Recommend or not? The influence of emotions on passengers' intention of airline recommendation during COVID-19

Xi Wang [a], Jie Zheng [b,*], Liang(Rebecca) Tang [b], Yi Luo [c]

[a] *Culture, Creativity and Management, School of Culture and Creativity, BNU-HKBU United International College, China*
[b] *Apparel, Events, and Hospitality Management, College of Human Sciences, Iowa State University, United States*
[c] *College of Business Administration, Capital University of Economics and Business, China*

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ABSTRACT

Due to the COVID-19 pandemic, the airline industry has undoubtedly suffered serious losses. Investigation of passenger's intention to recommend an airline is urgently needed for airline companies to formulate specific retention strategies and revitalize the industry. Therefore, this study mainly sought to identify the latent factors that determine airline passenger's recommendation intention during the COVID-19 period, and investigate how the emotions expressed in passenger reviews affect their intention to recommend an airline. From the period between January 2020 and October 2021, 6798 online reviews were collected and analyzed. The results indicate that four out of eight emotional dimensions, including joy, trust, anger, and disgust, significantly influence passengers' intention to recommend. This study not only extended the applications of the expectancy-disconfirmation theory and Plutchik's emotional theory but also provided instructive suggestions for airline businesses that need to formulate marketing strategies, especially during the COVID-19 period.

Credit author statement

Funding information

1. Introduction

Air travel has always been one of the most common means of transportation. According to a forecast issued by the International Air Transport Association (IATA), the number of global passengers will reach 7.3 billion by 2034, which accounts for an average annual growth of 4.1% of the air connection demand (IATA, 2014). However, due to the outbreak of COVID-19, the number of air passengers as well as all travelers in general have dropped sharply for various reasons, and the expectations of the airline industry have also been reconsidered (Lamb et al., 2020). The global airline revenue in 2021 declined by 46 percent from 2019, with a three-year total loss of $20.1 billion (Habtemariam, 2020; IATA, 2021). While this has been an unexcepted winter for the airline industry, special attention should be paid to passengers so that airline companies can adopt different strategies to recover in this unique period. With the decrease of the COVID-19 cases and removal of travel restrictions in 2021, customers' travel needs revived (Hanafiah et al., 2021). Nevertheless, most travelers still keep vigilant about the healthy precautions (Matiza & Kruger, 2021). Thus, the travel industry has adjusted the plan of tourism promotion, marketing, and services with special attention given to mitigate anxiety and boost the confidence of domestic and foreign tourists.

Customer intention to recommend, considered one of the most critical indicators by businesses in strategic planning, not only makes a difference in every individual customer's decision-making but also has always been examined by businesses to gauge their reputation and satisfaction level (Bontis et al., 2007; Zhang et al., 2018). Intention to

* Corresponding author.
E-mail addresses: xiwang@uic.edu.cn (X. Wang), jiezheng@iastate.edu (J. Zheng), rebeccat@iastate.edu (L. Tang), luoyi@cueb.edu.cn (Y. Luo).

recommend means the willingness of a customer to endorse a product or service with a positive user experience for others (Cheung & Thadani, 2012). In the airline industry, passengers' (customer) intention to recommend is strongly related to the perceived service quality during a flying experience (Vijayadurai, 2008).

In the existing literature, although research related to the intention to recommend in the airline industry has been adequately explored, a twofold research gap can still be very clearly identified (Table 1). First,

Table 1
Investigations on recommendation topics in the airline industry since 2010.

Reference	Data Source	Context	Analysis Method	Independent Variable
Ban and Kim (2019)	Skytrax	Airline	SNA, ANOVA, Regression	Staff, food and beverage, entertainment, comfort of seat, ground service, value for money
Chatterjee and Mandal (2020)	Skytrax	Passenger	Regression	Type of passenger, culture orientation of passenger, avoidance of culture from customer
Hong and Park (2019)	Skytrax	Airline	Text mining, clustering analysis, empirical test	Core keywords of review, customer satisfaction
Xu et al. (2019)	Skytrax	Airline	Path analysis	Service failures, service recovery, type of airline
Prabhakar et al. (2019)	Skytrax	Airline	Machine learning, decision tree	Airline attributes, airline review airline service rating
SN and Caytiles (2018)	Kaggle	Passenger	Naive Bayes Classifiers	Customer complaint, customer sentiment
Siering et al. (2018)	Skytrax	Airline/airport	Regression	Aircraft, seat, safety punctuality, ground service, cabin service, food and beverages, entertainment, Wi-Fi, value for money
Chen and Liu (2017)	Survey	Airline	SEM	Perceived value, brand image, service quality
Hapsari et al. (2017)	Survey	Airline	Levene's test, *t*-test	Customer engagement, services quality
Koklic et al. (2017)	Survey	Airline	SEM	Airline type, customer satisfaction
Rahim (2016)	Survey	Airline	Regression	Services quality
Rajaguru (2016)	Survey	Airline	SEM	Services quality, value for money, customer satisfaction
Singh (2015)	Survey	Airline	EFA, SEM	Customer satisfaction, perceived value
Geraldine and David (2013)	Survey	Airline	SEM, Correlation analysis	Airline image, service quality
Khraim (2013)	Survey	Airline	Regression, *t*-test	Airline image, service quality
Huang (2010)	Survey	Airline	SEM	Customer satisfaction, services quality, services value
Nikbin and Hyun (2017)	Onsite Survey	Airline	PLS	Stability, controllability, emotions
Wen and Chi (2013)	Onsite Survey	Airline	SEM	Perceived justice, consumption emotions, trust, service recovery

*ANOVA: analysis of variance; SEM: structural equation modeling; SNA: semantic network analysis; EFA: exploratory factor analysis, PLS: partial least squares regression.

although several studies have investigated the topics on customer recommendation from different perspectives, most of them explored the attributes on the superficial level, such as airline attributes (in-flight entertainment, seat comfort, food and beverage), airport attributes (queuing time, terminal seat, airport shopping), staff service (service, ground service, cabin service) or service recovery. These studies failed to scrutinize the latent determinants from the perspectives of passenger perceptions and experience, since they applied predesigned survey which ignored the survey "fatigue bias" especially for on-site field studies (Lavrakas, 2008) and using small scaled convenience sample (Nikbin & Hyun, 2017). Second, while a few studies applied the text mining methods to explore some latent variables, they neither examined sentiment and emotions from the passenger reviews, nor determined the relationship between passengers' emotions and potential future behavioral intentions (e.g., intention to recommend).

The expectancy-disconfirmation theory (EDT) was applied as the theoretical background for this study. Proposed by Oliver (1980), EDT indicates that customers' total satisfaction results in the disconfirmation between expectation and perceived performance outcome. Since customer satisfaction has always been deemed to be the prerequisite for post behavior intention (Chang & Wang, 2019; Mittal et al., 1999), this research extended from the EDT and presented a new perspective to investigate customer behavior intention (led by satisfaction in EDT) toward products, services, and even brands in many businesses (e.g., Chiu et al., 2011; da Silva Lopes, 2015; Oh et al., 2002).

However, with the emergence of the internet, people, especially millennials, not only prefer writing comments or reviews online nowadays but also like to refer to online information and opinions before making decisions (Hong & Park, 2019; Siering et al., 2018). When elaborating on online comments, expressing emotions and using emotional words can make a significant difference in customers' disconfirmation level in the e-business context (Jha & Shah, 2021; Liao et al., 2011). Meanwhile, as indicated in the EDT by Westbrook (1987), people's emotions arise, and emotional fluctuations are caused when facing the disconfirmation of expectation and perceived performance outcome in purchasing activities. Therefore, sentiment and emotion should also be considered when analyzing customer behavior, such as the intention to recommend.

