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## **The effects of tourism information quality on customer e-loyalty with online travel brands in Thailand: The mediation role of satisfaction in tourism**

Thadathibesra Phuthong

Faculty of Management Science, Silpakorn University, Petchaburi, Thailand

Corresponding author: thadathibesra@gmail.com

### **Abstract**

This study aims to deepen the current understanding of tourism information quality by using the Delone and McLean IS success model and Technology Acceptance Model (TAM). The purpose of this paper is to examine the antecedents of e-customer satisfaction and its consequences on customer e-loyalty in the specific context of online travel brands in Thailand. The tool, which is questionnaire, is developed by reviewing the literature and test the reliability by coefficient alpha. The questionnaire was distributed to 272 samples that have experience of using online travel agency websites by convenience sampling. Partial least squares structural equation modeling (PLS-SEM) was used to test the hypotheses in the research model using SmartPLS 3.0.

Findings indicate that there is a significant relationship between perceived ease of use and perceived usefulness and perceived usefulness, information quality and e-customer satisfaction. This positive value will affect favorably customers' e-loyalty. Moreover, the results also confirm that e-customer satisfaction partially mediate the relationship between perceived usefulness, information quality and customer e-loyalty. This study offers importance theoretical contributions, as it provides valuable information to researchers in developing and testing related theories. In addition, the study brings clear practical implications to hotel and tourism operators, online travel agencies, and hospitality technology vendors in developing effective tourism information quality and website quality to increase the customer e-loyalty of online travel brands users in Thailand.

**Keywords:** tourism information quality, customer e-loyalty, online travel brands

### **Introduction**

In the digital era, where information technology plays an essential role in people's travel planning, Thai travelers search for information and expedite related transactions, such as hotel booking, and share their travel experiences via social media platforms, i.e., Facebook, Instagram, Line, blogging or online applications that the operators create to give customers easy access via smartphone. (Kasikorn Research Center, 2017). This means that, nowadays, to use the internet as a source of information and communication is almost as usual-or even more-as using those sources that, less than two decades ago, were the only ones available: reading books or magazines or making phone calls. This new vehicle for communication and transactions has introduced significant changes in our daily lives, creating new opportunities and challenges in a world that is constantly and rapidly changing, as well as for the companies which operate in it.

The development of information technologies (IT) and the Internet offers firms new avenues to achieve competitive advantages and to improve performance through innovative ways to communicate, promote, and to distribute their products and services. This innovation contributes to the development of internet-based businesses such as the tourism industry and in particular its travel agency sector (e.g., Buhalis & Law, 2008; Kim, Chung, & Lee, 2011). Increasingly, travel agencies use online channels that enable travelers to access a wide variety of tourist services in easier, more convenient, cheaper, and customized manners that increase the perceived value of the offer and thus the online purchase (Wang & Wang, 2010). The new IT and Internet tools facilitate the interactivity between the travel agencies and their clients and also between the clients themselves. The latter interaction allows clients to better know the tourist experience. With this information, agencies can improve their service quality and thereby improve customer satisfaction and the willingness to repeat the purchase, which thus facilitates the strengthening of the customer relationships (Buhalis & Law, 2008).

The primary motivation for tourism providers to ensure customer satisfaction is the assumption that such efforts will lead to a higher level of repurchase intention, repeat attendance behavior, and customer loyalty (Yoon and Uysal, 2005; Oliver and Burke, 1999). High customer satisfaction has been linked to customer retention, market share, loyalty, and consequently higher company profits (Szymanski and Hise, 2000, Tarasi et al., 2013). Customer satisfaction and loyalty have become one of the main objectives in all areas of business, especially in tourism due to the higher level of expectations regarding the experience, more than in other industries like banking or other financial sectors, where customers are looking for more functional advantages (Aminu, 2012). One of the most difficult problems is learning how to obtain either satisfaction or loyalty, which involves identifying customers' needs and desires, and transferring them to the product or service specifications offered.

The importance of understanding what drives customer loyalty within the Internet ecosystem, in particular regarding the purchase of tourist products, creates the need for thorough research on this topic. Despite previous studies, there is still a clear gap in the literature regarding the identification and assessment of antecedents influencing customer e-loyalty in tourism and, more specifically, regarding e-travel agencies, from the customer point of view and taking customer profile into consideration. There have been a few studies looking at the tourism industry but, mainly concerning traditional products like hotels, restaurants, theme parks, airline business, particularly variables regarding service quality, among others. For example, Bowen and Chen (2001), developed and implemented a method to identify attributes that will increase customer loyalty, but particularly in the hotel industry. Also addressing the hospitality industry, Kandampully and Suhartanto (2000) hypothesized how image and satisfaction can improve loyalty, which is particularly interesting in the hospitality management field, and concluded that these two constructs, supported by resource determinants as housekeeping, reception, F&B and price are positive related with loyalty in the hotel industry. In other context, Ho and Lee (2007) developed a study in order to predict the capability to guarantee satisfaction and loyalty intention but only using an independent variable, e-travel service quality (assuming a full concept approach where information quality, security, website functionality and responsiveness are included). Huang (2008) identified determinants of e-loyalty in a different context than ours, a B2B context (the one related with wholesaler and retailer travel agencies).

Moreover, other researchers have presented different models of customer loyalty. The review of these articles shows that diversity, if not divergence, exists regarding the measurement and conceptualization of online loyalty. Toufaily et al. (2013) developed a descriptive meta-analysis of the empirical literature among the determinants of e-loyalty. They concluded that a single study can analyze more than one relationship; however, no studies were found to simultaneously link technology acceptance, such as perceived ease of use and/or perceived usefulness, with website characteristics, such as system quality and information quality. A complementary perspective is the one presented by Yi et al. (2006), who reinforced that a model explaining antecedents of loyalty in an industry has to incorporate factors which take into account the characteristics of that specific industry (in that case, the banking industry).

Therefore, typically a model trying to explain antecedents of e-loyalty in the online context has to incorporate factors that take into account the characteristics of the industry being studied as well as those of the medium. In this study we believed it is also important to incorporate some of the customer personal/psychological characteristics when interacting with the industry, tourism, in this medium, online. Thus, the current paper addresses for the first time the study of a set of four tourism information quality-perceived ease of use (PEOU), perceived usefulness (PU), system quality (SQ), and information quality (IQ) and their impact on customer e-loyalty-from the tourism e-customer perspective, mediated by satisfaction, another critical relationship marketing construct most of the times seen as an independent variable and not as a link to join specific e-relationship determinants to loyalty.

