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Article

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Twitter Sentiment Analysis of the Low-Cost Airline Services After COVID-19 Outbreak: The Case of AirAsia

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Abstract

Background: Public opinion about experience and expectation on services that appear on Twitter platforms provides valuable insights into satisfaction and experience. **Objectives:** This research investigates consumer perception and opinion toward AirAsia's services after the COVID-19 outbreak. **Methods/Approach:** A framework is proposed by integrating the customer satisfaction model with the digital service quality dimension: product quality, price, situational factors, personal factors, service quality, and digital service quality. Nvivo is used to extract and analyse Twitter data for sentiment analysis, thematic analysis, and word frequency calculations. **Results:** Findings demonstrated that AirAsia had received more negative sentiments than positive sentiments, indicating a lower level of satisfaction across all dimensions of customer satisfaction. **Conclusions:** This research provides the airline industry, especially AirAsia, with an opportunity to better understand the sentiments and preferences of its customers. AirAsia can use the findings of this research to evaluate the quality of their services, especially in terms of service quality, to improve customer satisfaction, gain customer loyalty, and enhance customer experience.

Keywords: Twitter, sentiment analysis, AirAsia, airline industry, service quality, customer satisfaction

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Introduction

Air transport is the fastest mode of public transport, providing worldwide unbroken journeys over land and sea. It shrunk the world by connecting people from different countries for business and leisure. According to The World Bank, from 2009 to 2019, global air passenger traffic grew from 2.2 billion to 4.5 billion, but the COVID-19 pandemic caused this number to drop by more than half in 2020, with 1.8 billion passengers carried (The World Bank, 2021). Malaysian Airlines was affected as well. Malaysia's air passenger traffic fell from 109.2 million in 2019 to 26.7 million in 2020 (Muller, 2021), as the Malaysian Aviation Commission (MAVCOM) forecast. The decline was about 72.8% to 75.7% per year, and the number of passengers carried is between 26.6 million and 29.7 million (MAVCOM, 2020). This phenomenon mirrors Sadi and Henderson's (2000) observations that the air transport industry is sensitive to stresses such as pandemics, economic downturns, political instability, and natural disasters.

The decline in air passenger traffic has greatly affected the economy. Evidence supports an interdependent relationship between the usage of airlines and economic activity, especially tourism (Hansman and Ishutkina, 2009). According to the Aviation Benefits Beyond Borders report on September 2020 (Aviation Benefits, 2020), before COVID-19, the airline industry supported a total of 87.7 million jobs, of which 44.8 million were tourism-related. The total global GDP supported by the airline industry is 4.1%, totalling USD 3.5 trillion. In turn, around 58% of all tourists fly to their destinations, increasing airline usage. This linkage between airline usage and economic activity helps stimulate the economic development of the places that air travel connects (Niewiadomski, 2017). According to an International Air Transport Association (IATA, 2019) report, in 2018, 450 thousand jobs were supported by the airline industry, including tourism-related jobs, accounting for 3.5% of the Malaysian GDP, with a total of USD 10.3 billion.

In general, airlines can be divided into two types: full-service airlines (FSAs) and low-cost airlines (LCAs), which are also known as budget airlines. An FSA provides a comfortable or luxurious full-board flight experience. The key passengers of FSAs are business passengers who often seek frequent scheduling, inflight flexibility, and ground service linkages, emphasising reliability, quality, connectivity, flight schedules, frequent flyer programmes, and comfort (Berrittella et al., 2009). Conversely, LCAs focus on cost minimisation, providing flights with low-cost tickets and limited in-flight service. LCAs initially attracted many young and leisure travellers who were sensitive to fare costs and then captured a significant proportion of small and medium-sized enterprise (SME) business travellers after the global financial crisis (Rajaguru, 2016). According to a report from MAVCOM (2020), in 2017, Malaysia's passenger traffic was dominated by LCAs, namely AirAsia, which has a domestic and international passenger share of 56.3% and 27.6%, respectively. Over the next few years, AirAsia continued to be the leader of Malaysia's airlines.

As the COVID-19 pandemic spread around the globe, the global airline industry paid a heavy toll, and so did AirAsia. On 12 November 2021, as Air Asia faced a cash crunch due to the pandemic, it planned to undertake debt restructuring with full support from Class A and C creditors and support from 97.6% of Class B creditors, enabling AirAsia to stay solvent and avoid delisting from Bursa Malaysia (Burgos, 2021). To speed up its recovery, AirAsia needs to understand the opinions and behaviours of its passengers better in order to develop a more robust and resilient marketing strategy to strengthen its position.

The main aim of this research is to identify the sentiment of AirAsia's customer satisfaction within service quality and digital service quality dimensions related to the COVID-19 pandemic. This research analyses Twitter sentiments about the service

quality of AirAsia to better understand their preferences and the competitiveness of AirAsia service offerings and to indirectly benefit the airline industry. The research objectives are (i) RQ1: To identify the topic discussion on customer satisfaction and identify the sentiments that emerge from Twitter communications among Twitter users with respect to AirAsia, and (ii) RQ2: To explore the textual patterns and identify the sentiments that emerge from Twitter communications among Twitter users with respect to AirAsia.