Therefore, the research question of this study was "what are latent factors that determine airline passenger's intention to recommend during the COVID-19 period?", and the analysis of this study mainly concentrated on investigating how passengers' intention to recommend can be affected by their latent sentiments and emotions expressed in online reviews. This study enriched the literature on both emotion analysis and recommendation intention through big data analytics for the airline industry. It also practically facilitated the understanding of consumer behavior, marketing strategy, and management issues for airline businesses, especially during the period of the pandemic.

2. Literature review

2.1. Expectancy-disconfirmation theory (EDT)

Developed by Oliver (1980), the expectancy-disconfirmation theory (EDT) explores customers' satisfaction with an experience based on previous expectations. According to EDT, a customer's total satisfaction results from an evaluation of the expectation (before purchase) with the perceived performance outcome (after purchase) (Yüksel & Yüksel, 2008). Customers can have various expectations from their personal experience, advertising, and word of mouth before any purchasing activity, and then they form subjective judgments based on their purchase experience (Do et al., 2019; Mokhtari et al., 2018).

Regarded as one of the most classic theories in marketing and consumer behavior disciplines, EDT has been widely applied in fields such as customer perception, satisfaction, and behavioral intention in the hospitality industry, as shown in Table 2. For instance, in the field of

Table 2
Summary of studies applying expectancy-disconfirmation theory (EDT) since 2010.

Study field & Reference	Context	Data source	Data size	Method	Purpose
Perception					
Rao and Sahu (2013)	Hotel	On-site survey	60	Descriptive analysis	Analyze how customers perceive and expect the front desk employees to provide service
Mazumder and Hasan (2014)	Hotel	On-site survey	200	Descriptive analysis, T-test	Determine the gap between domestic and foreign hotel visitors in Bangladesh based on their perceptions of the level of service they expect from the hotels
Chang and Beise-Zee (2013)	Restaurant	On-site survey	447	Regression	Analyze customers' evaluations of the health advantages of a health-promoting destination
Cai and Chi (2021)	Restaurant	Online survey	1105	Regression, ANCOVA, ANCOVA	Identify the role that food images have in forming consumer expectations and performance evaluation
Leung and Wen (2021)	Restaurant	In-lab experiment	198	Factor analysis, MANOVA, ANOVA	Analyze the role of consumer sentiment in digital food ordering
Elkhani et al. (2014)	Airline	Online survey	300	PLS-SEM	Present a full framework for measuring airline websites' performance from the customer perspective
Martin, et al (2008)	Airline	On-site survey	380	PLS-SEM	Examine the connections between perceived justice and recovery satisfaction to understand more about the significance of good service recovery in the airline industry
Satisfaction					
Fong et al. (2013)	Hotel	Online survey	152	Regression	Explore the prioritization of determinants of customer satisfaction among Chinese travelers
Ray and Rahman (2016)	Hotel	On-site survey	291	Regression, Correlation	Assess the level of student satisfaction with several tourist destinations in Rajshahi, Bangladesh
Weng (2016)	Hotel	On-site survey	240	Correlation	Determine which variables at Xi'an Hotel have the greatest impact on the degree of customer satisfaction
Bello and Bello (2017)	Hotel	On-site survey	ND	Regression	Examine how the front desk workers at hotels relate to employee empowerment, service quality, and customer happiness
Ojo and Majebi Enesi (2018)	Hotel	On-site survey	1450	Regressions	Examine the connection between aspects of customer satisfaction and service quality at hotels in Auchi, Nigeria
Li et al. (2020)	Hotel	Qunar and Ctrip	ND	Correlation	Develop a way to measure hotel customer satisfaction in accordance with the Dempster-Shafer (D-S) evidence theory
Agyeiwaah et al. (2016)	Restaurant	On-site survey	2096	T-test, ANOVA	Summarize literature on service quality/satisfaction, and identify the characteristics that influence sector satisfaction and investigate the relationship between satisfaction and loyalty
Suhartanto and Noor (2012)	Airline	Online survey	400	Regression	Examine the consumer satisfaction of full-service airlines versus low-cost flights from the standpoint of the customer
Behavior intention					
Siddiqi et al. (2020)	Hotel	On-site survey	448	SEM	Examine the effects of ulterior motives in peer and expert online hotel reviews on customers' feelings of deception and discontent, as well as their altruistic response and repurchase intention
Zehrer et al. (2011)	Hotel	TripAdvisor	134	ANOVA	Explain the effect that travel blog contributors have on blog users
Harun et al. (2018)	Restaurant	On-site survey	901	PLS-SEM	Analyze a theoretical model examining the variables affecting good word-of-mouth behavior of restaurants following a service failure and recovery experience
Pinem et al. (2018)	Restaurant	Online survey	81	PLS -SEM	Investigate the causes of negative customer behavior among tourists
Chang and Wang (2019)	Restaurant	On-site survey	354	CFA, SEM	Explore whether the levels of disconfirmation effect caused by destination advertisement information and WOM have an impact on traveler satisfaction and intention to return
Namkung and Jang (2010)	Restaurant	On-site survey	326	SEM	Examine the interactions between feelings, behavioral goals, and perceived service fairness in a restaurant context
Au and Tse (2019)	Airline	On-site survey	161	MANOVA	Evaluate the influence of expectancy disconfirmation on the reactions of airline customers to delays
Others					
Abrate et al. (2021)	Hotel	NH Hotel Group	44,707	Panel regression	Analyze the effect of pricing on hotel rating
Chong and Law (2019)	Airline	Literature review	ND	Literature Review	Identify a comprehensive website evaluation model

*SEM: structural equation modeling; PLS: partial least squares; CFA: confirmatory factor analysis; GLM: general linear model analysis; ND: not determine.

customer perception, studies have examined customer expectations and perceptions of restaurant and hotel services (e.g., Mohd-Any et al., 2019; Rao & Sahu, 2013), disparities in perception levels of the same service among various groups of people (e.g., Mazumder & Hasan, 2014), and how the performance of services is influenced by customer perceptions in various consumption scenarios (e.g., Cai & Chi, 2021; Elkhani et al., 2014). Regarding customer satisfaction, literature supported by EDT mainly focuses on exploring major elements that contribute to customer satisfaction with a business in the hospitality and tourism field (e.g., Fong et al., 2013; Weng, 2016).

Moreover, expanding the original EDT model, the literature also extensively evaluates the further consequence (behavioral intention) of satisfaction/dissatisfaction, because satisfaction or dissatisfaction, identified as the outcome of disconfirmation, can also lead to behavior intentions of different customers. For instance, Au and Tse (2019) investigated the effect of flight delays on behavioral intention, while Chang and Wang (2019) investigated the relationship between electronic word-of-mouth (e-WOM) and customer revisiting intention. Furthermore, Harun et al. (2018) and Pinem et al. (2018) examined customers' reaction to service failure in the hospitality industry.