Moreover, not only does e-commerce have its own determinants and defining elements, but also these elements change regarding the specific product category we are considering. Tourism, in this case, is directly associated with individual taste, preferences and lifestyle and, therefore, represents a bigger challenge for online vendors, when satisfying their customer needs. To accomplish the research aims, a questionnaire was applied to regular online travel brands customers in Thailand, and a sample of 272 individuals was analyzed.

The research hypotheses were tested and the proposed model was validated using Structural Equation Modeling. The research offers theoretical contributions and expands the understanding of consumer e-loyalty. Moreover, practical insights are given to the online tourism providers..

### **Research objectives**

To investigate the impact of tourism information quality on customer e-loyalty and the mediating effect of e-customer satisfaction within the context of online travel brands in Thailand.

## **Literature review and hypotheses development**

### **Relationship between perceived ease of use, perceived usefulness and e-customer satisfaction**

Perceived ease of use has been defined as “the degree to which a person believes that using a particular system would be free of effort” Davis (1989). In the current study, perceived ease of use is defined as the extent to which the online travel customer believes that participating in online travel community will be free from effort. According to TAM, perceived ease of use, perceived usefulness, e-customer satisfaction and customer e-loyalty have been theorized to be the prime influencers for usage and acceptance attitude (Agag and El-Masry, 2016; Akman and Mishra, 2015; Hsu and Lin, 2008; Lai et al., 2010; Lim et al., 2008).

Research has supported the positive and significant relationship between perceived ease of use and e-customer satisfaction online shopping (e.g. Agag and El-Masry, 2016; Ayeh, 2015; Morosan and Jeong, 2008; Zhu and Chan, 2014). TAM implies that, other things being equal, an online shopping web site perceived to be easier to use is more likely to induce perception of usefulness. Davis et al. (1989) argued that improvements in ease of use may also be instrumental, contributing to increased performance. To the extent that increased perceived ease of use leads to improved performance, perceived ease of use would have a direct effect on perceived usefulness (Venkatesh and Davis, 2000). Also, it is generally believed that a system will be regarded as more useful if it is easy to use. For example, studies by Morosan (2012), Kim et al. (2008), Kim et al. (2008), Ayeh (2015) and Agag and El-Masry (2016) among others, offer strong empirical support for a positive relationship between perceived usefulness and perceived ease of use. Therefore, participation in online travel community will be more useful if it easy to use.

Also, Davis (1989) conceptualized perceived usefulness as “the degree to which a person believes that using a particular system would enhance his or her job performance”. In our study, perceived usefulness refers to the extent to which the consumer believes that participating in an online travel community improves his/her travel planning. Previous studies support the positive and significant relationship between perceived usefulness and e-customer satisfaction e.g. (Agag and El-Masry, 2016; Ayeh et al., 2013; Joo and Sang, 2013; Persico et al., 2014; Workman, 2014).

*H1: Perceived ease of use has positively effect on perceived usefulness.*

*H2: Perceived ease of use has positively effect on e-customer satisfaction.*

*H3: Perceived usefulness has positively effect on e-customer satisfaction.*

### **Relationship between system quality, information quality and e-customer satisfaction**

Regarding the updated DeLone and McLean IS success model, many researches employed information quality, system quality, or service quality dimension to investigate the consumers' e-commerce behavior (Brown and Jayakody, 2008; Kuan et al., 2008; Lee and Kozar, 2006; Lin and Lee, 2006 and Lin, 2007). Lin (2007) identified web site quality dimension, including information quality, system quality, and service quality and emphasized that system quality, information quality, and service quality are important factors influencing e-customer satisfaction.

In sum, according to the previous literature, information quality and system quality are important independent variables of information system usage and user satisfaction. These two factors have been applied in many contexts. Therefore, this study proposes:

*H4: System quality has positively effect on customer satisfaction.*

*H5: Information quality has positively effect on customer satisfaction.*

### **Relationship between perceived usefulness, system quality, information quality, e-customer satisfaction and customer e-loyalty**

Past studies have shown that perceived usefulness influenced attitude and e-purchasing intention (Chiu et al., 2009; Monsuwé et al., 2004). The findings showed that perceived usefulness impacts customer loyalty of e-shopping (Shih, 2004). This is congruent with the finding of Ha and Stoel (2009). Positive attitude towards a web site's usefulness contributed to customers' purchase intentions (Verhagen and Van Dolen, 2007). Furthermore, a survey study highlighted that perceived usefulness positively impacted upon consumers' attitudes towards e-retailing in Hong Kong (Liao and Shi, 2009) and intentions to use e-service (Roca et al., 2009). Therefore, the researcher hypothesizes that:

*H6: Perceived usefulness has positively effect on customer e-loyalty.*

On the Internet, the online retailer is 'faceless'. Hence, the website itself is a representation of the retailer with the website's interface serving as the online storefront upon which first impressions are formed. Consumers are known to be fickle in their online allegiances and loyalties, thus, the probability of that website being able to continue to attract the same group of consumers if its interface is unsatisfactory is remote indeed (Heba, 2007). Should consumers perceive the website's interface to be of high quality, they will more likely develop high trust beliefs towards the website that lead to a willingness to return to the website for subsequent visits. Some studies have identified system design quality and interactivity between the customer and online marketer as leading to a website's success (Liu and Arnett, 2000). Similarly, this study expected that an increase in system quality would increase e-customer satisfaction and customer e-loyalty levels in the context of online travel website brands. Hence, the following hypothesis is proposed:

*H7: System quality has positively effect on customer e-loyalty.*

Information quality is likely to help customers compare products, make informed purchases and enhance transaction security (Liu and Arnett, 2000; Park and Kim, 2003). The informational components present in the website must succeed in projecting a sense of trustworthiness in the site. Cyr (2008) has empirically proven that information design generates retain customers of the online portals. This is because the gist of the website represents the source of the information which comprises of companies, organizations, service providers etc. advocating their products, ideas or propositions. In addition, customer

relationship aspects specifically the company's competence, security, privacy, financial and legal concerns would also be typically incorporated into the website, along with seals of approval or third-party certificates (Cheskin Studio and Archetype/Sapient, 1999; Nielsen, 2000; Shneiderman, 2000; Egger, 2001). This study expected that improved information quality would lead to high levels of online travel website loyalty. Thus, the following hypothesis is proposed

