

Literature review of the Internet Provider Service Quality based on Sentiment Analysis

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Abstract

As of February 2020, Covid-19 has spread in Indonesia. Since then, people's behavior started to change. The spread of the virus required people to do a physical distance and stay at home. The offline activity started to be shifted into online activities. Working from home, learning from home, and buying from home are the new lifestyle. In this situation, people depend more on a wifi connection, and it could be seen as an opportunity for the internet service provider company. In fact, providing the best service quality to customers is still a challenge faced by the internet service provider as there are still a lot of complaints from customers. Therefore, companies need to measure their service quality performance based on their customer's testimonials. One of the ways to see customers' opinions regarding the service quality is to do text mining, more specifically sentiment analysis from Twitter because people tend to give more honest testimonials in their tweets. The service quality research with text mining to do the analysis of people's sentiment related to the company's service quality is potentially utilized for this study due to its being considered more efficient than using a questionnaire. A literature exploration from previous research was conducted to identify whether using text mining and sentiment analysis to measure the service quality provided by ISP company is possible to do. Six papers were then reviewed. Result shows that using text mining and sentiment analysis to identify the service quality provided by companies is possible to do. Out of six papers that were reviewed, only two of them using ISP as the main object. Service quality literature which use text mining and sentiment analysis to define the quality of service provided in ISP industry is still rarely done by researcher. Meanwhile, public's need for internet service is growing. This should be seen as an opportunity for researcher to do more research regarding the service quality of ISP companies so they could improve.

Keywords

Service Quality, Text Mining, Internet Service Provider, Sentiment Analysis.

1. Introduction

The fast-moving development of the internet makes it easier for people to communicate across cities, provinces, and even the world. The internet has become a part of almost all aspects of people's lives. People open the internet in daily

basis, for shopping, teaching, learning, and even working (Diomidous et al., 2016). Indonesia is one of the countries that is also experiencing the fast-paced development of internet. Based on research conducted by Badan Pusat Statistik (BPS) in Rizaty (2019), it was stated that the number of internet user in Indonesia keeps growing in the period of 2015 to 2019. This increase does not only occur in urban but also in rural areas. In 2021, a report from Kemp (2021) shows that the number of internet user in Indonesia has reached 202.6 million which was 73.7% of the total population.

The usage number of internet has been significantly growing since Covid-19 pandemic was declared to enter Indonesia on March 2nd, 2020. As an effort to reduce the spread of virus, the Indonesian Government imposed the lockdown policy called Large-Scale Social Restriction, known as PSBB. (Muhyiddin, 2022). During this time, people are advised to implement social distancing and staying at home. This phenomenon changes people's behavior in their activities. All activities that were usually carried out offline have begun to be shifted to online. In this situation, people depend more on a wifi connection. As a result of this phenomenon, the role of Internet Service Provider (ISP) becomes very important. ISP companies have become the backbone for all types of organizations around the world and are now a major industry (Mahmood & Manzoor, 2021). The increasing need for internet services is an opportunity for these ISP companies to increase their market share and acquire customers. Companies must be able to improve their competence to increase customer trust so that they are only interested in using their services. One way to improve the company's competence is to improve the quality of services provided because service quality plays an important role in the success of the service industry (Vanissa et al., 2021). In fact, providing the best service quality to customers is still a challenge faced by the internet service provider as there are still a lot of complaints from customers. (Rintyarna et al., 2022).

To give the best service quality, it is important for companies to really understand their current quality of services by gaining feedback from customers so they would know the perceived service quality based on customer's point of view. Before social media was well known to the public, companies need to put extra effort to get feedback from customers. The efforts were by conducting direct surveys, online surveys, sending emails to customers, adding comment fields on the website, including telephone numbers as a means of criticism and suggestions, distributing questionnaires, and doing interviews. However, with the development of technology, social media has become an effective means for companies to obtain feedback. People can spend more than 8 hours a day using social media (Kemp, 2021). People also tend to be more confident in expressing their opinion and views on social media (Li & Khan, 2009). Customer feedback and data collection can be done by applying text mining to measure the sentiment of public using sentiment analysis method. Text mining retrieves information from available text through pattern and trend forecasting by means of statistical pattern learning (Ranjan & Prasad, 2021).

The research related to service quality was usually conducted using questionnaire as a tool for data collection. However, collecting data using the questionnaire has several weaknesses. In terms of filling in the data, there is a possibility that respondents are not 100% honest with their answer and respondents may be limited to expressing their true opinions as their answer is usually limited by the points given by researcher. In terms of the validity of respondents, a data collection using questionnaire was usually done using the help of online survey tools. Thus, researcher can not be sure that their respondent was the right target because everyone can open the link and fill out the survey (Siva et al., 2019). Based on Paramita & Noviarisanti (2021), the text mining method became one of the options chosen by contemporary researchers because it was considered more efficient in terms of time and cost, compared to questionnaire surveys and interview with consumers.