In terms of the study about the customer behavioral intention, although some alternative theories (e.g., theory of reasoned action (TRA)) have also been widely used in study of behavioral intention, the present authors deemed EDT is the most appropriate one that comply the logical in the research. Because the logical flow of this research follows 1) to access the traveler's expectation and his/her actual traveling experience, and then 2) to identify the disconfirmation between perceived performance and expectation from the cues of his/her emotional expression, and finally 3) to determine the effects such as emotional disconfirmations on their behavior intention of

recommendation. Therefore, although some alternative theories such as TRA also focuses on the human behavioral intentions, two major factors of subjective norms and attitudes were not the key consideration in this study. Meanwhile, numerous previous literatures demonstrated that the recommendation intention of customers were influenced by many other factors (e.g., personal experience, personal expectations) (e.g., Altunel & Erkurt, 2015; Jiménez-Castillo & Sánchez-Fernández, 2019) besides the subjective norms and attitudes towards behavior. Particularly, EDT has merits in measuring the affective feelings of people, which can be better applied to address the impact of emotions on behavioral intention compared to other behavioral theories. And in recent years, EDT has been proven to be widely applicable in the tourism settings (Adnan & Omar, 2021; Zhang et al., 2021).

2.2. EDT, post behavior, and intention to recommend

Potential post behavior and behavioral intention after patronage were prospective topics that sparked the interest of researchers while using EDT. Studies based on EDT not only discussed customers' continuous behavior intention toward products, services, and even brands, which is most significantly influenced by satisfaction (Chiu et al., 2011; da Silva Lopes, 2015; Oh et al., 2002), but they also demonstrated the inter-relationship between customer satisfaction and behavioral intentions, such as intention to recommend, return, or complain (Makkonen et al., 2019; Oh & Parks, 1996), in the hospitality industry.

People's intention to recommend, as one of the fundamental post behavior concerns, means their willingness to recommend a product or service after a positive user experience to others (Cheung & Thadani, 2012). In the airline industry, passengers' intentions to recommend, as shown in previous literature, is often driven by their satisfaction levels that originate from the perceived performance outcome and service quality during the flying experience (Vijayadurai, 2008). When their perceived quality actually matches the expectations, the disconfirmation gap of customer would be narrower; thus, the customer would likely express an increase in willingness to recommend and re-purchase as well (Hernández-Lobato et al., 2006; Lee et al., 2007; Zeithaml et al., 1996).

2.3. Airline passenger's emotions

Customer emotion, generally regarded as the individuals' affective, states and experiences, is identified as a critical factor of demonstrating customers' perceptions of service experience (Herjanto et al., 2021; Lin and Liang, 2011). In the tourism and hospitality industry, the topics focusing on customer emotion have also been investigated abundantly. For instance, Ali et al. (2016) indicated that besides the tangible facilities and intangible service provided by a hotel, the emotional considerations accompanied with the holistic staying experience significantly affect the customer satisfaction level. Brunner-Sperdin et al. (2012) suggested that various service settings such as service environment, social surrounding, and leisure experiences make differences on customer's emotional states during their traveling experience. More specifically, positive emotion normally plays a vital role in building attachment of the tourism destination contributing to improve business reputation, and achieving positive customer behavioral intention (Kastenholz et al., 2020; Li et al., 2022); while negative emotion felt by a customer is often deemed as having a stronger cognitive and behavioral intention than positive emotion, which causes unfavorable outcomes such as complaints or switching behavior (Nawijn & Biran, 2019).

However, when comparing to the general hospitality and tourism contexts, passenger's emotions evoked from their flying experiences show some unique natures. First and foremost, indicated by Nieman-Gonder et al. (2018), the flying experience actually creates a unique, personal, and powerful emotional feelings, and the passenger's future decision making are strongly influenced by those emotional reasons. These emotions make differences on passenger's decision

making on a certain airline or agency (He et al., 2019). For instance, Kim and Park (2016) indicated airline passengers incline to have an immediate emotional response to the service failure of their flying experience. Since a number of passengers taking flights to relax on holiday or hurry on business, any factors of hindrance such as flight delay, differential ticket price, or boredom in waiting all work against experience and trigger the intense emotional reactions of passengers immediately, which may be different or unique from the experience occurring in hotels, restaurants, or travel attractions (Bor, 2007; Kim & Park, 2016).

One of the commonest service failures, the service (flight) delay, is taken as an example. Specified in previous literature, the service delay was identified having significant influences on the passengers' negative emotions, and the bad service experienced by passengers generates negative emotional responses that can further lead to the unfavorable their behavior intention such as repurchase, WOM, and recommendation (Herjanto et al., 2021; Kim & Park, 2016; Xu et al., 2019). Different from the general tourism and service contexts, the planless waiting time confronted by airline passengers would make them anger and feel about a certain level of the uncertainty to their air safety and flying experiences (Taylor, 1994).

In addition to their in-flight experiences, passengers also tend to evaluate the airline routes and ground service (ARGS) and cognitively generate emotional responses and consider it into their overall traveling experience (Ban & Kim, 2019). However, the emotional feelings generated during their waiting periods such as in the airline lounge, analyzed by Kim et al. (2016), including joyful, happy, relaxed, refreshed, rejuvenated, and peaceful, have significant impacts on their overall well-being perception and satisfaction level, which further indirectly affect their behavior intentions.

Literature discussed about the relationship between emotion determinates and various airline factors were summarized in Table 3. And it is clear that, although there was no lack of analysis exploring effects of passengers' emotion on the corresponding behavioral intention, previous studies hardly ever touch on the recommendation intention. Therefore, as discussed above, it was imperative to distinctively investigate the effects of emotional determinates for the airline industry.

2.4. EDT and customers' emotions

As discoed before, investigations established based on the passenger's emotional experiences can be welly explained in the EDT model. Indicated by Westbrook (1987), disconfirmation of expectations and perceived performance outcome also stimulate people's emotional fluctuation related to purchasing activities. According to Oliver et al. (1994), positive emotion is governed by the extent to which customer experience surpasses one's expectations and is pleasantly surprising. On the other hand, confirmation is more likely to elicit a neutral or mild emotional reaction. Therefore, the greater the extent of disconfirmation is, the stronger customers' emotion is.

Besides, the effect of emotion on behavioral intention can be further explained based on the cognitive appraisal theory. The theory states that an individual's evaluative judgment (appraisal) of a situation (e.g., purchase, consumption) determines the emotional response to it (Averill, 1980; Hassenzahl, 2018). During any purchasing activity, the experience of products, usage, and service can arouse customers' emotional reactions, and it is the emotion that generates feedback and affects their decision-making and post-purchase behavior (Babin & Attaway, 2000; Machleit & Eroglu, 2000). Moreover, with regard to people's cognitive appraisal with EDT, Chea and Luo (2008) identified a significant interplay of cognition-emotion, satisfaction, and post behaviors. Fig. 1 explains the proposed research model with the connection among expectations, perceived experience, emotional disconfirmation, and the intention to recommend of airline passengers.

In the online review context, after analyzing the textual content of online reviews, customers expressing emotions and using emotional words proved to have a significant relationship with the disconfirmation

Table 3
Literature exploring relationship between emotion determinates and various airline factors.