Literature Review

Customer Satisfaction

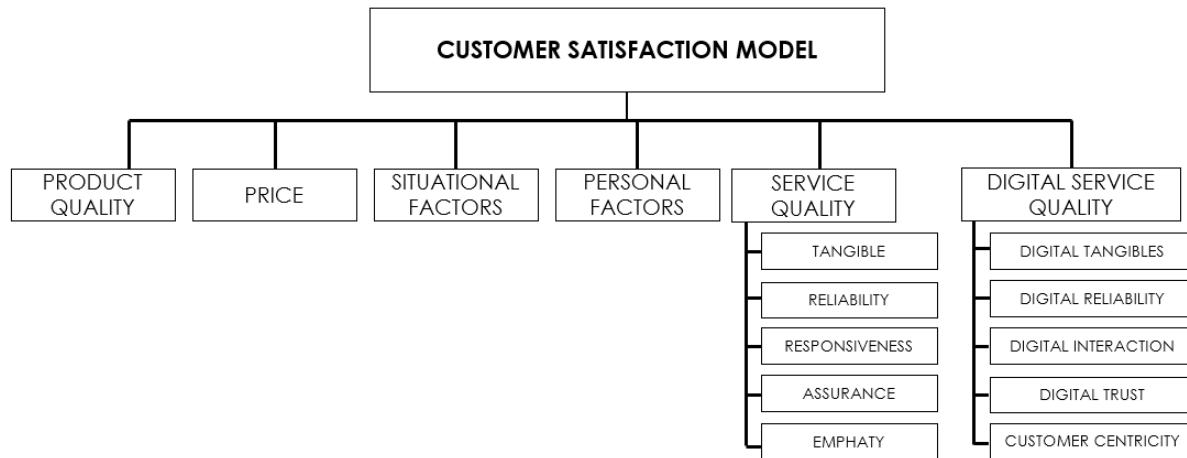
Customers are the people who make purchases from an organisation, whether those purchases be of the goods or the services that the business offers. Customers, in other words, are participants of the business since they are the ones who pay money in return for the offer that is presented to them by the organisation with the intention of satisfying a need and bringing about the highest satisfaction (Masorgo, et al. 2022). Customer satisfaction based on the experience concept has spread across the service industry at a rate that has never been seen before, and the body of academic research is coming to a consensus on what is and is not (Becker and Jaakkola, 2020; De Keyser et al., 2020). Satisfaction is determined by whether the customer has a positive or negative opinion regarding the result of the consumption. This concept is generally accepted in both academic literature and corporate practice because it is favourably related to a wide variety of critical outcomes such as brand or company recognition, customer loyalty and retention, and customer value.

In the context of transportation, the degree to which passengers are content with the quality of the services being offered has a critical influence on whether or not a particular carrier will remain in business over the long run. As a result of the poor service delivered, disgruntled customers may lose faith in the airlines and be less likely to choose that carrier for future travel. It is critically necessary for airlines to guarantee that consumers will get the level of service quality that they demand. Hence, some companies analyse their customers' satisfaction through social media platforms to assess and improve their product or service quality. Park et al. (2019) stated that customer satisfaction is a core factor of success in a competitive market.

This research adopted the customer satisfaction model developed by Wilson et al. (2016), in which customer satisfaction depends on the perception of service quality, product quality, price, situational factors, and personal factors. In this model, the perception of service quality is measured with the SERVQUAL model developed by Parasuraman et al. in 1988. They proposed five service quality dimensions: tangibles, reliability, responsiveness, assurance, and empathy (Parasuraman et al., 1988). However, the understanding of service quality has changed with the widespread use of digital technologies. Büyüközkan et al. (2020) suggested that the main dimensions of the SERVQUAL model and the evaluation criteria need to be updated to reflect digital transformation, proposed a new digital service quality (DSQ) model to measure the changed perception of service quality due to digital transformation, and validated it with a real case in the Turkish airline industry. The DSQ model consists of five primary dimensions: digital tangibles, reliability, digital interaction, digital trust, and customer-centricity. This research adopted the customer satisfaction model and DSQ model as a framework for a more comprehensive understanding of passengers' sentiments from multiple dimensions. This integrated framework consists of six essential perceptions: product quality, price, situational factors, personal factors, service

quality, and digital service quality, as depicted in Figure 1. This framework describes the various evaluation criteria for researching customer satisfaction connotations.

*Figure 1
Customer Satisfaction Model*



Source: Authors' illustration

Elements of the above customer satisfaction model will be elaborated on in the rest of the chapter.

Product Quality

This research focuses on a quality metric directly connected to the product's travel convenience in terms of the itinerary's directness (measured by the flight distance between the passengers' origin and destination) (Gayle and Thomas, 2015). In the airline industry, product quality refers to routing quality (Chen and Gayle, 2019). It describes the convenience of the air travel itinerary. The higher the value of the routing quality measure, the closer the flight distance of the airlines' route is to the direct route and the more desirable the travel itinerary is for passengers (Chen and Gayle, 2015).

Price

Price is the actual amount customers pay in exchange for a product or service (Lovelock and Wirtz, 2007). In the airline industry, price refers to the fare. As the air travel market is an oligopoly, airlines are constantly reacting to competitors' actions, monitoring their prices and trying to price fares accordingly. In the airline industry, pricing is intended to maximise profit by targeting different market segments, but it also leads to price differentiation (Suhartanto and Noor, 2012). In general, the level of satisfaction established with the perceived price, as well as the overall process, is proportional to both the perceived price and the degree of compromise made. The lower the perceived price and the greater the degree of compromise, the greater the level of satisfaction established (Parasuraman et al., 1988).

Situational Factors

Situational factors usually involve external factors beyond service providers' control that affect customers' perceptions at a specific time and place within the context of the service delivery environment (Kalaiarasan et al., 2018). In general, the situational factor influences how customers come into contact with and engage with a product or service, which in turn shapes the consumer's view at that precise instant in time. For

example, in the airline industry, boarding location, events, weather, health or economic conditions can be situational factors (DeCelles and Norton, 2016; Parasuraman et al., 1988).

Personal Factors

According to the research that has been conducted, personal factors refer to personal characteristics such as age, occupation, education level, income or salary, lifestyle, personality, and self-concept that have been identified as having a substantial effect on the aspects of customer satisfaction (Hapsari et al., 2017; Oyewole, 2001). According to Oyewole (2001), passengers' satisfaction with airline service is affected by various personal factors. The findings discovered that the level of customer satisfaction with various services offered by the airline passengers flew with was significantly influenced by the passengers' occupation, marital status, gender, and level of education.