*H8: Information quality has positively effect on customer e-loyalty.*

Customer satisfaction over a particular app refers to a positive navigational experience and a well-designed app. Satisfaction describes the essential ingredient for a business success. To be able to build and maintain trust and loyalty, online vendors should focus on e-service quality (Pereira et al., 2016; Yoon and Uysal, 2005). Customer loyalty is the ultimate goal for all electronic marketplace. The company will do its best to retain existing customers. Along with the technology development over time, customer e-loyalty has always been an interesting topic to research. Nonetheless, technology is not the only cause of the emergence of customer e-loyalty. Another reason is that the best customers' experience that have been consistently given by the company. It has something to do with the nature of loyalty which is a long-term process of satisfaction (Pereira et al., 2016; Srinivasan, 2002; Trif, 2013 and Yoon and Uysal, 2005). Based on the explanation above, this research proposes:

*H9: e-Customer satisfaction has positively effect on customer e-loyalty*

### **Mediating role of e-customer satisfaction on e-customer loyalty**

Satisfaction has played a mediating role between a number of antecedents (such as perceived ease of use, online perceived usefulness, system quality, information quality) and customer loyalty. Satisfaction with travel experiences contributes to destination loyalty. Yoon and Uysal (2005) studied tourist motivation and extended the theoretical and empirical evidence on the causal relationships among the push and pull motivations, satisfaction and destination loyalty. Johnson and Auh (1998) extended the conceptualization of the satisfaction-loyalty relationship to encompass a trust environment. Martenson (2007) studied the impact of the corporate store image on customer satisfaction and store loyalty in grocery retailing and found that satisfied customers are loyal to the store. In another study, Bloemer et al. (1998) investigated how image, perceived service quality and satisfaction determine loyalty in a retail bank setting. Image was indirectly related to bank loyalty via perceived quality. In turn, service quality was both directly and indirectly related to bank loyalty via satisfaction. The latter had a direct effect on bank loyalty. Chi and Qu (2008) sought to understand destination loyalty by examining the theoretical and empirical evidence on the causal relationships among destination image, overall satisfaction, and destination loyalty. The results supported the proposed destination loyalty model: destination image was a direct antecedent of overall satisfaction, and satisfaction in turn had direct and positive impact on destination loyalty. Lai et al. (2009) examined the relations among service quality, value, image, satisfaction and loyalty in China. Their research findings revealed that image influence satisfaction and customer satisfaction is a significant determinant of loyalty. Also, Abdullah et al. (2000) studied the role that both image of a product or service and customer satisfaction play in determining whether a customer becomes (or remains) a loyal patron. Hernandez-Lobato et al. (2006) analyzed the causal relationships among three key variables in tourism marketing: image, satisfaction and loyalty. Their study confirmed the strong relationship among the cognitive image service quality, satisfaction and loyalty-related with website knowledge. Flavián et al. (2006) conducted a study to determine the influence that perceived usability-perceived as website knowledge-has on the user's loyalty to the websites they visit. Greater usability was found to have a positive influence on user's satisfaction, and this also generated greater website loyalty. Khalifa and Liu (2007) developed the information systems continuance model in the context on online shopping, using a contingency theory that accounts for the roles of online shopping habit and online shopping experience. They formed online shopping habit as mediated through satisfaction on repurchase intention. The literature review has thus led to the creation of the following two hypotheses:

*H10: e-Customer satisfaction moderates the relationship between perceived ease of use and customer e-loyalty.*

*H11: e-Customer satisfaction moderates the relationship between perceived usefulness and customer e-loyalty.*

*H12: e-Customer satisfaction moderates the relationship between system quality and customer e-loyalty.*

*H13: e-Customer satisfaction moderates the relationship between information quality and customer e-loyalty.*

### **Conceptual framework**

This empirical analytical study, using the Partial Least Squares Structural Equation Modeling (PLS-SEM), In Figure 1, the conceptual framework was demonstrated based on the above literature reviews. The relationships among the constructs both direct and indirect (mediating) are shown in this figure that will be proven by hypotheses testing.



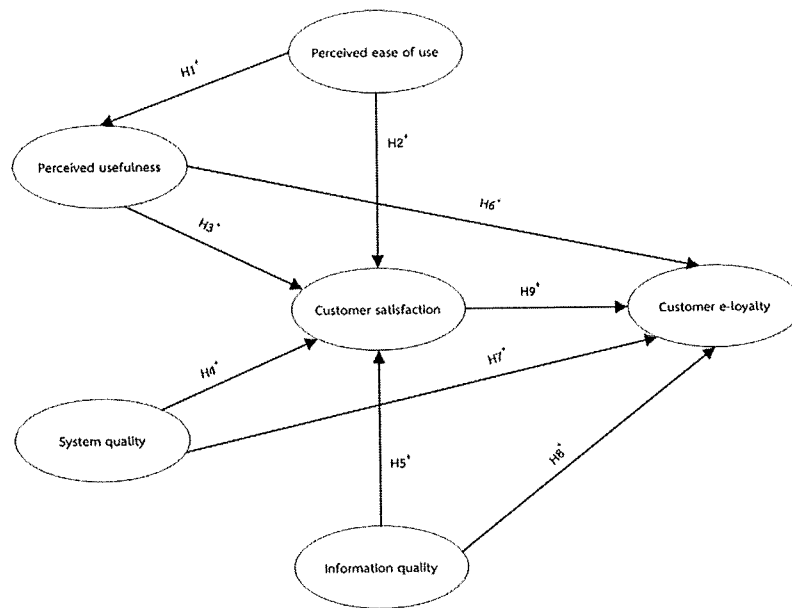


Figure.1 Conceptual Framework

**Hypotheses**

According to conceptual framework above, we are summarize the hypotheses as shown in Table.1

Table.1 Hypotheses

Hypotheses	Description
H1	Perceived ease of use has positively effect on perceived usefulness
H2	Perceived ease of use has positively effect on e-customer satisfaction
H3	Perceived usefulness has positively effect on e-customer satisfaction
H4	System quality has positively effect on customer satisfaction
H5	Information quality has positively effect on customer satisfaction
H6	Perceived usefulness has positively effect on customer e-loyalty
H7	System quality has positively effect on customer e-loyalty
H8	Information quality has positively effect on customer e-loyalty
H9	e-Customer satisfaction has positively effect on customer e-loyalty
H10	e-Customer satisfaction moderates the relationship between perceived ease of use and customer e-loyalty.
H11	e-Customer satisfaction moderates the relationship between perceived usefulness and customer e-loyalty.
H12	e-Customer satisfaction moderates the relationship between system quality and customer e-loyalty.
H13	e-Customer satisfaction moderates the relationship between information quality and customer e-loyalty.