Author	Airline context	Dependent variable	Emotion determinates	Purpose
Nikbin et al. (2015)	Service	Recovery emotion, recovery satisfaction	Positive, negative	To examine how pre- and post-recovery emotions are related
Kim and Park (2016)	Service	WOM, repurchase intention	Anger, uncertainty, acceptability	To investigate how the service delay affects the behavioral intentions of airline passengers based on their positive and negative emotional reactions
Xu et al. (2019)	Service	Satisfaction, recommendation	Positive, negative	To examine the effects of various attributes of airline service failures and recovery actions on passenger's emotion of consumption, satisfaction level, and recommendation intention through text mining, sentiment analysis, and path analysis
Park et al. (2019)	Service	Satisfaction	Positive, negative	To analyze feedback of customers on airline services to determine the potential determinants of their perceived satisfaction
Hoang (2020)	Service	Complaint, WOM, switch	Anger, frustration, regret	To identify the impact of negative emotions on the coping behaviors of passengers using airline services at Tan Son Nhat Airport
Herjanto et al. (2021)	Service	Service failure	17 different negative emotions	To identify and analyze LCC passengers' comments about their flight experiences
Kim et al. (2016)	Airport lounge	WOM, revisit intention	Emotional evaluation	To analyze the effects of cognitive, emotional, and sensory dimensions of airline lounge experiences on subsequent responses from travelers
Lee et al. (2017)	Airport lounge	Satisfaction, revisit intention	Positive	To investigate the association between brand personality, self and functional congruity, positive emotions, satisfaction, and revisit intentions of airline lounges
Othman et al. (2016)	Brand	Resonance	Pleasure, arousal, dominance, spirituality	To assess the perception, experience, and psychological responses to the environment, extend the organism of pad theory.
Seo et al. (2020)	Brand	Brand awareness, brand image	Trust	To analyze the impacts of e-WOM, trust, and brand equity on the usage intention of the social media
Chen (2013)	Corporate social responsibility	Desire, purchase intention	Positive, negative	To determine the motivation and determinants for airline passengers to participate in carbon offset programs
Han et al. (2020)	Corporate social responsibility	Purchase intention, obligation sense to social actions	Positive, negative	To develop a comprehensive understanding of airline customers' purchase and payment intentions by integrating perceptions of airline CSR, emotions, volitional factors, moral obligation, and brand involvement as key considerations
Kim et al. (2018)	Consumer knowledge	Desire, purchase intention	Positive, negative	To identify the factors driving airline passengers' sustainable consumption
Loo (2020)	Consumer engagement	Engagement	Positive, neutral, negative	To examine the motivations of airline companies and customers for using the Facebook page, the types of Facebook content, and the challenges associated with maintaining a Facebook page
Lee (2005)	Airline crisis	Purchase intention	Trust	To analyze the consumers' evaluation of Hong Kong's organizational crisis empirically
Abayi & khoshtinata (2016)	Advertisement	Online ticket purchasing	Enjoyment, arousal	To examine the effects of advertising on the purchase tendency of airline tickets on the internet by taking into account both motivational and emotional influences

*LCC: low-cost-carrier, WOM: word-of-mouth, CSR: corporate social responsibility.
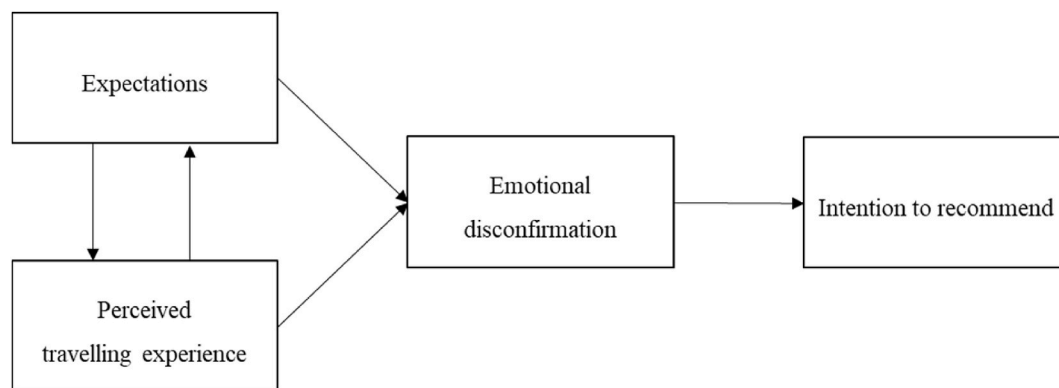

Fig. 1. Proposed research model based on EDT.

level (Jha & Shah, 2021; Qazi et al., 2017). Liao et al. (2011) particularly indicated that disconfirmation has a significant correlation with the emotion of regret in the e-business context. However, in the airline industry, the literature has seldom touched on the relationship between emotion and recommendation. Although some research, such as that of Song et al. (2020) and Prabhakar et al. (2019), have investigated the effects of emotions in online reviews, both of those studies yielded to the two sentiments analysis (positive vs. negative). To analyze passenger emotions, these explorations only superficially tested positive and

negative perspectives, which is far from the desired outcome. Therefore, a multi-dimensional emotional framework developed by Plutchik (2001) was implemented in this study to scrutinize emotions with a further step of investigation.

2.5. The multi-dimension emotional framework

According to the classic study conducted by Ekman (1992) in the discipline of psychology, people's discrete emotions were first

sublimated into six main categories: sadness, fear, disgust, anger, surprise, and happiness. Drawing from Ekman's emotional structure, Plutchik (2001) further demonstrated the eight-dimensional emotional framework, which evaluates people's emotion expression using four opposing pairs: anticipation–surprise, joy–sadness, trust–disgust, and fear–anger.

Being superior to Ekman's theory, Plutchik's emotional framework not only indicated two more emotions in measurement but also readjusted emotions from the positive and negative perspectives. Despite being from a psychological perspective, Plutchik's eight-dimensional emotion framework became dominant and widely adopted in measuring issues in social science, such as marketing (e.g., Lopez et al., 2020; Machleit & Eroglu, 2000), consumer behavior (e.g., Havlena & Holbrook, 1986; Oliver et al., 1997), and the hospitality and tourism industry (e.g., Decrop, 1999; Serrano et al., 2021).

For instance, at the general sentiment level, discussed by Nawijn and Fricke (2015), customers can experience the negative sentiment more intensively compared with the positive aspect. In the hotel industry, the negative sentiment expressed by customers in their online comments would not only decreases the hotel's online rating, but also affects potential customer's future behavior intention such as hotel selecting and WOM (Lai et al., 2021). However, the positive sentiment was regarded as an antecedent determining the customer satisfaction level, which further makes differences on the behavior intention such as visiting and recommendation (Prayag et al., 2015; Serra-Cantallops et al., 2020).

As to the single emotion level, there were many literatures exploring those eight emotions from Plutchik's emotional framework conveyed from customer's online textual review in the tourism and hospitality industry as well. For example, Weismayer et al. (2021) checked the relationship between those eight emotions and customer's experience and self-confidence of the Instagram posts of a tourist destination. What is more, rather than yield at the descriptive statistical analysis of emotions, investigation conducted by Orea-Giner et al. (2022) provided an in-depth understanding of the relationship among every individual emotion and customer's preference on hotel facilities and services. Besides, eight emotions expressed from the customer reviews was also proved making difference on customer's selecting intention and WOM behavior on a certain tourism product (Yan et al., 2018).

Therefore, benefiting from the multi-dimension of Plutchik's emotional framework (two sentiments and eight emotions) and the support of EDT, this study conducted a systematic analysis to determine emotions embedded in passengers' online reviews in the airline industry and further highlighted the effects of passengers' emotions (generated from disconfirmation) on the intention to recommend. Following those discussions, the following hypotheses were proposed:

H1. Positive sentiment expressed in passenger's online review has a positive influence on their intention to recommend.

H1a. Joy expressed in passenger's online review has a positive influence on their intention to recommend.