This paper will try to review the existing research related to service quality using text mining as data collection tool especially in an ISP industry as studies on the quality of service in the ISP industry are still rarely glimpsed by researchers, while the public's need for the internet is increasing. The study of the service quality of internet service providers in Indonesia with the latest approach, namely text mining, is still very much needed. This research is expected to ignite the spirit of further researchers to continue to review the quality of ISP services in Indonesia so that they can develop.

2. Literature Review (Theoretical Background)

2.1 Service Quality

Service quality was first defined by Lewis & Booms (1983) as a measure of how appropriate the services provided are with customer expectations or expectations. There are two factors that influence service quality, namely the expected service and the perceived service (Parasuraman et al., 1985). Ideal quality occurs when the quality received

by the customer is the same as the expected quality. On the other hand, if the quality received is less than the expected quality, the service quality is perceived as negative or bad. Therefore, the role of service providers is highly dependent on consistently meeting customer expectations. Adapting to the current situation, the service quality concept which initially consisted of five quality dimensions, began to adjust with several adjustments based on the object of study. In lodging industry, Knutson et al (1990) introduced LODGSERV dimension consisted of reliability, assurance, responsiveness, tangibles, and empathy. Wong Ooi Mei et al (1999) introduced HOLSERV to identify the service quality in the hospitality industry consisted of 3 dimensions such as employees, tangibles, and reliability. Khan (2003) introduced ECOSERV as the service quality dimension in eco-tourist industry consisted of reliability, responsiveness, assurance, empathy, eco-tangible, and tangibles. Ekiz et al (2009) introduced RENTQUAL to identify the quality of service in a car rental industry consisted of comfort, delivery, handling over, security, ergonomics, and accessibility. Tumsekcali et al (2021) introduced P-SERVQUAL 4.0 to identify the quality of service in a public transportation industry consisted of reliability, responsiveness, assurance, empathy, tangibility, industry 4.0 and pandemic. In the ISP industry, Thaichon et al (2014) introduced the service quality dimension consisted of network quality, customer service, technical support, security and privacy and information quality.

2.2 Text Mining

Text mining is a process of obtaining information from many unstructured texts (Berezina et al., 2016). Text mining is concerned with extracting and analyzing business insights from textual elements such as comments, reviews, tweets (the term for tweets on Twitter social media), and blogs. Such data extraction is usually used to understand user sentiment or identify hot themes or topics among the community (G. F. Khan, 2018).

In the internet service industry, text mining techniques have been carried out several times before. Rintyarna et al (2022), developed a model for measuring the service quality of internet service providers by attracting public opinion to see public sentiment towards products from Telkomsel and Indosat providers. Vanissa et al (2021) identified the competence of internet service providers in Indonesia consisting of Indihome, First Media, Biznet, and Gigbyindosat using sentiment analysis found in text mining. Alamsyah & Bernatapi (2019) analyzes customer experiences with internet service products in Indonesia using text analytics.

3. Sentiment Analysis

According to Liu (2010), sentiment analysis aims to analyze the opinions, evaluation of sentiments, judgment attitudes, and emotions of a speaker or writer related to a topic, service, organization, or other activity. In this sentiment analysis, look at the text contained in a sentence or document and then determine whether the opinion expressed in the sentence or document is positive or negative.

Sentiment analysis can also examine feelings of sadness, joy or anger. One source of data or opinion sources that are often used for sentiment analysis is Twitter social media Nakov et al (2016). To measure service quality based on public sentiment, a total quality score is calculated using the formula as follows:

$$S_i = \frac{N_{pi} - N_{ni}}{N_{pi} + N_{ni}} \dots \dots \dots (2.1)$$

Where N_{pi} states the number of positive sentiments in dimension I while N_{ni} states the number of negative negative sentiment (Duan et al., 2013). The calculation of this sentiment score is carried out to determine the overall value of public sentiment towards the product or service provided by the service provider.