Service Quality

Many research adopt the SERVQUAL method to evaluate airline service quality (Erdil and Yıldız, 2011; Jahmani, 2017; Young et al., 1994). In the airline industry, service quality is related to an airline's ability to transport passengers to their desired destinations while providing a high standard of service (Jahmani, 2017). According to Jahmani (2017), the five dimensions of service quality in airline service delivery are defined as:

- Tangibles or the physical appearance of employees, facilities, equipment, personnel, and communication material used to provide airline service.
- Reliability, or the ability to perform the promised service dependably under routine and unexpected conditions, which includes punctuality, check-in efficiency, and ticketing accuracy.
- Responsiveness or the willingness to quickly and properly solve service problems such as flight cancellations, luggage loss, emergency response, and luggage delivery.
- Assurance of employees' knowledge and courtesy and their ability to display trust and confidence when addressing customers, for instance, politeness, respect, and general interest for passengers.
- Empathy or providing reliable, valuing, individualised attention to passengers, for instance, offering them preferred seating or a frequent flyer program.

Digital Service Quality

In the airline industry, digital service quality is related to the efficiency and reliability of digital services, as well as the latest technologies used (Low et al., 2020). The same dimensions appear in this model from a different perspective. Hence, they are differentiated by the addition of "digital" to distinguish the two models. According to Büyüközkan et al. (2020), the five dimensions of digital service quality are:

- Digital tangibles, digitalised equipment, facilities, and their digital properties can be wirelessly networked or linked to various digital representations.
- Digital reliability is the ability to manage digital processing and fulfil the promised digital services effectively.
- Digital interaction, or the digital communication networks established between passengers and airlines through digital platforms.
- Digital trust, or the acquisition and retention of passengers and shareholder value through confidence in digital services and channels.

- Customer-centricity or prioritising passengers and fulfilling their emotional needs through innovative service delivery experiences.

Company Background

AirAsia Group Berhad (called AirAsia) is a Malaysian multinational LCA that was established in 1993 and is headquartered in Kuala Lumpur, Malaysia. A government-owned group initially formed AirAsia, but in its early years, it was heavily indebted, which led to its acquisition by Tony Fernandez in 2001 for MYR 1 and the agreement to take on millions of dollars in debt (QUARTZ, 2015). AirAsia initially provided airline services and then launched into offering digital business services. During the last two decades, AirAsia's operation has improved, and it has become a leading LCA. According to the Daily Express (2021), AirAsia was named the World's Best Low-Cost Airline at the Skytrax 2021 World Airline Awards; this is the 12th consecutive year the airline has won the award.

As AirAsia focuses on offering lower fares without a plethora of other amenities, it makes air travel more affordable and lives up to its famous slogan, "Now Everyone Can Fly". In addition, AirAsia has developed several subsidiaries in Asia, utilising the AirAsia brand and adopting identical low-cost business models, including Indonesia AirAsia, Philippines AirAsia, Thai AirAsia, and AirAsia India. The company has also developed its long-haul airline brand, the AirAsia X Group, which includes AirAsia X and Thai AirAsia X. To cope with its substantial route networks, AirAsia currently has 101 aircraft. All but one are from the A320 family, and that is an A330-300 (Planespotters, 2021). With subsidiaries located across the continent, AirAsia will grow even stronger in the future.

According to the Skytrax 2021 World Airline Awards, AirAsia received the title of "World's Best Low-Cost Airline" for a record-breaking twelve years, which comes after it was given another outstanding award for business innovation at Flight Global's 2021 Airline Strategy Awards (AirAsia Group Berhad, 2021a). In addition, at the 28th annual World Travel Awards 2021, AirAsia was recognised as having Asia's Leading Low-Cost Airline Cabin Crew for the sixth year in a row and was granted the title of Asia's Leading Low-Cost Airline for the fifth year in a row. AirAsia came out on top in this category after receiving the most votes from customers, industry professionals, and other industry participants from all over the area (AirAsia Group Berhad, 2021b).

AirAsia Group Berhad has changed the name of its listed holding company to 'Capital A' effective on 28 January 2022 (Burgos, 2022). The new name reflects the group's new core business strategy as an investment holding company with a portfolio of synergistic travel and lifestyle businesses, including logistics, aircraft engineering, venture capital, education and mobile applications (CNA, 2022). However, the airline still operates under the AirAsia brand name. These businesses have rapidly transformed the AirAsia brand into more than just an airline, and the name change reflects this change in overall business strategy (Hospitality-on.com, 2022).

Problem Statement

Due to growing competition, providing high-quality service has become a marketing need for the airline industry. The airline industry began concentrating on how service quality improvements impact revenue and whether perceived service quality is a crucial factor in customer happiness and loyalty. Service quality is the most heavily stressed airline industry's competitive variable, such as rates, frequency, equipment, service quality, market access, and advertising. Customer service standards set an airline apart from its rivals, determine market share, and eventually decide profitability

(Martin-Domingo et al., 2019). Most significant conventional airlines have adopted this strategy. Airlines must be aware of passengers' requirements and expectations to provide better services, as consumers' expectations serve as a benchmark by which businesses are measured.

As the airline industry faced decreasing passenger traffic due to the COVID-19 pandemic, the competition among airlines increased. As a result, airlines have sought ways to understand passengers' needs and desires to improve their marketing strategies and attract more passengers while increasing customer satisfaction. Nowadays, social media has become an integral part of people's daily routines. It not only offers personal communication but also serves in business operations. More and more people use social media platforms such as Facebook and Twitter to review and share opinions on specific products and services, which is valid for airline passengers. Passenger reviews and opinions from social media can be transformed into meaningful information about airlines, helping them better understand the topics of discussion about their brands (Gensler et al., 2015). This analysis of brand-specific opinions is called sentiment analysis. There has been much research on sentiment classification in the field of airline service (Rane and Kumar, 2018; Sreeja et al., 2020; Anitsal et al., 2019), but few studies use sentiment analysis based on Twitter about specific airline brands, particularly Malaysian airlines.

Although it is evident that the COVID-19 epidemic influenced airlines' traffic and financial performance, the effect on customers' perceptions of airlines is not as evident. AirAsia and its subsidiary AirAsia X (AAX) grounded hundreds of flights in 2020 and 2021 due to the Malaysian government's decision to close state and international borders to prevent the spread of COVID-19 (AirAsia Group Berhad, 2021c). Since commercial and international travel has begun to resume and vaccination rates have risen from September 2021, the number of passengers flying each day across a wide range of countries, including Malaysia, is quickly approaching the levels seen before the epidemic began (AirAsia Group Berhad, 2021d). Because of this inflow, airlines and airports have had difficulty accommodating passengers, leading to longer wait times at customer service counters, considerable flight delays, and unexpected cancellations.