H1b. Fear expressed in passenger's online review has a positive influence on their intention to recommend.

H1c. Trust expressed in passenger's online review has a positive influence on their intention to recommend.

H1d. Anticipation expressed in passenger's online review has a positive influence on their intention to recommend.

H2. Negative sentiment expressed in passenger's online review has a negative influence on their intention to recommend.

H2a. Sadness expressed in passenger's online review has a negative influence on their intention to recommend.

H2b. Anger expressed in passenger's online review has a negative influence on their intention to recommend.

H2c. Disgust expressed in passenger's online review has a negative influence on their intention to recommend.

H2d. Surprise expressed in passenger's online review has a negative influence on their intention to recommend.

3. Methods

3.1. Data collection

Data was collected from Skytrax (http://www.airlinequality.com/) during October 30–31, 2021. Being superior to other general tourism and travel websites or online platforms such as TripAdvisor or Expedia, Skytrax—with its specialization in the airline industry—not only provided a platform for passengers to share flight experience and opinions for other passengers' references but also ensured a large volume of passenger comments that enabled investigating potential consumer behaviors (Kumar, 2013). Containing comprehensive information about airline attributes, airport attributes, and passenger experience, Skytrax supplied a more intuitive reference for other potential passengers (Messner, 2020). According to the results of the World Airline Awards, the top 100 airlines around the world, such as Qatar Airways, Singapore Airlines, and ANA All Nippon Airways were identified as the sample of the present study. Since this study only concentrated on the online review information after the outbreak of the pandemic (after January 2020), acquisition of 100 airline companies' information can not only well-reflect passengers' choices, but also ensure sufficient volume of reviews for data analysis (Skytrax, 2019). Fig. 2 presents a sample review from the Skytrax website.

Since the present study aimed to analyze the passengers' recommendation behaviors in the post-COVID-19 period, only online passenger reviews posted after January 2020 were considered. With this constraint, 7868 passenger (customer) reviews were retrieved from the original dataset. Following the multi-step data cleaning procedure introduced by Khalid (2020) (i.e., removing empty reviews, punctuations, numbers, symbols, links, and hashtags), 6798 passenger reviews in total were considered in the analysis. Table 4 provides the descriptive analysis of all the variables of interest.

3.2. Dependent variables

Passengers' intention to recommend served as the dependent variable in the study. As mentioned in section 2.2, intention to recommend represents whether the airline and its corresponding experience are recognized by the passenger, and at the same time, it also reveals willingness of a passenger to promote a certain airline when other people compare the product and service available in the marketplace (Tansitpong, 2020). Being distinct from other airline review websites (e.g., TripAdvisor and Expedia), passengers' intention to recommend is one of the unique variables that stands out in the Skytrax platform. With the binary attribute, passengers' intention to recommend was measured by "0" and "1," referring to not recommended and recommended, respectively. The distribution of the dependent variable for the 6798 pieces of online passenger reviews is provided in Fig. 3.

### 3.3. Independent variables

Both sentiments and emotions expressed in the online passenger reviews were taken as the independent variables of interest in the analysis. The sentiments reflected the general positive and negative attitude of a passenger toward a particular airline, while the eight emotional dimensions—including anticipation, trust, anger, fear, surprise, sadness, joy, and disgust—also provided additional insight into the passenger's repressed emotions. Emotions embedded in reviews were analyzed via the software Linguistic Inquiry and Word Count (LIWC) 2015. LIWC, created by Pennebaker (2011), assists in the

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"Delta never fails to impress"

░░░░░ (United States) 13th December 2021

✅ *Trip Verified* | Delta never fails to impress but there were some glitches this time some not due to the airline and some did. Check in in Bogota was fast, too many questions were asked before being able to check in by security. Once provided with a boarding pass there was no line for Delta One customers so it took more than hour and a half standing. Lounges were closed due to covid but also by the time I had made it past security it was already almost time to board the plane. What made this flight memorable was the attention provided by the lead flight attendant which went out of her way to make me feel welcome. Unlike my previous flight also on Delta one as soon as upon entering she walked me to my seat and asked me is she could stow my jacket. A duvet, pillow, Tumi amenity kit, noise canceling phones and big water bottle were waiting on my seat. While taxing dinner orders were taken as well as drink choices and throughout the short 5 hour hop back to New York City many rounds of wine were provided. The meal was a veggie sandwich with hummus, some custard which was amazing, salad and wine. Later on I found out the same was offered on coach so this is where the airline lagged but to their defense meat wasn't allowed on flights by Colombian authorities due to the pandemic. Inflight entertainment was okay small selection on these older aircraft and my seat was comfy enough to sleep on. Bags arrived on time after landing.
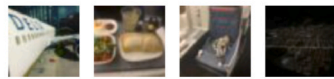
Aircraft	Boeing 767-300ER
Type Of Traveller	Solo Leisure
Seat Type	First Class
Route	Bogota to New York
Date Flown	June 2021
Seat Comfort	⭐⭐⭐⭐☆
Cabin Staff Service	⭐⭐⭐⭐⭐
Food & Beverages	⭐⭐⭐☆☆
Inflight Entertainment	⭐⭐⭐☆☆
Ground Service	⭐⭐⭐⭐⭐
Wifi & Connectivity	⭐⭐⭐☆☆
Value For Money	⭐⭐⭐⭐⭐
Recommended	✔

Fig. 2. Sample online passenger's review in Skytrax.

identification of various cognitive, emotional, and structural components in a variety of textual contexts, such as formal paragraphs, speeches, and online reviews. It attempts to determine the percentage of each word in a given category by comparing it to its own dictionary. It then displays the precise value score for a given measured category, such as the emotion category in the current study (Pennebaker et al., 2015).

However, in order to accurately identify the multi-dimensional emotions with a basis of the Plutchik's emotion theory (2001), this study inset the Word-Emotion Association Lexicon (EmoLex) dictionary to the LIWC for the advanced emotional analysis. As suggested by Mohammad and Turney (2013), with a specialization in analyzing the emotion expressed in complicated sentences, EmoLex can conduct a high standard detection of the eight dimensions of emotions in the sophisticated scenario of online passenger reviews (Hudson & Thal, 2013; Wang et al., 2019). Thus, with an incorporation of the EmoLex, it not only overcame the restriction of the default emotional analysis (only a few emotions), but also lifted the emotional analysis to an advanced level with eight dimensions (Badaro et al., 2018; Clos et al., 2017). And

the sample words from the EmoLex corresponding to each emotional dimension identified by Plutchik (2001) were presented in Table 5.

3.4. Control variables

Eleven control variables were considered from both airline and passenger perspectives. Concerning the airline attributes, the airline's overall rating evaluated by Skytrax was measured from "1" to "10," and several sub-ratings, including food and beverages, flight entertainment, seat comfort, staff service, and value for money, were measured from "1" to "5." The airline Skytrax star indicated the qualified level officially recognized by the platform, ranging from "1" to "5" stars. In addition, the total review number of an airline, representing the popularity level of a certain airline, was also taken into consideration in the analysis.