**Research method**

This research is a quantitative research conducted by distributing a questionnaire to the sample and conducted the pilot test for improving the quality of questionnaire. Partial Least Squares-Structural Equation Modeling (PLS-SEM) was used to testing hypotheses because the model is nearly complexity. The real objective of this study is to determine the result, not testing or comparing the theory which technique to apply. Moreover, found that Structural equation modeling (SEM) has been widely used to examine complex research models in marketing, information system and strategic management (Sarstedt et al., 2017).

**Population**

The population in this research is tourism web users that have experience of using online travel agencies website in Thailand.

### **Samples**

This research uses the Partial Least Squares Structural Equation Modeling for hypotheses testing. It is suggested a 5:1 to 10:1 subject-to-index ratio as a rule of thumb can be used structural equation modeling (Hair et al., 2010). As the study had 24 items, a 10:5 ratio was to determine the sample size of 240 and the past of research suggested that the suitable sample size for the Partial Least Squares Structural Equation Modeling (PLS-SEM) should be 100-200 samples (Ringle et al., 2015; Hair et al. 2011; Sarstedt et al., 2017). So that this research uses the sample size higher than 240 which convenience sampling.

### **Instrumentation**

Instrumentation used in this research is a questionnaire type to compile all data 2 main parts which is part 1) general information questions. Part 2) the effects of tourism information quality on customer e-loyalty with online travel brands, resulting in a total of 24 items. A 5-point Likert scale divided the responses from 5 ("strongly agree") to 1 ("strongly disagree").

### **Instrument quality test**

To ensure the questions are covering all variables and content of studying. The questionnaire quality has been checked following details below:

1) To find Validate data by presenting this research content to 3 professionals in order to get Index of Consistency data. This method called Content Validity which means after checking process, the questionnaire will be considered as highly valid when the IOC rate is not lower than 0.5 is considered valid.

2) To find Reliability data by presenting the revised of questionnaire to 40 trial people who are on the similar conditions of real online travel agencies site users (Pilot Test). The study made use of Cronbach's alpha to evaluate the initial questionnaire samples which used 5-point Likert rating scale and the result should be more than 0.7 to prove as highly valid (Hair et al., 2010).

### **Data collection**

The survey used for the empirical study was performed from the period of May, 2017 to June, 2017, on Thais who had experience using online travel agencies site. The survey was carried out with convenience sampling method at Bangkok, Thailand. Surveyors distributed questionnaires directly to research subjects and then collected them after respondents responded. 300 questionnaires were distributed, 275 of which were returned. However, 3 questionnaires were incomplete and leaving 272 questionnaires for analysis.

### **Missing values treatment**

A researcher should consider missing data from data set (Schafer and Olsen, 1998; Acuna and Rodriguez, 2004; Graham et al., 1997), as missing values or missing data are "a pervasive problem in sample surveys" (Little, 1988) that leads to concern in the analysis of multivariate data in social and behavioural sciences (Schafer and Olsen, 1998; Rezaei and Ghodsi, 2014). The expectation maximization method is an iterative processing through which all other variables relevant to the construct of interest are used to predict the values of the missing variables (Graham et al., 1997). Therefore, before the data were analyzed in SEM, we performed an expectation maximization algorithm (Little, 1988) to impute missing values and handle missing values by means of SPSS software.

### **Non-response bias**

Survey methods are criticized for non-response bias (Armstrong and Overton, 1977). If the respondents respond differently from the respondents who do not respond, the issue of non-respondents should be considered to ensure the validity of the findings. Lewis et al. (2013) defined non-response bias "as a systematic and significant difference between those who respond to a survey and those who do not in terms of characteristics central to the research focus". In this study, according to the continuum of resistance theory (Lin and Schaeffer, 1995), we first performed an analysis of known demographic characteristics, such as age, and then conducted a wave analysis and, finally, compared the key constructs of the study, such as attitude toward advertising, and attitude toward brand; no significant differences were shown between groups using the t-test. The late responders were considered as almost non-responders and used as a proxy for the non-response group, then, the relevant variables were compared between the early and late responders. Our empirical assessment shows that the study sample is free of non-respondent bias.

### **Common method variance**

Additionally, Common method variance (CMV), which occurs because of a single survey method being used to collect responses (Podsakoff et al., 2003), is considered in this research. CMV, which is a variance that is attributable to the measurement method, is problematic in behavioural studies. CMV contributes to item covariation between the latent constructs (MacKenzie and Podsakoff, 2012) that influence the structural relationship (Kline et al., 2000). According to Reio (2010), procedural design of the questionnaire design and statistical control are solutions to reduce the probability of CMV. This study addressed the CMV concerning its potential threat by following the guidelines proposed by Podsakoff et al. (2003). At the survey design stage and data analysis, statistical techniques including the Harman's one-

factor test in the partial correlation procedures and the structural model marker-variable technique were conducted. Moreover, followed by Scarpello and Carraher (2008), the modified process of Harman's one-factor test that is using pairs of indicators from "hypothetically independent scales" to be entered into a single factor was conducted. The results from modified process of Harman's one-factor test also indicate that CMV is not a problem as the single factor solution was not obtained. Therefore, our statistical findings confirm that CMV is not a concern in this study.