On 21 October, AirAsia started to reactivate everyone aboard after the government announced the return of interstate travel and tourist operations. AirAsia had the most excellent quarterly load rate of 80%, with a 3.4 million capacity in Q4 of 2021 after introducing quarantine-free travel bubbles for Malaysia and the loosening of travel restrictions. (AirAsia Group Berhad, 2021e). Nevertheless, months after the low-cost airline started flights after the October removal of interstate and international border restrictions for Malaysians, hundreds of passengers took to social media to complain about poor customer care and lengthy refund wait times (Daniele, 2022). For the airline industry, this means a sudden increase in demand, new expectations, and complex operational and service challenges, not to mention regaining the competitive advantage via service quality.

Using data collected from Twitter towards AirAsia, this study contributes to the big data analysis, text mining and sentiment analysis literature on customer satisfaction and service quality. This research is practical and contributes to existing airline service operations literature by suggesting a procedure for the analysis of the textual content of Twitter of customer satisfaction and service quality. Most research papers have collected airline service operations data using quantitative techniques such as surveys, qualitative techniques, or, in general, in-depth interviews to elicit customer satisfaction and service quality. However, the wide availability of consumer opinions on social media platforms, together with the increasing number of computer tools for

the analysis of unstructured data, this study has shifted attention to the study of customer satisfaction and service quality using text mining and sentiment analysis via social media platforms. In addition, this research integrates the customer satisfaction model and digital service quality dimension as a framework for a more comprehensive understanding of passengers' sentiments from multiple dimensions that are important for all service providers, especially in the airline industry.

The rest of this article is structured as follows: first, we provide a brief literature and theory background on text mining, sentiment analysis, and customer satisfaction model, then develop a relevant theoretical model. Next, in the research methodology section, we explain data collection and analysis procedures. After that, the findings and discussion section present the interpretation of the analytics results. Lastly, the conclusion section discusses some of the limitations of the current study and the future scope of work.

Methodology

Text Mining

Text mining can be considered as a process of editing, organising, analysing and interpreting unstructured text into structured format (Berezina et al., 2016; Fan et al., 2006). The main purpose of text mining is to find relevant patterns in a prepared document and discover the hidden information embedded within the documents (Tian et al., 2020). Text mining has become more practical, using automated computer algorithms and natural language processing techniques to analyse and interpret a large amount of unstructured text (Fan et al., 2006). Text mining has been extensively used in analysing user-generated content produced by users of social media platforms that are available publicly (He et al., 2017). These types of content include opinions, comments, views, expressions, and interactions between users and brands.

The analysis of consumers' thoughts and comments on brand-related tweets yields valuable information that has a direct impact on changing brand perceptions. The inclusion of user-generated material pertaining to brands allows consumers to articulate their opinions and perspectives on items and services, therefore empowering businesses to transform this data into valuable insights into customers' preferences and requirements (Pejić Bach et al., 2019). Numerous scholarly investigations have used sentiment analysis as a key component in their examination of Twitter data, with a particular emphasis on a wide range of sectors such as retail (Ibrahim & Wang, 2019), banking (Krstić et al., 2019; Pejić Bach et al., 2019), and airlines (Kwon et al., 2021; Yee Liau and Pei Tan, 2014).

In the context of airline services, text mining and sentiment analysis are essential because they enable managers to generate meaningful insights into passengers' opinions, which, in turn, may help refine strategic responses or become the basis for further research (Zaki and McColl-Kennedy, 2020). Several studies in the airlines' service literature provide an alternative customer satisfaction and service quality analysis using customer review content for hearing the voice of their customers by using text mining techniques (Dwesar and Sahoo, 2022; Tian et al., 2020; Sezgen et al., 2019). Airline companies can improve their ability to manage their service recovery efforts and strategies for the prioritisation of service quality elements by better-understanding passengers' experiences and expectations (Sezgen et al., 2019).

Sentiment Analysis

The field of research known as sentiment analysis, which is also known as opinion mining, examines people's opinions, attitudes, and emotions concerning entities such as products, services, organisations, individuals, issues, events, topics, and their characteristics. Because consumers are expressing their opinions more freely using social media than ever before, sentiment analysis is becoming an essential tool for understanding the emotions of consumers and becomes vital for businesses, as it allows them to understand better customers' opinions, reactions, experiences, and perceptions of a phenomenon. Hence, airlines should consider passengers' sentiments as online opinions will continue to influence service companies' reputations and brand images (Devedi et al., 2017) and other customers' decision-making (Gensler et al., 2015). At a deeper level, online reviews or opinions suggest customers' requirements for products and services (Chen et al., 2020). Sentiment analysis involves developing automatic learning models that detect whether customers' sentiments are positive, negative, or neutral, as well as their degree of intensity (Melville et al., 2009).

This research examines content from Twitter for sentiments about AirAsia in Malaysia. The field of airline services includes much sentiment analysis research, most of which analyses Twitter data extracted about the airline industry. Twitter data is a reliable data source as users tweet their genuine feelings and feedback, making it suitable for investigation (Rane and Kumar, 2018). Since Twitter launched in 2006, it has become one of the most preferred information-sharing platforms for travellers. Millions of travellers travel with airlines and share their views on Twitter in the form of text, photos, videos, and website links. Users' posts on Twitter are limited to 280 characters and are called "tweets" (Boot et al., 2019). In 2020, there were over 500 million daily tweets and 187 million active Twitter users globally (Sayce, 2020).