On the other hand, in terms of passenger attributes, the passenger type (including business, couple leisure, family leisure, and solo leisure) and the seat type (including first class, business class, premium economy class, and economy class) were both divided into four groups and

Table 4
Descriptive analysis of variables.

| Variables	Min	Max	Mean	Mode	Std.
Recommendation	0	1	0.1878	0	0.3906
Food Beverages	1	4	2.4703	3	0.7967
In flight Entertainment	1	4	2.1620	2	0.9286
Seat Comfort	1	4	2.6437	3	0.6071
Staff Service	2	5	2.7588	3	0.7117
Value for Money	1	4	2.6125	3	0.6332
Overall Rating	1	8	4.1320	4	1.5087
Total Review Number	29	4431	1962.2277	1615	1350.4486
Skytrax Star	2	5	3.3877	3	0.6069
Passenger Type	1	4	2.9000	3	1.0262
Seat Type	1	4	3.8521	4	0.5262
Trip Verified	0	1	0.6508	1	0.4767
Positive	0.0000	31.8200	4.6310	4.1400	2.8881
Negative	0.0000	23.3300	3.0070	2.7000	2.1297
Anger	0.0000	12.9000	1.1505	0.8700	1.3149
Anticipation	0.0000	27.5900	2.5439	2.2500	1.9856
Disgust	0.0000	12.9000	0.8570	0.5200	1.1732
Fear	0.0000	23.3300	1.4812	1.2100	1.4905
Joy	0.0000	24.1400	1.6716	1.2000	1.9671
Sadness	0.0000	13.9500	1.6250	1.3700	1.5196
Surprise	0.0000	15.3800	1.0474	0.7900	1.2645
Trust	0.0000	24.2400	3.1352	2.6300	2.5613

*n = 6798.
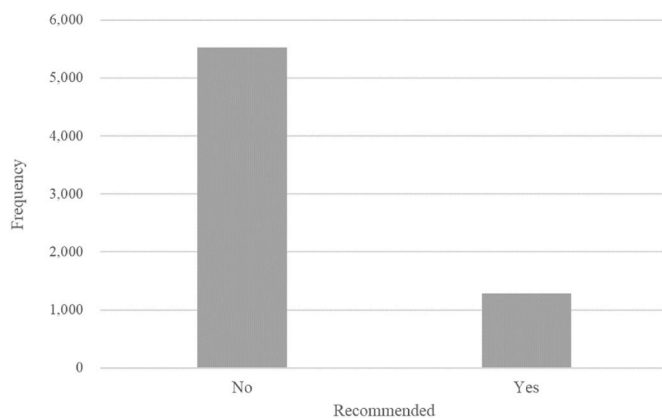
Fig. 3. Distribution of passenger intention to recommend.

Table 5
Eight emotional dimensions and sample words from EmoLex.

Emotional dimensions	Sample words
Anger	annoying, blame, cheat, dispute
Anticipation	attempt, bless, interest, expected
Disgust	abject, depressive, defective, boredom
Fear	afraid, terror, haunt, cautionary, defend
Joy	abundant, optimism, charmed, delicious
Sadness	abortive, deceit, badly, embarrass
Surprise	amaze, detonate, occasional, quickness
Trust	accountable, elegant, believed, cohesive

measured from "1" to "4." Passengers' verified status indicated whether the passenger is a verified user of the Skytrax website, in which "0" and "1" refer to general and verified passengers, respectively.

4. Results

Logistic regression was performed in the present analysis because that the dependent variable of passenger intention to recommend is not only predictable but also has a binary attribute. The results indicated

that the logistic regression model was significant, with log likelihood = −1395.27, χ^2 = 34.60, and p < 0.00. Meanwhile, McFadden's R square indicated that 33.95% of variation of the dependent variables was accounted for by all variables of interest. The logistic regression results are provided in Table 6.

According to the results, the passengers' general positive sentiments (β = 0.1152, p = 0.0000; H1 accepted) indicated a significant positive effect on intention to recommend, while the negative sentiments (β = −0.2298, p = 0.0000; H2 accepted) indicated a negative effect on it. Among the eight emotional dimensions, four had a significant influence on the dependent variable, that is, joy and trust showed positive influences on the intention to recommend while anger and disgust demonstrated negative influences. Specifically, with an increase in the joy (β = 0.4511, p = 0.0000; H1a accepted) and trust (β = 0.0942, p = 0.0018; H1c accepted) emotions expressed in the review content, the passengers' intention to recommend surges. However, with an increase in the anger (β = −0.3971, p = 0.0000; H2b accepted) and disgust (β = −0.2712, p = 0.0007; H2c accepted) emotions expressed in review contents, the passengers' intention to recommend decreases. There is no significant difference of review contents with fear (H1b rejected), anticipation (H1d rejected), sadness (H2a rejected), and surprise (H2d rejected) on the passengers' intention to recommend.

Six control variables were found to have a significant effect in the analysis. Both the food beverages rating (β = 0.4782, p = 0.0106) and seat comfort rating (β = 1.3450, p = 0.0000) revealed positive effects on the passengers' intention to recommend, but the in-flight entertainment rating (β = −0.4891, p = 0.0000) revealed a negative effect. Moreover, the total review number (β = 0.0003, p = 0.0000) had a significantly positive effect on passengers' intention to recommend. Passenger type (β = 0.1103, p = 0.0297) showed a significant difference in the analysis, indicating there are different attitudes toward the intention to recommend among the four types of passengers. Furthermore, different attitudes toward the intention to recommend were shown to exist between verified and unverified passengers (β = −0.3331, p = 0.0016).

5. Discussion and conclusion

The present study mainly investigated passengers' emotions embedded in online passenger reviews in the airline industry. With a

Table 6
Logistic regression analysis results.

Coefficients:	Estimate	Std.	Error	z-value	Pr(>|z|)
(Intercept)	−8.5710	0.6852	−12.5090	0.0000	***
Airline Attributes					
Food Beverages	0.4782	0.1870	2.5560	0.0106	**
In flight Entertainment	−0.4891	0.1029	−4.7520	0.0000	***
Seat Comfort	1.3450	0.2603	5.1690	0.0000	***
Staff Service	−0.1770	0.2073	−0.8540	0.3932	
Value for Money	0.2044	0.2007	1.0180	0.3086	
Overall Rating	0.1563	0.1085	1.4400	0.1498	
Total Review Number	0.0003	0.0001	5.1620	0.0000	***
Skytrax Star	0.2009	0.1246	1.6120	0.1070	
Passenger Attributes					
Passenger Type	0.1103	0.0507	2.1740	0.0297	**
Seat Type	0.0022	0.0878	0.0260	0.9796	
Trip Verified	−0.3331	0.1055	−3.1590	0.0016	***
Emotions					
Positive	0.1152	0.0255	4.5100	0.0000	***
Negative	−0.2298	0.0437	−5.2650	0.0000	***
Anger	−0.3971	0.0650	−6.1080	0.0000	***
Anticipation	−0.0463	0.0329	−1.4050	0.1602	
Disgust	−0.2712	0.0796	−3.4090	0.0007	***
Fear	−0.0186	0.0465	−0.3990	0.6895	
Joy	0.4511	0.0463	9.7450	0.0000	***
Sadness	0.0980	0.0561	1.7470	0.0806	
Surprise	−0.0442	0.0516	−0.8560	0.3917	
Trust	0.0942	0.0302	3.1220	0.0018	***

***P < 0.01, **P < 0.05.

series of text mining methods, passenger's emotions expressed in their textual review content were detected and analyzed. Moreover, two sentiments and eight emotional dimensions proposed in Plutchik's emotional framework were transformed to measurable score values.