### Partial least squares-structural equation modeling (PLS-SEM)

We performed PLS-SEM to analyze the data using SmartPLS software (Ringle et al., 2005). PLS-SEM is, however, advantageous compared to the covariance-based SEM when analyzing predictive research models that are in the early stages of theory development (Gimbert et al., 2010; Henseler et al., 2016; Dijkstra and Henseler, 2015; Henseler, 2010; Rezaei and Ismail, 2014). The statistical objective of PLS-SEM is to maximize the explained variance of the endogenous latent constructs (Hair et al., 2011). The common approach is to present results in two phases (Chin, 2010); first is the focus on the reliability and validity of the item measures used, and, the second stage involves the structural model assessment (Hair et al., 2013). The assessment of the validity of the reflective measurement models focuses on the convergent validity and discriminant validity (Hair et al., 2011). Table 3 depicts the construct validity, which assesses the measurement models. Outer model assessment involves examining individual indicator reliabilities, the reliabilities for each construct's composite of measures (i.e. internal consistency reliability) and the convergent and discriminant validities of the measures (Hair et al., 2012; Rezaei and Ghodsi, 2014).

## Research Results

### Demographics

In this study, 60% of the respondents were female; nearly 36% were ages of more than equal to 35; nearly 72% had earned a four-year college degree; nearly 52% were office workers; nearly 37% had a household income of B20,000 - B30,000; In the past year ago 40% had an online travel agencies website using experience for 2-3 time; and 32% had a most visit to Agoda.com.

### Content, construct and convergent validity

The measurement model was tested to assess the internal consistency reliability, convergent validity (CV) and discriminant validity (DV) of the constructs used in this study. Internal consistency reliability measures the degree to which the items are a measure of the latent constructs (Hair et al., 2014; Ramayah et al., 2016). Composite reliability was assessed as a measure of internal consistency (Hair et al., 2017). The measurement model with composite reliability above the threshold value of 0.7 for each construct is considered satisfactory (Nunnally, 1978; Nunnally and Bernstein, 1994; Richter et al., 2016). The results indicated that the composite reliability for all of the constructs exceed the cut-off value (0.7)-perceived ease of use (0.866), perceived usefulness (0.847), system quality (0.863), information quality (0.855), e-customer satisfaction (0.827) and customer e-loyalty (0.917)-thereby indicating the high internal consistency of the measures. Another measure to be mindful of is convergent validity (CV), which assesses "the extent to which a measure correlates positively with alternative measures of the same construct" (Hair et al., 2017). Convergent validity (CV) is assessed by checking the outer loading of the items and the average variance extracted (AVE). As a general rule of thumb, outer loadings should have a value of 0.708 or higher, while an AVE score of 0.5 is considered satisfactory (Avkiran, 2017). Items with an outer loading of 0.6 might also be considered acceptable (Chin et al., 1997). Hair et al. (2017) recommend retaining indicators with weaker factor loadings if other indicators with high loadings can explain at least 50 per cent of the variance (AVE = 0.50). The results indicate that all the items had adequate outer loadings and not excluded due to a weak loading. All of the constructs achieved adequate AVE- perceived ease of use (0.618), perceived usefulness (0.735), system quality (0.678), information quality (0.596), e-customer satisfaction (0.616) and customer e-loyalty (0.791)-thus confirming the convergent validity (CV) of the constructs. Table 2 presents the results of the internal consistency reliability and convergent validity.

**Table 2** Measurement Model Results

Construct	Items	Factor loading	t-Statistics	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
Perceived ease of use	PEOU1	0.822	13.377	0.794	0.866	0.618
	PEOU2	0.803	13.753			
	PEOU3	0.742	12.920			
	PEOU4	0.776	13.794			
Perceived usefulness	PU1	0.855	19.988	0.639	0.847	0.735
	PU2	0.860	19.117			
System quality	SQ1	0.760	12.255	0.761	0.863	0.678

	SQ2	0.856	14.842			
	SQ3	0.851	14.746			
Information quality	IQ1	0.774	11.795			
	IQ2	0.791	12.359	0.773	0.855	0.596
	IQ3	0.814	12.210			
	IQ4	0.704	10.807			
e-Customer satisfaction	CS1	0.742	15.887			
	CS2	0.743	18.118	0.686	0.827	0.616
	CS3	0.863	21.592			
Customer e-loyalty	CEL1	0.892	20.490			
	CEL2	0.917	22.989	0.867	0.919	0.791
	CEL3	0.858	20.641			

Table 2 shows that all the reflective constructs have high levels of internal consistency reliability, as demonstrated by the above composite reliability values. Composite reliability should be higher than 0.70 (Hair et al., 2011). The average variance extracted (AVE) values (Convergent Validity) are well above the minimum required level of 0.50, therefore showing convergent validity for all the three constructs. The AVE of each latent construct should be higher than the construct's highest squared correlation with any other latent construct (Hair et al., 2011) for which our study confirms the convergent validity.

### Discriminant validity

Tables 3 and 4 show the discriminant validity of research constructs. According to Table 3, diagonals (numbers in italic) represent the AVE, whereas the other entries represent the squared correlations. The off-diagonal values in the matrix are the correlations between the latent constructs that are less than AVEs values. In addition, a comparison of the loadings across the columns in the above matrix (loadings and cross-loadings of items) implies that an indicator's loadings on its own construct are in all cases higher than all of its cross-loadings with other constructs. The results, thus, indicate that there is discriminant validity between all the constructs based on Fornell-Larcker criterion and cross-loadings criterion (Fornell and Larcker, 1981).

**Table. 3** Discriminant Validity Matrix

Construct	CEL	CS	IQ	PEOU	PU	SQ
Customer e-loyalty	<b><i>0.889</i></b>					
e-Customer satisfaction	0.733	<b><i>0.785</i></b>				
Information quality	0.510	0.580	<b><i>0.772</i></b>			
Perceive ease of use	0.448	0.501	0.619	<b><i>0.786</i></b>		
Perceived usefulness	0.465	0.515	0.548	0.664	<b><i>0.857</i></b>	
System quality	0.455	0.501	0.673	0.465	0.567	<b><i>0.823</i></b>

Note. Diagonal items in bold and italics show the square root of the AVE. Off-diagonal items show the correlations between constructs.

