapping. The services that exhibit the most stable performance are those found in Rata.id Bandung, where the positive sentiment dominates in terms of the number of dominances, and bigrams like *friendly_doctor*, *good_service*, and *friendly_service* appear. The results of these findings show that the biggest strengths of the Rata.id Bandung are related to the quality of interpersonal interaction and consistency of service.

The facilities and service convenience of Rata Clinic Center is shown by the bigram *clean_clinic*, which appears to be the top choice, and many positive reviews about the facilities of the clinic. This branch though has a significant number of pain points in the responsiveness dimension, namely the presence of slow responses, slow customer service and chatbots. These results suggest that the two main concerns for patients are the speed of response and the quality of communication with customer service.

Meanwhile, Rata.id Gading Serpong showed strength in the empathy dimension with the presence of bigrams of *friendly_doctor* and *friendly_service*. There were however, a number of reviews that spoke ill of the service transparency and administrative procedures, with the presence of extra charges, false advertising and complicated refunds. In addition, there is an issue of responsiveness which still exists, and that requires improvement in terms of operability.

Overall, across all branches, Rata.id Clinic's greatest strength is Empathy, and its area that needs the most management attention is Responsiveness. Therefore, improving service response speed, optimizing customer service, and increasing transparency of information and service costs are strategic priorities to continuously improve the customer experience and quality of clinic services.

DISCUSSION

The purpose of this study is to apply Voice of Customer data that is patients' reviews on Google maps as a source of Business Intelligence in analyzing the quality of services provided by Rata.id Clinic. The findings suggest that overall service quality is positively perceived by the patients at the three branches studied. According to SERVQUAL mapping, empathy and tangibles are the two most valued strengths of the services received by patients, while responsiveness is the reason for most patient complaints.

The results are consistent with Wang et al. (2021) research which demonstrate that patient reviews can be leveraged to predict patient satisfaction based on communication, friendliness of medical staff, and wait times. The findings of this study also corroborate the study by Chen et al. (2022) which claimed that online patient reviews are a source of business intelligence to know the customer needs and how to improve the healthcare services.

This study adds value by showing how patient reviews can be used in the Google Maps platform as an alternate source of service quality assessment in the perspective of the SERVQUAL framework. One big difference with standard survey methods is that online reviews provide more real-life patient feedback that is spontaneous in nature. Hence, the Voice of Customer, Sentiment Analysis, Bigram Analysis and SERVQUAL integration may be a suitable method for healthcare service quality data-driven evaluation and improvement.

Managerial Implication

First, management needs to maintain and strengthen excellence in the Empathy dimension, which is a key strength of all clinic branches. The most frequent bigrams, *friendly_doctor*, *friendly_service*, *friendly_staff* and *friendly_nurse*, suggest that friendliness and interpersonal interactions are important aspects of positive patient experiences. Therefore, it is imperative that training sessions on customer service, interpersonal communications and patient-oriented service be held regularly to enable the medical staff, administrative staff and

patients to interact with each other in the same manner at all times in order to ensure quality service.

Second, there is a need to make quality of service in the Responsiveness dimension as a top company priority. The *slow_response*, *slow_customerservice*, *complicated_scheduling* and *lack_appointment* findings show that there are still some obstacles for patients to obtain a fast response service for their service needs. To do so, management can streamline the capacity and the number of customer service agents, set-up response time benchmarks (service level agreements), refine the consultation scheduling process, and integrate digital communication in platforms such as WhatsApp Business, CRM or online reservation platforms to enable quicker and more standardized patient responses.

Thirdly, the information about the services and charges of the Rata.id Gading Serpong branch should be improved to be more transparent. The presence of bigrams like *added_cost*, *marketing_trapping*, *complicated_refund*, and *not_transparan* suggests a mismatch in the information provided to patients prior to service use and the service costs they actually experience. In this regard, the clinic should set more clear standards of communication with respect to treatment prices, refunds, promotions and services processes. It is important that this information is communicated clearly from the consultation process through to ensure there are no misunderstandings and building confidence in the services offered at the clinic.

Fourth, the research findings indicate that patients are delighted with the facilities' cleanliness and comfort at all the clinic branches. The Tangibles dimension positively influences the patient customer experience as suggested by bigrams like *clean_clinic*, *comfortable_place*, *clean_room*, and *good_facility*. For this reason, management should ensure standards of cleanliness, comfort in the waiting room, and quality of medical facilities and equipment, as part of a service differentiation strategy. Fifthly, this study has the capability to emphasize the significance of using digital reviews as an ongoing service quality monitoring system. The management of Rata.id is recommended to create a Voice of Customer dashboard which includes Google Reviews ratings, patient ratings, and frequent sentiment analysis. This will allow management to track how perceptions of the patient are changing in real time, give them a heads-up about potential service issues and enable them to make decisions using real customer data. The idea is consistent with business intelligence that considers customer data as a strategic information source for the enhancement of the quality of customer service and the competitiveness of the healthcare business.

The results of this study suggest that patients' satisfaction is generally positive, with some problems repeatedly appearing in several clinic branches concerning responsiveness. This indicates that the quality of healthcare services goes beyond the skills and effectiveness of healthcare providers and patients, and also depends on how well they communicate and how fast they respond to patients' needs. As healthcare becomes more digital, the power to handle customer interactions over multiple channels is a significant component of the patient journey and reputation of the service. Thus, the continuous tracking of patient feedback allows organizations to detect service issues at an early stage, preventing them from affecting patient satisfaction and loyalty. These results also validate the SERVQUAL model created by Parasuraman et al. (1988), which suggests that the service quality dimensions of empathy and responsiveness play a significant role in determining customer perceptions of service quality. These two dimensions are important aspects of the patient's experience and satisfaction with the health care services they receive.

CONCLUSION

This study proves that Google Maps' patient reviews can be used as a Voice of Customer and Business Intelligence tool to assess the quality of healthcare services. Sentiment analysis, bigram analysis, thematic grouping, and SERVQUAL mapping enable patient experiences to be

transformed into information that offers insight into the strengths of the services, areas that need improvement, and priorities for the development of clinical services.

The findings suggest that empathy and tangibles are the most valued aspects of nursing care by patients, but responsiveness is a strength that needs to be strengthened. The results indicate that the quality of interactions with health care professionals and comfort of the facility are key factors in the patient experience. But there is room for improvement for speed of service response, customer communication and information transparency.

This study can practically be used as a tool for data-driven decision making to enhance the service quality continuously from the actual experience of patients. By learning from patient feedback, healthcare providers can gain insight into customer needs sooner, proactively address service issues, and make decisions rooted in their actual experiences rather than traditional survey methods to enhance service quality over time.

LIMITATION

There are a number of limitations associated with this study. First of all, patient reviews were just found online via Google Maps, which means that other digital platforms, like social media and healthcare marketplaces, were not taken into account. Second, the sentiment analysis employed a lexicon-based technique which is considered traditional and impractical for different language contexts. Third, this study used publicly available reviews on Google Maps so the identity and background of the reviewers could not be independently verified by the researcher.

Future research is suggested to leverage a wider range of data sources beyond Google Maps and also to include other digital sources, as well as more branches or institutions in the health sector to enhance the generalizability of the research findings. Furthermore, the use of more advanced Natural Language Processing (NLP) methods such as BERTopic, Aspect-Based Sentiment Analysis, or transformer-based models can be considered to produce more in-depth and comprehensive topic and sentiment analysis.

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