Research process

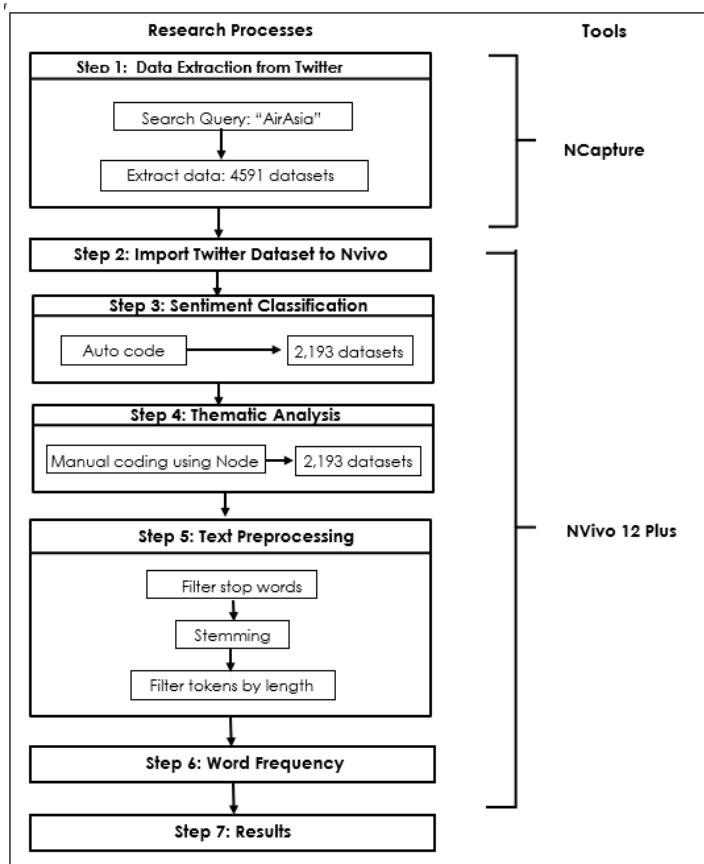
A sequence of steps was designed to demonstrate the research process, including the seven main steps depicted in Figure 2:

- Step 1: This research uses NCapture to capture the consumer sentiment formed concerning the keywords "AirAsia" on Twitter. NCapture is a browser add-on designed for NVivo to capture web content that can be analysed on NVivo. NCapture is a browser extension built for NVivo to capture online information for NVivo analysis. Only recent tweets written in English were used in this research. The data were extracted on 17 November 2021 and consisted of 4,591 tweets from 8 November to 17 November, including original tweets and retweets.
- Step 2: Tweets extracted from Twitter were imported into NVivo 12 Plus as a dataset for further analysis.
- Step 3: In this step, the auto code function in NVivo 12 Plus was used to identify the sentiment in tweets automatically. The tweets were coded according to sentences. After auto-coding, a total of 2,193 results were automatically categorised into four main groups by sentiment: very negative, moderately negative, moderately positive, and very positive.
- Step 4: Manual coding using NVivo's node function was used to perform a theme analysis of the comments. The textual content was coded based on the dimensions of the customer satisfaction model. The thematic analysis consisted of carefully analysing each remark, locating patterns, deciding on appropriate codes, and developing themes and sub-themes based on the accumulated data (Bonello and Meehan, 2019). The coding process was done manually with pre-constructed coding schemes where the nodes are first created from the six dimensions of the customer satisfaction model (digital tangibles, reliability, digital interaction, digital

trust, and customer-centricity), including the five sub-dimensions of service quality (tangibles, reliability, responsiveness, assurance, empathy) and five sub-dimensions of digital service quality (digital tangibles, digital reliability, digital interaction, digital trust, customer-centricity). In order to achieve maximum analytical rigour, the data were independently analysed and coded by three coders. The codes were examined, contrasted, and debated to find a consensus.

- Step 5: Before assessing word frequency, text preprocessing was required to ensure efficient and accurate text analysis. In this research, stop words that do not provide meaningful information, such as "http", will be omitted. Mamgain et al. (2016) define stop words as common words that do not contribute to sentence sentiment and should be removed, which allows the researcher to focus on the important words. Stemming is also applied in this step. Srividhya and Anitha (2010) describe stemming as the process of removing the suffixes from words and extracting the root or stem. In this research, words will be grouped with their stems; for instance, "reimbursed" and "reimbursement" is stemmed to "reimburse" and grouped. Filtering tokens by length is another of the text preprocessing steps. It involves removing tokens that are shorter or longer than a specified character length; in this research, the minimum character length is 3, as many common words are shorter than three characters and offer little information, such as "in", "am", and "is".
- Step 6: The top 25 most frequent words were used in the word cloud for further investigation.
- Step 7: The final step was to interpret the results

Figure 2
Flowchart of Research Process



Source: Authors' illustration

Findings

Sentiment Analysis

Table 1 shows the overall distribution of sentiments in tweets related to the keyword "AirAsia". Out of 2,193 results, 125 were coded as very negative, 1,312 as moderately negative, 693 as moderately positive, and 63 as very positive. Moderately negative sentiments predominated, accounting for 59.83% of all sentiments, while very positive sentiments were least common at 2.87%. Overall, 65% of the sentiments were negative.

Table 1
Distribution of Sentiment Analysis

Sentiment	Very Negative	Moderately Negative	Moderately Positive	Very Positive
Frequency	125	1,312	693	63
Percentage	5.70	59.83	31.60	2.87

Note: n = 2,193; Source: Authors' work

Sentiment Analysis of Customer Satisfaction

Table 2 summarises the sentiment analysis by nodes. For all types of sentiment, passengers primarily discuss service quality. It dominates all sentiment related to AirAsia on Twitter at 85.57%, followed by situational factors at 6.02%, digital service quality factors at 5.45%, personal factors at 2.05%, price factors at 0.60%, and product quality factors at 0.31%. As mentioned earlier, moderately negative sentiments predominated, and when people discuss AirAsia on Twitter, moderately negative sentiments are the most common regarding all factors except for price and digital service quality. Price received more moderately positive sentiments, while digital service quality received mostly very negative sentiments. Interestingly, none of the tweets discussing price indicated moderately negative sentiments. Meanwhile, none of the tweets discussed product quality and situational factors with very positive sentiments.