**Table. 4** Discriminant validity-loading and cross-loading criterion

construct	Item	CEL	CS	IQ	PEOU	PU	SQ
Customer e-loyalty	CEL1	<b><i>0.892</i></b>	0.679	0.473	0.413	0.415	0.464
	CEL2	<b><i>0.917</i></b>	0.664	0.458	0.457	0.430	0.359
	CEL3	<b><i>0.858</i></b>	0.611	0.427	0.320	0.395	0.388
e-Customer satisfaction	CS1	0.532	<b><i>0.742</i></b>	0.461	0.348	0.372	0.540
	CS2	0.498	<b><i>0.743</i></b>	0.448	0.412	0.345	0.309
	CS3	0.681	<b><i>0.863</i></b>	0.461	0.420	0.483	0.338
Information quality	IQ1	0.464	0.486	<b><i>0.774</i></b>	0.389	0.379	0.473
	IQ2	0.326	0.396	<b><i>0.791</i></b>	0.576	0.464	0.510
	IQ3	0.354	0.458	<b><i>0.814</i></b>	0.494	0.426	0.584
	IQ4	0.406	0.435	<b><i>0.704</i></b>	0.472	0.430	0.513
Perceive ease of use	PEOU1	0.327	0.364	0.512	<b><i>0.822</i></b>	0.480	0.362
	PEOU2	0.347	0.384	0.514	<b><i>0.803</i></b>	0.540	0.361
	PEOU3	0.305	0.356	0.414	<b><i>0.742</i></b>	0.497	0.310
	PEOU4	0.418	0.457	0.501	<b><i>0.776</i></b>	0.560	0.418
Perceived usefulness	PU1	0.421	0.488	0.512	0.508	<b><i>0.855</i></b>	0.498

	PU2	0.377	0.396	0.429	0.630	<b>0.860</b>	0.475
	SQ1	0.344	0.390	0.594	0.440	0.541	<b>0.760</b>
System quality	SQ2	0.372	0.433	0.539	0.296	0.429	<b>0.856</b>
	SQ3	0.406	0.414	0.536	0.418	0.439	<b>0.851</b>

### Multicollinearity

Before analyzing the structural model, in addition to reliability and validity, the variance inflation factor (VIF) must be assessed to compute multicollinearity. A VIF value greater than 10.0 is regarded as indication of multicollinearity (Burns and Burns, 2008). However, Hair et al. (2014) recommend a cut-off value of 5.0 for multicollinearity. The VIF results for each construct in this study fall within the acceptable range of 1.279–2.817, indicate that collinearity issues between the constructs were absent from this study.

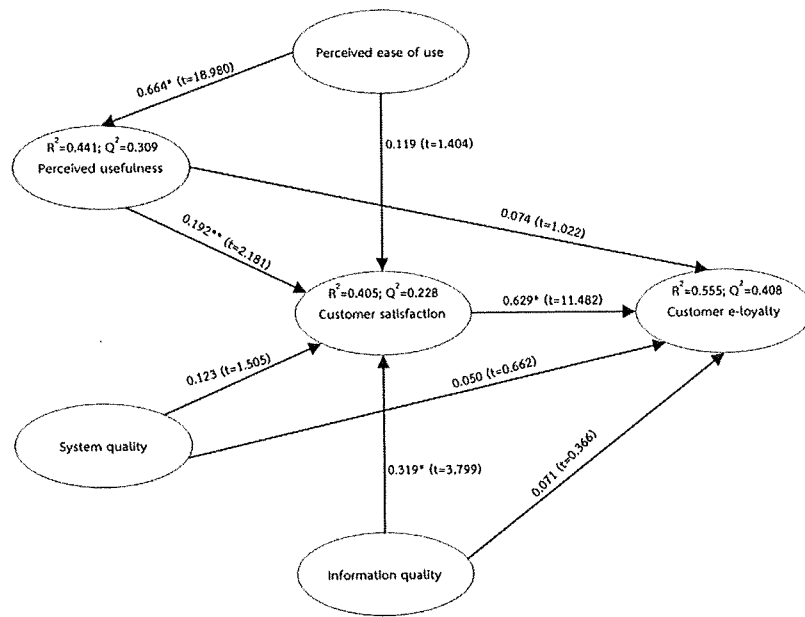
### Structural model

To test the hypotheses of this study, we deployed the SEM approach to estimate simultaneously a series of interrelated dependence relationships. SEM has achieved popularity in several fields, including marketing, psychology, social science and information systems (Li and Yeh, 2010; Rezaei, 2015). PLS-SEM has enjoyed increasing popularity in recent years (Becker et al., 2012). Applications and research into the use of hierarchical construct models using PLS path modeling are still limited (Wetzels et al., 2009). PLS path modeling allows for the conceptualization of a hierarchical model through the repeated use of manifest variables (Wetzels et al., 2009). Hierarchical latent variable models with reflective relationships are the most appropriate if the objective of the study is to find the common factor of several related, yet distinct reflective constructs (Becker et al., 2012; Rezaei and Ghodsi, 2014). Bootstrapping analysis allows for the statistical testing of the hypothesis that a coefficient equals zero, as opposed to the alternative hypothesis that the coefficient does not equal zero (one-tailed test) (Hair et al., 2011). Table 5 presents the summary of hypothesis testing.

The primary criteria for inner model evolution is  $R^2$ , which represents the amount of explained variance of each endogenous latent variable (Hair et al., 2012).  $R^2$  values of 0.75, 0.50 or 0.25 for the endogenous latent construct, as a rule of thumb, are considered as substantial, moderate or weak, respectively (Hair et al., 2011). Table 6 shows that the  $R^2$  for the entire model is 0.555, which presents a substantial explanation of the model. In addition to evaluating the magnitude of the  $R^2$  values as a criterion of predictive accuracy, researchers should also examine the  $Q^2$  value, which is an indicator of the model's predictive relevance (Hair et al., 2013). The blindfolding procedure is only applied to endogenous latent constructs that have a reflective measurement model specification (Hair et al., 2011). When blindfolding is run for all endogenous latent constructs in the model, they all have  $Q^2$  values considerably above zero. Table 6 shows that all  $Q^2$  values are considerably above zero, thus providing support for predictive relevance for the fourth endogenous constructs (Hair et al., 2013; Rezaei, 2015). Table 6 shows the results of  $R^2$  and  $Q^2$  values.