4. Research and Methodology

The mechanism of this literature review is illustrated as follows: (Figure 1)

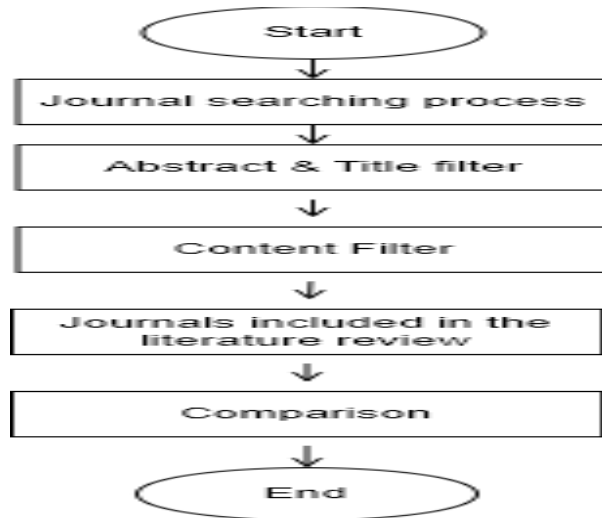


Figure 1. Literature Review Methodology

The articles reviewed in this paper is focused to service quality topic in technology industry with text mining as a tool for data collection and sentiment analysis as a tool for data analyzing. The articles reviewed in this paper is not specified on the ISP industry only as the research with ISP as the object is still rarely done. Hence, the literature with ISP industry as the object is prioritized but will not be the only requirement. The first step is to search relevant papers from reputable sources such as ScienceDirect, Google Scholar, Emerald, and ResearchGate. The papers found are then filtered by the title and abstract. If the title and abstract match, then literature review is conducted and lastly comparison is held. The purpose of this review is 1). To see if using text mining and sentiment analysis in defining the service quality of an organization 2). To understand better the mechanism of using sentiment analysis in defining the service quality 3). To understand better the tools and application for identifying sentiment analysis 4). To get a holistic view of Internet Service Provider in previous journals and articles.

5. Finding and Result

Based on search searching and filtering result. 47 paper was found. Below is the summary of data processing of the 47 papers. (Figures 1 – 4))

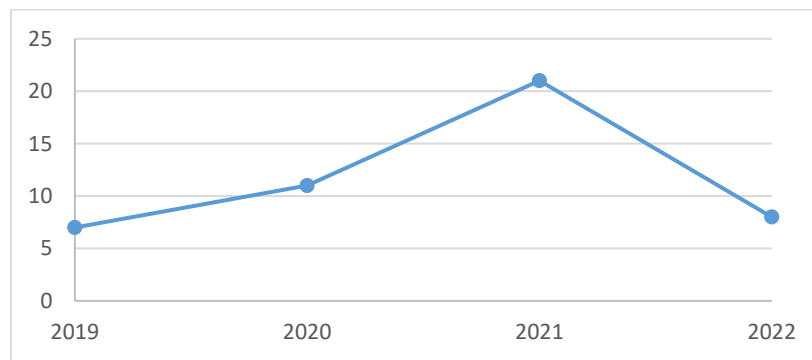


Figure 1. Summary of Journals Based on Year of Publishing

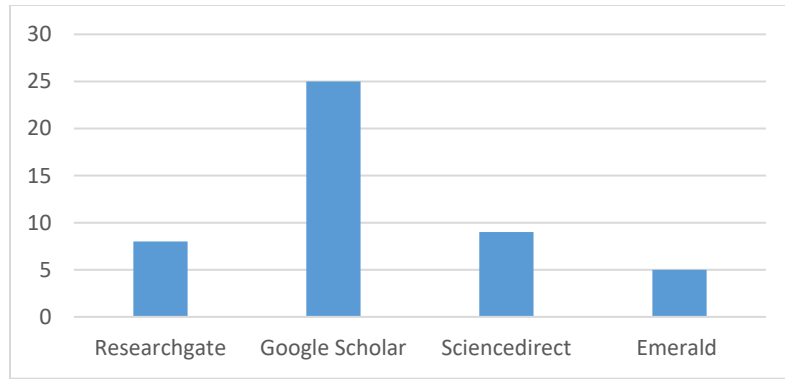


Figure 2. Summary of Journals Based on Source of Publishing



Figure 3. Summary of Journals Based on Keywords

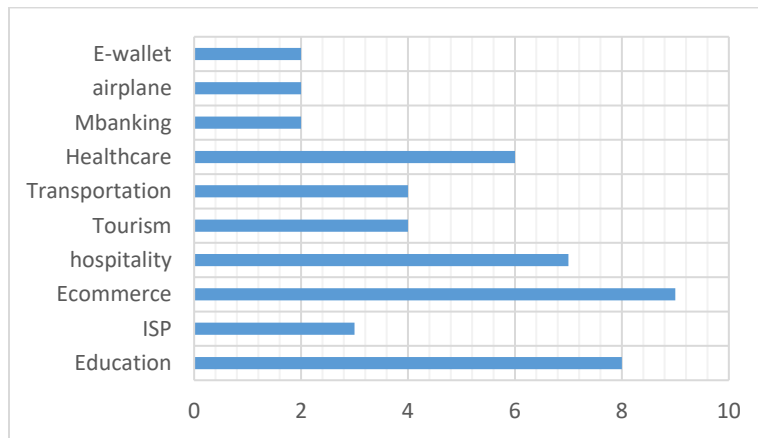


Figure 4. Summary of Journals Based on the Objected Industry

Out of 47 papers found. Six papers made it to the review process. The filtered paper that was reviewed is shown in Table 1 as follows.