Table 2
Summary Sentiment Analysis of Customer Satisfaction Model

	Product Quality		Price		Situational Factors		Personal Factors		Service Quality		Digital Service Quality	
	F	%	F	%	F	%	F	%	F	%	F	%
VN	1	0.04	5	0.23	19	0.87	12	0.55	46	2.10	42	1.93
MN	4	0.18	0	0.00	69	3.15	20	0.91	1,184	54.00	35	1.56
MP	2	0.09	6	0.28	44	2.00	6	0.27	610	27.83	25	1.14
VP	0	0.00	2	0.09	0	0.00	7	0.32	36	1.64	18	0.82
T	5	0.31	13	0.60	132	6.02	45	2.05	1,876	85.57	120	5.45

Note: VN = Very Negative Sentiment; MN = Moderately Negative Sentiment; MP = Moderately Positive Sentiment; VP = Very Positive Sentiment; T = Total; F = Frequency; % = Percentage; n= 2,193; Source: Authors' work

Sentiment Analysis of Service Quality

Table 3 summarises the sentiment analysis of service quality factors. Around 65% of tweets conveyed negative sentiments. Responsiveness dominates with 93.29% of tweets, followed by reliability at 3.25%, empathy at 1.97%, assurance at 1.07%, and tangibles at 0.42%.

Table 3
Summary Sentiment Analysis of Service Quality

Tangibles		Reliability		Responsiveness		Assurance		Empathy		
F	%	F	%	F	%	F	%	F	%	
VN	1	0.05	14	0.75	14	0.75	5	0.27	12	0.63
MN	5	0.27	33	1.76	1,124	59.91	5	0.27	17	0.91
MP	1	0.05	7	0.37	589	31.40	7	0.37	6	0.32
VP	1	0.05	7	0.37	23	1.23	3	0.16	2	0.11
T	8	0.42	48	3.25	1,750	93.29	20	1.07	37	1.97

Note: VN = Very Negative Sentiment; MN = Moderately Negative Sentiment; MP = Moderately Positive Sentiment; VP = Very Positive Sentiment; T = Total; F = Frequency; % = Percentage; n= 1,876; Source: Authors' work

Sentiment Analysis of Digital Service Quality

Table 4 presents the sentiment analysis of digital service quality factors. Around 60% of tweets about digital service quality conveyed negative sentiments. Digital tangibles feature in 50% of tweets, followed by customer-centricity at 22.5%, digital reliability at 18.33%, and digital trust at 9.17%. Interestingly, no tweets discussed digital interaction, and very positive sentiments appear only for digital tangibles.

Table 4
Summary Sentiment Analysis of Digital Service Quality

Digital Tangibles		Digital Reliability		Digital Interaction		Digital Trust		Customer-centricity		
F	%	F	%	F	%	F	%	F	%	
VN	8	6.67	10	8.33	0	0.00	8	6.67	16	13.34
MN	15	12.50	10	8.33	0	0.00	3	2.50	7	5.83
MP	19	15.83	2	1.67	0	0.00	0	0.00	4	3.33
VP	18	15.00	0	0.00	0	0.00	0	0.00	0	0.00
T	60	50.00	22	18.33	0	0.00	11	9.17	27	22.50

Note: VN = Very Negative Sentiment; MN = Moderately Negative Sentiment; MP = Moderately Positive Sentiment; VP = Very Positive Sentiment; T = Total; F = Frequency; % = Percentage; n = 120; Source: Authors' work

Word Frequency

A word cloud is a visualisation for text analytics. Word clouds were used to visualise the 25 most frequent words in the dataset and sentiment analyses. The stop words "http," "lmao," "duhuhh," and "amp" were omitted in favour of other words that could offer more meaningful insights.

Figure 3 shows the words frequently used in tweets related to AirAsia. Among all AirAsia-related tweets, the most frequently used term is "AirAsia", followed by "customers", "taking", "MAVCOM", and "ticket".

Figure 4 shows "AirAsia" as the most frequent word used in negative-sentiment tweets, followed by "MAVCOM", "ticket", "take", and "fails".

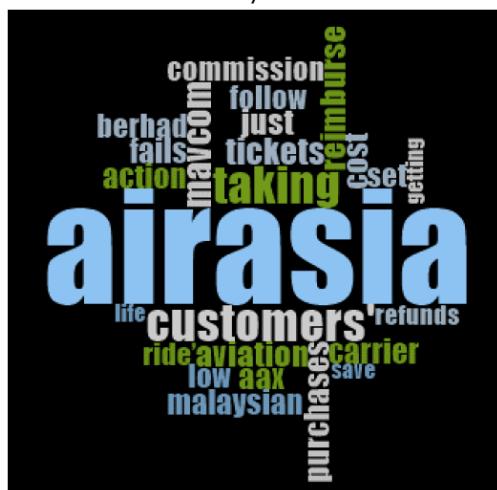
For positive-sentiment tweets, shown in Figure 5, "AirAsia" was again the most frequently used word, followed by "refunding", "customers", "money", and "taking".

Some organisations and target groups repeatedly appear in word clouds for different datasets, such as "AirAsia", "customers", and "MAVCOM". Naturally, "AirAsia" is used most frequently as it is the brand name and the keyword for this research, so the tweets used in the research dataset must contain it. Twitter users use hashtags (#) or mentions (@) of AirAsia to categorise tweets and link to other tweets with the same hashtags or mentions, as well as to connect with a specific topic. "Customers" and

"customers" also appear frequently in all three-word clouds. Customers are important in business; in the airline industry, they are passengers, and "customers" refers to passengers' belongings. "MAVCOM" is the name of an organisation in Malaysia, the Malaysian Aviation Commission.

Verbs also appear repeatedly in the three word clouds, including "taking" and its stem word, "take". "Take" means "use or ready to use". If "take" is combined with "action", it means to do something for a particular result. Some goods or items are also listed in the word clouds, such as "ticket" and "money". In the airline industry, a ticket is a proof that a passenger is entitled to a seat on a flight, and it can be paper or electronic. "Money" is a medium of exchange that allows people to obtain what they need or want. Word clouds visually represent passengers' thoughts. The most popular topic of discussion among AirAsia passengers was the refund issues due to flight cancellations during the COVID-19 pandemic. During the pandemic, AirAsia cancelled all flights but did not refund customers' tickets. After a few months or a year, passengers hoped MAVCOM would act against AirAsia to return their money.