When assessing the relationships from the exogenous constructs (i.e. the perceived ease of use dimensions) to perceived usefulness, e-customer satisfaction and customer e-loyalty, this paper finds that all the path's standardized coefficients are significant ( $p < 0.01$ ;  $p < 0.05$ ) excepted the path of perceived ease of use and system quality to e-customer satisfaction and perceived usefulness, information quality and system quality to customer e-loyalty. These results support hypotheses H1, H3, H5, and H9 and reject H2, H4 and H6 to H8. As shown in Figure 2, the information quality is the most important explanation of e-customer satisfaction ( $\beta = 0.319$ ,  $t = 3.779$ ,  $p < 0.001$ ), followed by the perceived usefulness ( $\beta = 0.192$ ,  $t = 2.181$ ,  $p < 0.05$ ). Moreover, the  $f^2$ - and  $q^2$ -effect sizes show the same rank order as the path coefficients, whereby information quality (0.073) and perceived usefulness (0.029) as well as the system quality (0.012) and perceived ease of use (0.011) represents rarely a small size. Perceived usefulness is driven by the perceived ease of use ( $\beta = 0.664$ ,  $t = 18.825$ ,  $p < 0.001$ ). Moreover, e-customer satisfaction is driven by the information quality ( $\beta = 0.319$ ,  $t = 3.779$ ,  $p < 0.001$ ) and perceived usefulness ( $\beta = 0.192$ ,  $t = 2.181$ ,  $p < 0.05$ ). The positive and significant ( $p < 0.01$ ) standardized coefficient of 0.629 substantiates the influence of e-customer satisfaction on customer e-loyalty (H9).

The final assessment addresses e-customer satisfaction's mediation of the perceived ease of use, perceived usefulness, system quality and information quality' effects on customer e-loyalty in the model. The mediation analysis follows the procedures suggested by Hair et al. (2017). The model estimation returns positive and significant ( $p < 0.01$ ) direct and indirect effects for the information quality between the e-customer satisfaction' effects on customer e-loyalty. Indirect effect  $0.319 * 0.629 = 0.200$ ; Total effect = indirect effect + direct effect =  $0.200 + 0.071 = 0.271$ ; VAF = indirect effect / total effect \* 100 =  $0.200/0.271 * 100 = 73.80\%$ . According to Hair et al. (2014), a VAF value of greater than 80% is full mediation, a value between 20% and 80% is partial mediation, and a value less than 20% means there is no mediation. As a result, e-customer satisfaction represents a partially mediating.



Note: \*means significance at  $p \leq 0.001$ ;  $|t| \geq 1.96$ , \*\*means significance at  $p \leq 0.05$ ;  $|t| \geq 1.96$

Figure. 2 shows The Partial Least Squares Structural Equation Modeling in the case of estimating standardized coefficients for the tourism information quality on customer e-loyalty with online travel brands in Thailand.

Table 5 Hypothesis testing

Hypothesis	Path	Path coefficient	Standard error	t-value	p-value	Results
H1	Perceived ease of use --> perceived usefulness	0.664	0.035	18.980*	0.000*	Accepted
H2	Perceived ease of use --> e-customer satisfaction	0.119	0.085	1.404	0.161	Rejected
H3	Perceived usefulness --> e-customer satisfaction	0.192	0.088	2.181*	0.030***	Accepted
H4	System quality --> e-customer satisfaction	0.123	0.081	1.505	0.133	Rejected
H5	Information quality --> e-customer satisfaction	0.319	0.084	3.799*	0.000**	Accepted
H6	Perceived usefulness --> customer e-loyalty	0.074	0.073	1.022	0.307	Rejected
H7	System quality --> customer e-loyalty	0.050	0.076	0.662	0.508	Rejected
H8	Information quality --> customer e-loyalty	0.071	0.078	0.906	0.366	Rejected
H9	e-Customer satisfaction --> customer e-loyalty	0.629	0.055	11.482*	0.000**	Accepted
H10	Perceived ease of use --> e-customer satisfaction --> customer e-loyalty	0.075	0.052	1.447	0.148	Rejected
H11	Perceived usefulness --> e-customer satisfaction --> customer e-loyalty	0.080	0.037	2.181*	0.030***	Accepted
H12	System quality --> e-customer satisfaction --> customer e-loyalty	0.077	0.049	1.578	0.115	Rejected

H13	Information quality --> e-customer satisfaction --> customer e-loyalty	0.738	0.056	3.611*	0.000*	Accepted
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Note: Critical t-values for two-tailed test: \* 1.96; \*\*p-value < 0.001; \*\*\*p-value < 0.05

**Table 6** Results of  $R^2$ ,  $Q^2$  and  $f^2$  values\*

Endogenous latent variables	Coefficient of determinant $R^2$	Predict relevance $Q^2$	$f^2$	Effect size Effect
Customer e-loyalty	0.555	0.408	0.015	Rarely small
e-Customer satisfaction	0.405	0.228	0.015	Rarely small
Perceived usefulness	0.441	0.309	0.004	Rarely small

Notes: \* $Q^2$  value = effect size: 0.02 = small; 0.15 = medium; 0.35 = large

## Discussion

As the Partial Least Squares Structural Equation Modeling (PLS-SEM) Analysis for test the effect between latent variables by path coefficient with SmartPLS software. The result showed that we accepted Hypothesis 1, Hypothesis 3, Hypothesis 5 and Hypothesis 9 while rejected Hypothesis 2, Hypothesis 4, Hypothesis 6, Hypothesis 7 and Hypothesis at the p-value is lower than 0.001 and 0.05. The results of this study are summarized as follows.

### *The relationship between perceived ease of use and perceived usefulness*

The findings of the study revealed that there was a significant positive correlation between perceived ease of use and perceived usefulness. This meant that the more users perceive the system to be easy to use, the more they will see it as useful and vice versa. This finding is consistent with previous scholars like Davis et al., (1989), who revealed that firms which have strong and favorable perception of the usefulness of the systems, use more of them than those with weak or unfavorable perception of the useful systems. Furthermore, technologies perceived to be easy to use all things being equal, are deemed as useful, as suggested by the direct relationship existing between perceived ease of use and perceived usefulness, (Ndubisi et al., 2003). This finding is also similar with Moon and Kim (2001); Wu and Chen, (2005) and Yu, et al. (2005), which showed perceived ease of use had direct effect on perceived usefulness and attitude toward use (Mohamed, 2010). So that these findings therefore confirm previous results that indicated the perceived ease of use is a precedent contributing to perceived usefulness.