As widely discussed in the literature, besides the contextual attributes of businesses, emotion is an essential factor that can make a difference in passengers' recommendation intention (e.g., Prayag et al., 2015; Su & Hsu, 2013; Wang et al., 2018). Therefore, according to the logistic regression results of this study, both sentiments have significant effects on passengers' recommendation intentions, where positive sentiment shows positive effects, while negative sentiment demonstrates negative effects on it. Positive emotion, as demonstrated in several works of research, can positively contribute to passenger satisfaction, especially in the hospitality and tourism industry (e.g., Hennig-Thurau et al., 2006; Wu & Shen, 2013). In previous consumer behavior research, passenger satisfaction, specifically emotional satisfaction, has been identified to have a significant relationship with passenger recommendation (Ladhari et al., 2011; Prayag et al., 2015). Therefore, it is not surprising that the findings regarding the two sentiments are in line with previous research in the hospitality and tourism contexts.

Special attention should be paid to the four out of eight emotions identified from Plutchik's emotional framework—anger, disgust, joy, and trust—which have significant effects on passengers' intention to recommend as well. The general results of the sub-categories of emotions reinforce the idea of Martin et al. (2018) that emotion is regarded as a social constructionist school of thought. The school of thought not only guides the passenger in appraising social situations (e.g., travel experience) but also makes some responses to them (e.g., recommendation, word of mouth).

Anger, as an appraisal agent, arises from the wrongdoing of other people (Harth et al., 2013). Referring to the regression results, anger has a strongly negative impact on passengers' intention to recommend, and this is consistent with the viewpoint that anger leads to confrontation and is directed to punishment behavior, such as not recommending those who are responsible for it (Harth et al., 2011, 2013).

Indicated by the survey of Vredenburgh et al. (2015), more than one-third of passengers have the potential to become angry with irritants found when flying, in which consideration of the space (seat size and pitch) is the most influential factor. Anger often acts as the trigger that leads to some aggressive reactions as prototypical or innate action impulse (Laux & Weber, 1991; Leach et al., 2006). That is, if anger exists during the experience, passengers are likelier to do something, such as not recommending or criticize as a reaction. This also explains why there are a greater number of passengers presented not recommending the airlines than those recommending, as shown in Fig. 3.

Disgust is widely accepted as a negative, high-arousal emotion reflecting repulsion, rejection, or offense in response to noxious stimuli (Rubenking, 2019). As discussed in previous literature, passengers with disgust would have a strong avoidance behavioral intention in general business as well as in the hospitality industry (Davis et al., 2017; Guido et al., 2018). During a flying experience, several factors such as hygiene consideration (e.g., Kahan & Hilgard, 2016) and service quality (e.g., Awa et al., 2021) can give rise to passengers' disgust emotions. Also consistent with the results of this study, passengers who express more disgust emotions are less likely to have recommendation intentions.

As discussed in the literature previously, joy is associated with positive outcomes in the realization of one's goals (Prayag et al., 2017). After realizing the positive outcome, the "delighted" group of passengers expresses a higher level of joy (Oliver & Westbrook, 1993), and this feeling of joy is highly relevant to the passenger experience (Hosany & Prayag, 2013). The results of the present analysis also reinforce this point of view that passengers' joy can have positive effects on recommendation intentions. It is consistent with Prayag et al.'s (2013) work stating that joy directly influences tourists' behavioral intention. Furthermore, referring to the hospitality satisfaction index model proposed by Deng et al. (2013), customer's consumption emotion is certified to have positive influences on the overall satisfaction, which can further affect the potential intention, such as recommending and revisiting (Deng et al., 2013).

From the traditional marketing viewpoint, trust is the key to maintaining a continuous positive relationship between a business and passengers (Anderson & Weitz, 1989). Feelings of trust can serve as a mechanism for reducing or mitigating uncertainty during purchasing activities (Chiu et al., 2012). In hospitality studies, passenger loyalty, both attitudinal and behavioral, results from a passenger's perception of trust and service quality (DeWitt et al., 2008), and the positive relationship between passengers' perceived trust and their emotional responses were widely verified in previous study. That is, passengers' emotions induced by trust can further affect their behavior intention, such as using, purchasing, and recommending (Chiu et al., 2012; Habib & Qayyum, 2018; Shin et al., 2013). In this study, trust was identified having a positive influence on the passenger's intention to recommend, which is consistent with Ashraf et al.'s (2020) study. Furthermore, the emotion of joy, as indicated by Faizabadi et al. (2018), normally has a strong correlation with the formation of trust emotions among people. Therefore, consistent with previous studies, the emotion of joy can also positively affect behavioral intentions, such as purchasing and recommending.

What is more, it is also worthy to make further efforts on understanding the control variables explored in this study. As to the airline attributes, it was not surprising that both food and beverage rating and seat comfort rating showed significant positive effects on passenger's intention to recommend, because a higher quality of food and beverage and a greater level of seat comfort are widely recognized as factors positively contributing to customers' perceptions of service quality in the hospitality and service industry (Berliansyah & Suroso, 2018), and this result was consisted with Ban and Kim (2019)'s discussion on airline passengers' satisfaction and recommendation.

Besides, results of this study also indicated a negative impact of the in-flight entertainment service on the passengers' recommendation intention. In-flight entertainment such as game, movie, and TV were traditionally regarded as augmented service to the passenger's traveling experience (Siering et al., 2018). However, Liu (2007) suggested that nowadays, rather than only having the antiquated entertainment facilities on the airplane, enabling the upgraded technologies and providing context-adaptive system for passengers with personalized entertainment services can be more than effectively help release both physical and psychological negative stress on a flight. Moreover, the recent research suggested that in-flight entertainment was once a novel idea that kept passengers enthralled, but either outdated system or serious germ hazard, especially existing during the COVID-19 epidemic, made passenger prohibitive and keep them away from the in-flight entertainment (Smith, 2020).

As to the passenger attribute, firstly, passenger type showed significant influence on passenger's intention to recommend. As discussed in section 3.4., business, couple leisure, family leisure, and solo leisure were main types of passengers, and the results indicated that significant differences of the behavioral intention are identified among those types of passengers. This situation can be well explained by the expectancy-disconfirmation theory (EDT) as well, since different types of passengers have different needs, wants, and expectations (on the airline attributes) (Van Ryzin, 2013). Therefore, when they are going to have the post behavior intention like evaluating and recommending, distinct criteria can be applied according to their individual status. As discussed by Chatterjee and Mandal (2020), the major travel goal between leisure and business passengers were dissimilar, and business passengers were prone to give neither a higher rating nor a recommendation than leisure passengers.

6. Implications

6.1. Academic implications

In terms of academic implications, the current study makes significant contributions to the expectancy-disconfirmation theory (EDT). Although EDT has been applied to various areas, notably e-business, tourism, and hospitality (e.g., Bello & Bello, 2017; Jha & Shah, 2021; Mazumder & Hasan, 2014), it has rarely been applied to the airline industry. The present study is revolutionary and significantly expands the application of EDT to a new field. Moreover, in comparison to the original EDT and other extended models, the present study uniquely incorporates the emotional variables of interest into the EDT and then evaluates the influence of emotional components on passengers' recommendation intention. The incorporation of emotions results in a potential shift in future studies on online reviews.