Table 1 Literature Review Result

Author & Year	Title	Service Quality Dimension	Object	Software	Research Result
Rintyarna <i>et al</i> (2022)	Modelling Service Quality of Internet Service Providers during COVID-19: The Customer Perspective Based on Twitter Dataset	Network Quality, Customer Service, Information Quality, Privacy and Security	By.U and MPWR	R Studio	The framework in this research successfully generated the service quality rate for By.U and MPWR. The result shows that By.U is better in terms of service quality meanwhile MPWR outperforms By.U in terms of customer service.
Sari <i>et al</i> (2018)	Measuring e-Commerce service quality from online customer review using sentiment analysis	Reliability, Responsiveness, Trust, Personalization	Tokopedia	RapidMiner	Based on the result, the personalization and reliability dimension need to be enhance as they have high negative sentiment. Meanwhile, trust and web design dimension have high positive sentiment, it implies that Tokopedia did a very good job in delivering service regarding this dimension. Last, the responsiveness dimension have neutral sentiment
Leem and Eum (2021)	Using text mining to measure mobile banking service quality	Security/Privacy, Practicity, Design/Aesthetics, Sociality, Enjoyment	Kakao Mobile Bank App	WebHarvy, Netminer 4.0, and TEXTOM	The result in this study shows that it was possible to see which factors among the various service quality dimension that need to be prioritized in improvement. The author also stated by periodically finding customer's feedback, customer complaints and service failures can be prevented early and service quality can be improved.
Calvin and Setiawan (2014)	Using Text Mining to Analyze Mobile Phone Provider Service Quality (Case Study: Social Media Twitter)	-	PT XL Axiata, PT Telkomsel Tbk and PT Indosat Tbk	LingPipe4Twitter	This paper was succeed to identify the service quality provided by using scoring method. Result shows that the ISP companies still need to improve the quality of service they provide to the customers.
Paramita and Noviarisanti (2021)	Service Quality Analysis of Mhealth Services Using Text Mining Method: Alodokter and Halodoc	Platform Quality, Interaction Quality, Outcome Quality	Halodoc and Alodokter	Python	This study successfully identify the service quality delivered by Alodokter and Halodoc. Based on the result, Halodoc and Alodokter perform well as positive sentiments were still dominating the user's review.
Deviani <i>et al</i> (2022)	Service Quality for Digital Wallet in Indonesia Using Sentiment Analysis and Topic Modelling	Efficiency, Fulfillment, System Availability, Privacy	Dana and Shopeepay	RapidMiner	Result shows that service quality delivered by Dana and Shopeepay in terms of efficiency, system availability, fulfillment and privacy still need to be improved as negative sentiments are still dominating.

From the Table 1 above, it is known that using text mining and sentiment analysis to define the service quality provided by companies is possible to do. There is several software that could help calculating the sentiment analysis such as Python, R Studio, NetMiner 4,0, and RapidMiner. Out of six papers that were reviewed, only two of them use ISP companies as the research object. This implies that the service quality literature which use text mining and sentiment analysis to define the quality of service provided in ISP industry is still rarely done by researcher. Meanwhile, public's need for internet service is growing. This should be seen as an opportunity for researcher to do more research regarding the service quality of ISP companies so they could improve.

6. Conclusions

This paper tries to review the existing research related to service quality using text mining as data collection tool especially in an ISP industry. Paper searching was done by exploring the reputable source such as Scopus, Google Scholar, Emerald and ResearchGate. Papers were then filtered by the title and abstract. The requirement of the papers to be reviewed including using service quality as the main topic, using text mining and sentiment analysis as a tool to define the quality of service provided by companies. Six papers were then reviewed. Result shows that using text mining and sentiment analysis to identify the service quality provided by companies is possible to do. Out of six papers

that were reviewed, only two of them using ISP as the main object. Service quality literature which uses text mining and sentiment analysis to define the quality of service provided in ISP industry is still rarely done by researcher. Meanwhile, public's need for internet service is growing. This should be seen as an opportunity for researcher to do more research regarding the service quality of ISP companies so they could improve.

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