### *The relationship between perceived ease of use, perceived usefulness, information quality, system quality and e-customer satisfaction*

The finding is consistent with Morosan and Jeong (2008) study, which demonstrated the significant effects of perceived usefulness on the consequences of customer satisfaction in the online hotel booking context. And confirm previous results of Szymanski and Hise (2000) which indicated that convenience, product offerings and product information and financial security are significantly and positively correlated to customer satisfaction. This result is in accordance with Burke (2002) studied and found that online shoppers were most satisfied with the convenience, product quality, value provided and product selection offered by the online shopping experience. According to the study of Jeong et al. (2003), increasing customer's satisfaction with website information through high quality product provisions has a significant positive influence on customer's intention to make a reservation online. So that these findings therefore confirm previous results which perceive usefulness and information quality had a positively associated with e-customer satisfaction. While perceived ease of use and system quality had no positively effects on e-customer satisfaction.

### *The relationship between perceived usefulness, information quality, system quality, e-customer satisfaction and customer e-loyalty*

The finding is consistent with Rosen (1995) study, which demonstrated that the 35-40% sales revenues of an e-commerce website come from repeat purchases. Satisfaction in online shopping can reflect the ability of a firm to cultivate customer loyalty (Wolfenbarger and Gilly, 2003), develop favorable word of mouth (Bhattacharjee, 2001), lead to repeat purchases (Reibstein, 2002), and improve its market share (Reichheld and Scheffer, 2000). So that these findings therefore confirm previous results which e-customer satisfaction had a positively associated with customer e-loyalty confirming that online travel brand with low e-loyalty could actively pursue tourism information quality in an attempt to increase e-customer satisfaction and develop customer e-loyalty. While perceived usefulness, system quality and information quality hadn't a positively direct effect on customer e-loyalty.

## Conclusion and implication

The key objective of this study is to simultaneously investigate the impact of tourism information quality on customer e-loyalty and the mediating effect of e-customer satisfaction within the context of online travel brands. In addition, the study tests the applicability of the proposed model to Thai consumers and extends the proposed loyalty model to the service sector and to tourism in particular.

Findings from online travel community members ( $n = 272$ ) indicated that perceived ease of use, perceived usefulness, information quality, and e-customer satisfaction are key factors that affect the e-loyalty of consumer to participate in online travel brands. In general, results support the proposed model: e-customer satisfaction has a partial mediating effect in the relationship between two of the so-called tourism information quality of online travel brands and customer e-loyalty. In this context, e-customer satisfaction is considered as an antecedent of customer e-loyalty, in line with studies by Kim et al. (2009) and Anderson and Srinivasan (2003).

### **Theoretical implications**

The results in the present study provide evidence that explained the relationship between tourism information quality, e-customer satisfaction and customer e-loyalty with online travel brands in Thailand. By integrated the Delone and McLean IS success model to Technology Acceptance Model (TAM) for developing the research framework which is consistent with the previous study. Moreover, the results can directly applicable to other industries. The general nature of the findings therefore needs to be confirmed in other contexts.

### **Managerial implications**

This study should help marketing practitioners to better understand the inter-relationships between perceived ease of use, perceived usefulness, information quality, e-customer satisfaction and customer e-loyalty, as well as the mechanism for enhancing loyalty. The results generally reinforce previous research involving goods and services in other industries.

A first practical contribution of this research for the online business tourism sector lies on the data pool, a large sample composed of clients of the national market leader, which can lead to a customer profile and corresponding purchasing behavior regarding online tourism products, potentially extendable to the sector.

This research, highlighting the impact of customer relation activities, such as ensuring the quality of the information on website, intended to represent a contribution to the sector, alerting managers with the need to overcome this weakness. Also, it allows managers to better understand that developing actions to assure delighted customers is critical to ensure their loyalty and that the impact of online determinants is also significant when using satisfaction as a mediator.

This research brought important insights for a better understanding of the customer profile for online tourism products. It grouped purchase loyalty determinants in this digital context using a satisfaction construct as a mediator of these relations, in order to ensure a more precise relationship marketing approach, and the definition of specific actions based on the profile of each customer. For example, by having each customer registered in the website, the company is able to track his/her consultation (information search stage in the consumer decision making process) and buying (purchase stage) behavior and, based on this, to propose specific and unique products/services/experiences adapted to each profile. This could be extended by allowing customers to leave in the website their testimonials after experiencing the service (post-purchase stage), with the identification of the "cluster" where they belong. Hence, firms can personalize the website, as well as provide customized service recommendations to different kind of tourists.

Market research from clickstream data can also be enhanced by stimulating users to sign in using their Facebook account, since that will allow the provider to collect further information about the consumer and thus fine tuning services to be offered to the tourist. This segments' diversity, evident in the conceptual model, allowed us to capture the behavioral complexity of the individuals, as well as the dynamics of the various influences.

Another contribution of this study is to reinforce the idea that marketers should pay more attention to website information usefulness since these influence e-customer satisfaction for online tourists. This is in line with Berry et al. (2002), which argues that it is important for organizations to make real efforts towards facilitating access to content and making it easily available, offering automation of payment (no need to resort to call-centers), providing variety and innovation in tourism products offered, and guaranteeing delivery on time. Also, from a technological standpoint, it is essential to ensure easy navigation with speed and ease of use, as concluded by Turban et al. (2002).

Hence, an online tourism website ought to give customers a comfortable and easy experience, which is reinforced by the fact that information quality also plays a significant role in e-customer satisfaction and, in the end, in customer e-loyalty. Indeed, friendly interfaces are more and more important to capture clients and make them e-loyal.

### **Limitations**



The limitations of this study as follows.

1) The sample for this study was restricted to Thai customers. More comprehensive studies incorporating a broader spectrum of customers would allow for a more meaningful generalization of the results. Thus, additional research should be conducted using our proposed conceptual model in other cultural contexts.

2) Also, further exploring the proposed model in terms of multi-group comparisons (taking into account socio-demographic characteristics) could possibly provide some extra insight and is a topic for future research.

#### Research Future

The recommended and direction for future studies are as follows.

1) The future research should maximize samples to generate higher generalization of the findings.

2) The study employed perceived ease of use, perceived usefulness, system quality and information quality as dimensions of tourism information quality. Future research could also incorporate other dimensions, such as service quality, website image, and personal innovativeness.

3) But not least, socio-demographic variables such as gender, age, income, and education, might have a significant impact, or a moderating effect, on the conceptual model and could be included in future analyses for a more thorough understanding of the studied phenomenon.

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