In addition, the present study contributes to the research on passengers' behavior intention, especially in terms of the intention to recommend. The intention to recommend should be a critical and popular research topic. However, due to the objectiveness of the data source, the Skytrax platform is the only channel that facilitates airline studies to investigate the intention to recommend with passengers' objective comments. The analysis results expand the literature related to the intention to recommend with the consideration of emotional variables and even enriched big data studies in the airline industry. Moreover, air transport and tourism are inextricably linked to each other (Papatheodorou, 2021). Airlines is an essential form of transportation to many travel sites, especially for international trips (Bieger & Wittmer, 2006). As the passenger experience have extended to before, during and after the trip (Carreira et al., 2014), this study also provides a new angle for deconstructing tourist experience. Furthermore, this study contributes to passenger emotion analysis and the theory of Plutchik's emotional framework as well. Although Plutchik's emotional framework has been applied to many fields, it has not been applied to the airline industry. Therefore, the study can be regarded as a pioneering work that innovatively extends from the traditional two basic sentiments to eight emotional dimensions in the airline study. Meanwhile, it significantly adds to the academic implications for both studies on passenger emotion and Plutchik's emotional framework.

Finally, the study provides a new perspective to explore airline passenger's emotions. Although previous studies have applied various methods to study online reviews, including online questionnaires, field studies, and option mining (Ismail & Hussin, 2016; Jiang & Zhang, 2016; Wen & Chi, 2013), very few have revealed the influences of the latent (eight) emotional dimensions expressed by passengers. However, the big data techniques employed in this study objectively provide a new perspective for studying passengers' sentiment by their reviews in the airline industry.

6.2. Practical implications

The present study has five practical implications. First, the study supports airline marketers in better understanding the emotions and behaviors of passengers, which is conducive to brand management and loyalty management, especially for those businesses recovering from the COVID-19 pandemic. In comparison with pre-Covid-19 travel, passengers may be more cautious about the perceived risks such as health, policy, monetary factors, and others. Moreover, due to the outbreak of COVID-19, negative emotions, such as anxiety, anger, and loss, increased due to unexpected situations, such as involuntary unemployment (Restubog et al., 2020). These passengers show a greater sensitivity to their trips. Their different negative emotions, such as anger and disgust, will have different impacts on recommendation intentions. For hospitality practitioners, a review miner algorithm based on the current model could be customized to better understand the special need of customers during this extraordinary time.

Currently, severe disruption of the tourism industry has been caused by the COVID-19 pandemic, even though the pandemic abates and travel restrictions are eased (Miao et al., 2022). Distinct from the needs for high level of service such as staff service and entertainment, passengers remain in need for the basic services offered during the flight, like food and seat comfort. This may result from the fear of getting infected by others amid the pandemics (Chung et al., 2021). Despite some of the countries moving into the post pandemic era, coronavirus continues spreading around the world, which make passengers cautious. Thus, hygiene and health-related actions are still worthy of attention for hospitality business, the service industry and airline industry practitioners.

In addition to attributes such value for money and airline stars that have been explored in previous studies, the results of the present analysis demonstrated the influence of emotions on passengers' propensity to suggest. This is extremely beneficial for marketers to understand the emotional principles of airline passengers and motivations while rating and providing recommendations.

Furthermore, the variables explored from both airline and passenger perspectives (e.g., food and beverage, seat comfort, in-flight entertainment) are also indicated having a significant relationship with passengers' intention to recommend. These results not only bring into correspondence with previous studies, but also validated the effectiveness of those factors during the COVID-19 pandemic. The outcome of the present study can have far-reaching implications for the hospitality business and service industry and inspire airline industry practitioners to make targeted corrections to maximize appeal for passenger.

In addition, the study provides innovative interactive ideas to other online platforms (e.g., Amazon and Yelp). Although the traditional star rating system is widely adopted in a variety of online platforms (Sezgen et al., 2019), the independent recommendation system panel can also reflect the passengers' attitude directly and provide more direct references for other passengers. In addition, the findings of the study show the relative relationship between emotions embedded in reviews and recommendation attitudes. Therefore, online platforms can show the result of recommendation trends after analyzing the review text to provide a reliable reference for others.

7. Limitations and future study

This study has several limitations. First, from the perspective of the timeliness of data, COVID-19 continues to evolving, and this evolution will undoubtedly result in changes in the preference of passengers for the airline industry. However, for an extended amount of time in the future, the findings of this research will retain their value as references. In the future, data can be updated periodically for real-time study results. Second, from the perspective of data resources, this research primarily collected online reviews from Skytrax. Relying on a single data source necessarily compromises the data's fairness and veracity. Future studies can attempt to incorporate multiple data sources or even involve mixed-method research, in which content crawlers on online travel platforms, on-site questionnaire surveys, or a combination of the two, can be used to ensure more accurate and objective results. Third, due to the limitations of data sources, the study discusses only a set of control variables (e.g., food and beverages and staff service). Future research can examine additional variables, such as the quality of VIP lounge service, the safety of checked baggage, and other relevant variables prior to or after the flight. Alternatively, investigations, on the other hand, also can employ methods such as topic modeling algorithms to mine variables from textual reviews (Hong & Davison, 2010). Finally, the study focused on determining the relationship between emotions and passenger's intention to recommend, but did not go deeply to examine effects of those control variables (e.g., food and beverages, in-flight entertainment, comfort level of seat, and total review number) on generating sentiments and emotions. Future research can focus on the antecedents of emotions in order to gain a more comprehensive

understanding by using aspect sentiment analysis (Thet et al., 2010). Meanwhile, it would be worthwhile to investigate the mechanism by which airline passengers' emotions are formed, differing from general tourism services. And a potential method for analysis could be latent aspect rating analysis (Luo et al., 2020).

Impact statement

Online reviews and recommendation sharing have long been a common practice for airline passengers. During the COVID-19 period, the online content shared by travelers is crucial for reviving the airline industry and enhancing passengers' experience. By exploring how the emotions expressed by passengers in reviews affect their recommendation intentions, this study provides a venue for airlines and airports to gain a detailed understanding of passenger emotions and behaviors (up to eight types of emotions). Meanwhile, this study reminds the importance of service quality and passenger satisfaction management. In addition, customized modifications and improvements can be made by airport and airline operators from multiple aspects of passenger service based on the result for maximizing appeal for passengers. Besides, diverse innovative ideas (e.g., independent recommendation system panel) for interactions with audiences are provided, which are also applicable to other online platforms (e.g., TripAdvisor, Amazon) in different industries.

Declaration of competing interest

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

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Xi Wang, Ph.D., is an assistant professor of culture, creativity and management at BNU-HKBU United International College. His areas of research are consumer behavior, big data analysis and tourism management. He has developed and published numbers of academic papers in top-tier journals, professional conferences, and international projects, and was invited as ad-hoc reviewer for several journals.

Jie Zheng is a Ph.D. student of Hospitality Management at Iowa State University. His research areas are consumer behavior, big data analysis and hospitality management. He has developed and published several papers in journals and professional conferences.

Liang (Rebecca) Tang, Ph.D., is an associate professor of Apparel, Events, and Hospitality Management at Iowa State University. Her primary research interest is tourism marketing and destination planning. She has produced over 170 journal papers, book chapters, conference papers, and technical reports. Many of her research papers have been accepted by top tourism and hospitality journals such as Tourism Management, Journal of Travel Research, International Journal of Hospitality Management, Journal of Hospitality & Tourism Research, etc.
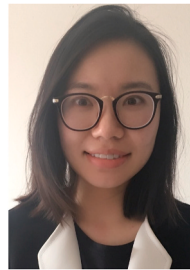
Yi Luo, Ph.D., is an associate professor in College of Business Administration at the Capital University of Economics and Business, China. Her research interests include consumer behavior, social media marketing, big data, and nature language processing.