Figure 3
Word Cloud Analysis for AirAsia



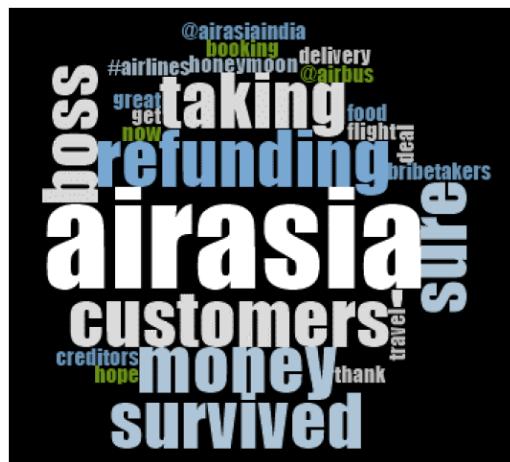
Source: Authors' work

Figure 4
Word Cloud Analysis for Negative
Sentiment Tweets for AirAsia



Source: Authors' work

Figure 5
Word Cloud Analysis for Positive
Sentiment Tweets for AirAsia



Source: Authors' work

By comparing the above three figures, we can see that there are more similarities between Figures 3 and Figure 4 than between Figures 3 and Figure 5. Because passengers' discussions of popular topics featured more tweets with negative sentiment labels than positive sentiment labels, it is unsurprising that the common words in Figure 3 are similar to the most frequently used words overall.

Discussion

One of the significant challenges of the airlines is keeping pace with customers' changing perceptions and requirements of service quality and other aspects of user experiences. With the development of information and communication technologies (ICTs), sentiment analysis permits understanding and exploring customers' attitudes towards airline services from their posts on various social media platforms. Various studies have been conducted to explore and understand the different polarities of customers' perceptions by utilising sentiment analysis or data mining approach to interpret customer satisfaction (Kumar and Zymbler, 2019), user experience (Song et al., 2020), and service quality (Martin-Domingo et al., 2019). In this research, sentiment analysis was performed on 2,193 tweets to understand the passengers' sentiments towards AirAsia and other popular topics related to the airline industry and services. The data analysis includes sentiment analysis, sentiment analysis by nodes, word frequency, and word maps related to AirAsia.

The first research objective was to identify the topic discussion on customer satisfaction and identify the sentiments that emerge from Twitter communications among Twitter users with respect to AirAsia. The dominant themes were categorised by nodes that identified the factors determining passengers' sentiments towards AirAsia. Service quality appeared to be the most common factor that AirAsia passengers cited, and most of the tweets were negatively coded. Service quality is a multidimensional construct described by various forms of interaction between customers and service providers. The SERVQUAL model proposed by Parasuraman et al. (1988) contains ten dimensions for service quality: tangibles, reliability, responsiveness, competence, courtesy, credibility, security, access, communication, and understanding of the customer.

Like other transportation industries, service quality is critical in the airline industry. The success and growth of the industry depend on users' perceptions of the value, comfort, and quality of user experiences. Passengers always have high expectations of the quality of services provided by airline carriers, which must be effective, efficient, regularly available, safe and secure, adequate, and comfortable at a reasonable cost (Adisasmitha et al., 2020). Increasing numbers of airline passengers have increased the demand for service quality from airline carriers (Oghojafor Ben et al., 2016). Numerous studies have observed a significant relationship between service quality and customer satisfaction in airline industries worldwide (Ashraf, 2017; Hapsari et al., 2017; Giao et al., 2021). For example, Hapsari et al. (2017) identified the significant positive effect of service quality on Indonesian airline passengers' satisfaction, which was also mediated by perceived value.

Furthermore, passengers' sentiments towards service quality were described by five core aspects of customer service quality: responsiveness, reliability, empathy, assurance, and tangibles. Of these five dimensions, responsiveness was most often highlighted by passengers in describing their frustration and negative feelings towards the airline service. Responsiveness refers to service providers' willingness to help or assist their customers and provide the prompt services expected (Pizam, 2010). Conceptually, it is a dimension of service performance in which customers' demands are met through market solutions (Lagat and Uyoga, 2019). In this research, issues of

ticket refunds due to communication failures with the bot, as well as the lack of in-person support, were highlighted. This issue became especially critical during the COVID-19 pandemic when many passengers needed to cancel and reschedule their flights due to travel restrictions. Other studies similarly emphasised issues related to responsiveness in the airline industry (Riantama et al., 2021; Zhu, 2017; Lagat and Uyoga, 2019). Riantama et al. (2021) found that responsiveness was the most important attribute of airline passengers' satisfaction after the pandemic.

Digital service quality was also identified as one of the factors determining passengers' sentiments towards AirAsia, although Twitter users did not highly emphasise it. Nowadays, digital technology bridges passengers' satisfaction and is the key method for airline carriers to promote their services and improve their overall efficiency. Digital service quality can affect the trend of air travel globally, aside from changing demographics and customer behaviour (Revfine, 2021). In this research, the most highlighted aspect of digital service quality was digital tangibles, followed by customer-centricity, digital reliability, and digital trust. While there was a balance of positive and negative sentiments for digital tangibles, more negative sentiments were recorded for all other aspects. This finding generally aligns with the digital service quality model for the airline industry by Büyüközkan et al. (2020), where digital trust, proactive customer service, cybersecurity, and customer insights were reported as the most important dimensions. Issues of digital service quality for airline passengers' satisfaction were also noted in other studies, such as a poor complaint management system (Rizki et al., 2021) and problems with the ticket reservation system (Abisoye et al., 2017).

Apart from the service-quality-related factors, other factors were identified as situational factors, personal factors, price factors, and product quality. However, these factors occurred with less than 10% frequency, suggesting that they were not highly emphasised by passengers reviewing AirAsia services. Other recent studies discussed these factors, which affect passengers' perceptions and satisfaction with their airline travel experiences. For example, an aspect related to airline product quality is the lack of destination variety (Rizki et al., 2021), and personal factors influencing airline passengers' satisfaction include gender, income, and education (Jiang and Zhang, 2016). Additionally, situational factors affecting airline passengers' satisfaction include lavatory cleanliness and odour control (Hamid et al., 2021).

The second research objective was to explore the textual patterns and identify the sentiments that emerge from Twitter communications among Twitter users with respect to AirAsia. Based on the word cloud diagrams, the most frequent word in AirAsia-related tweets is "AirAsia", followed by "customers", "taking", "MAVCOM", and "ticket". "AirAsia" was the most frequent word in both the negative- and positive-sentiment clouds. Other frequent positive-sentiment words are "refunding", "customers", "money", and "taking", while frequent negative-sentiment words include "MAVCOM", "ticket", "take", and "fails". These results suggest that "AirAsia" is a hot topic with mixed sentiments among Twitter users. The popularly discussed aspects on Twitter include the Malaysian Aviation Commission (MAVCOM), as well as ticketing and refunding issues. Although the airline industry has been severely affected by the COVID-19 pandemic, AirAsia still ranked the highest among all other airlines in the ASEAN region, occupying 20th place among the world's most valuable airline brands (TTR Weekly, 2021). AirAsia is also striving to become a leading e-commerce platform through AirAsia.com for one-stop travel and lifestyle in this region (AirAsia Group Berhad, 2020f). Meanwhile, AirAsia India, which has been a joint venture between Tata Sons and Malaysia-based AirAsia Berhad since 2014, retained its leadership position with 90.8% on-time performance (OTP) in April 2022 (ETTravelWorld, 2022).

Overall, the research findings from the sentiment analysis of the tweets related to AirAsia showed that the passengers' sentiments were generally negative rather than positive. More than half of the sentiments were negative, and these were typically moderate, which suggests that the airline carrier should investigate emerging concerns among its passengers to improve the quality of its services and products. This finding concurs with many recent studies, which also revealed negative customer perceptions and sentiments regarding their air travel experiences (Hoang, 2020; Herjanto et al., 2022; Sulu et al., 2021; Song et al., 2020). For example, Hoang (2020) revealed negative emotions like anger, regret, and frustration towards airline services, which have led to complaining, switching travel intentions, and spreading negative word-of-mouth among Vietnam's airline passengers. Similarly, Herjanto et al. (2022) generated 17 different negative emotions based on the online reviews of LCA passengers, including shock, disappointment, and surprise due to the failures of the airline services.

In addition, respondents' negative sentiments towards airline services could be influenced by travel restrictions and other pandemic-related challenges. As Monmousseau et al. (2020) stated, travel restriction measures due to COVID-19 cases have caused major disruptions and unprecedented impacts on airlines globally. AirAsia has faced backlash and a wave of complaints from passengers who have taken to social media to express their dissatisfaction with its customer service and delays in refunding due to the pandemic (Daniele, 2022). Piccinelli et al. (2021) revealed the relationship between the rising numbers of COVID-19 and air travellers' negative sentiments based on online comments about airline cancellations, compensation, and customer service. They further explained that the pandemic has led to financial difficulties for users, who then complain heavily about refund issues from airline service providers. Similarly, Sulu et al. (2021) found that the COVID-19 pandemic is a dominant theme describing the airline passengers' perceptions of service quality, in which their dissatisfaction with airline experience was linked to airline cancellations and refund processes due to COVID-19 and airport services.

Another interesting finding from this research is that there were fewer negative than positive sentiments about price compared to the other five factors. Most AirAsia passengers do not consider price the main hurdle in determining their travels. Rather, LCA passengers' satisfaction is more likely to be determined by other non-price-related factors, particularly the service quality dimensions discussed previously, which is similarly noted in several studies, which found that price was not the main decisive factor affecting passengers' travel preferences among LCAs (Akamavi et al., 2015; Calisir et al., 2016). However, Jiang and Zhang (2016) found that the impact of ticket pricing differs by the type of passengers; while it strengthens leisure travellers' satisfaction and loyalty, no significant impact was observed among business passengers.

Conclusion

The airline industry is one of the fastest-growing major players in the public transportation market in many countries. This research provides some helpful insights for the key players and policymakers in the airline industry. The findings have also enriched the existing literature, particularly on the use of social media for insightful real-time insight into how passengers perceive airline services and the possible factors influencing airline travellers' changing preferences and behaviours. The airline industry will recover once it has a better understanding of customer expectations, increased service quality management, and expanded digitalisation across the ecosystem,

which will ensure that the industry emerges from the pandemic with greater financial sustainability, responsiveness and agility than it has ever had before.

In summary, the research findings reinforce the following key points:

- Passenger-first approach: Airline services need to focus on their customers by emphasising the five dimensions of service quality, especially responsiveness. This will also be useful in attracting more loyal passengers who will recommend their services to others.
- The use of digital and social media: Airline carriers' ability to adapt to rapid technological and digital progress will determine their competitiveness and sustainability in the airline industry. Social media is also instrumental for airline carriers not only to maintain effective engagement with passengers but also to monitor and understand their sentiments towards the services provided.
- Varying marketing strategies: Customers' satisfaction is subjective and varies across individuals. Thus, different customer segments may have different preferences regarding airfare and service quality. Lower prices do not imply that the quality of airline service is expected to be low as well. Therefore, other non-price-related marketing strategies can be designed to improve the airline industry's sustainability in a post-pandemic setting.

Although the research makes some contributions to both theoretical and empirical literature, it still has some limitations. The study is limited to satisfaction factors and service quality dimensions of only one LCC airline, AirAsia passengers. Our sample might not represent all LCC airlines in Malaysia and the rest of the world. Consequently, the findings may not be generalisable to the general population of airline companies. Future research may address these concerns by replicating this research on different airlines in Malaysia and outside of Malaysia. This will enable us to investigate whether the factors of passenger response satisfaction and service quality dimensions of airline passengers are similar across different airlines and national boundaries. Another limitation arises from the use of single-source data collection on the Twitter platform. It would be beneficial to cover other social media platforms, such as Facebook and Instagram; this can be incorporated into future work.

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