

# The Impact of Technological Competence and Service Innovation Implementation on Brand Equity: A Case Study of Hotel Industry in Vietnam

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**Abstract:** *This paper aims to propose and investigate two new antecedent factors (Technological competence and service innovation implementation) that affect hotel brand equity development in the context of the hotel. Questionnaire data were collected from 215 domestic tourists who have traveled to at least one experience using service to stay at 4-5 star hotels. The results of empirical tests using a structural equation model support the research hypotheses. The findings support direct positive links between technological competence, service innovation implementation, and the dimensions of brand equity, as well as the positive relationship between overall brand equity and its dimensions, except for the effect of destination brand awareness. Finally, relevant implications are provided for destination marketers to improve hotel brand equity in the tourism industry.*

**Keywords:** Technological Competence, Service Innovation Implementation, Brand Equity, Domestic Tourists, Hotel Industry

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## 1. Introduction

Brand equity has been well-researched and widely regarded as a valuable asset. Brand equity is the added value that a brand provides to a product (Farquhar, 1989). From this perspective, hotel brand equity can be defined as the added value brands like Sheraton, Marriott, Hilton, Hyatt, and Westin provide to their products (Kim & Kim, 2007). Brand equity has been considered the primary source of profit (Bendixen et al., 2004). It creates customer loyalty, enhances consumer trust, and reduces perceived risk, especially in services (Vinh et al., 2019). Because of its strong relationship with marketing strategy and organizations' sustainable competitive advantage, brand equity has been identified as an essential research domain (Keller, 2003; Hsu et al., 2012; Mizik, 2014; Chow et al., 2017).

With this competence, a company can become a market leader through new product creation and new manufacturing methods (Ritter & Gemünden, 2004). Thus, companies with a high level of technological competence will have more tremendous innovation success than those with a low level of technological competence (Ritter & Gemünden, 2004). Meanwhile, service innovation refers to new service concepts or business models through continuous operational improvement, technology, employee performance investment, or customer experience

management (Verma et al., 2008). Innovative service offerings are sometimes required to maintain a company's market share, and innovations can improve service differentiation and generate financial gains. As a result, executives must execute innovations that customers want and are profitable for the company (Karmarkar, 2004; Verma et al., 2008).

In the research context of the hotel industry, several studies have explored the influence of technological competence and service innovation implementation factors on hotel brand equity (Ruan et al., 2020; Šerić et al., 2014; Verma et al., 2008). Also, in the research context of the hotel industry, the studies evaluate the impact of brand equity's components on overall brand equity (Kim & Kim, 2005; Kim et al., 2008; Lee & Kim, 2009; Nel et al., 2009; Nam et al., 2011; Hsu et al., 2012; Šerić & Gil-Saura, 2012). Service innovation implementation and technical competence have been acknowledged as essential components in hotel brand renovation (Ruan et al., 2020). To the best of our knowledge, however, there are still rare studies that propose an integrated model to evaluate the influence of two antecedent factors (e.g., technological competence and service innovation implementation) on the dimensions of hotel brand equity as well as the influence of brand equity's components on overall hotel brand equity. Significantly, few studies have been conducted to explore the above issue in the study context of Vietnam's hotel industry. From the research gaps discussed above, this study examined the impact of technological competence and service innovation implementation on hotel brand equity. This study is one of the few studies conducted in the context of the hotel industry in Vietnam that proposes an integrated model to evaluate two new antecedent factors (Technological competence and service innovation implementation) that affect hotel brand equity development. The research results will provide some practical implications for hotel managers to increase hotel brand equity from the research results.

## 2. Literature review and hypothesis development

### 2.1 Research concepts

#### 2.1.1 Brand Equity and its Dimensions

Aaker (1991) defined brand equity as "a set of brand assets and liabilities linked to a brand, its name, and symbol, which add to or subtract from the value provided by a product or service to a firm and/or to that firm's customers." Keller (1993) denoted brand equity as "the differential effect of brand knowledge on the consumer response to the brand's marketing". In many businesses, brand equity has been acknowledged as the primary source of capital (Bendixen et al., 2004). It is thought to increase customer loyalty, enhance consumer trust, and lower perceived risk, particularly in services (Lee & Back, 2008). The components of brand equity developed by Aaker (1991, 1996) are the most widely accepted and adapted by a large number of studies (e.g., Tran et al., 2019; Tran et al., 2021; Nguyen et al., 2023; Ho-Mai et al., 2024) including:

*Brand awareness* is "the ability for a customer to recognize or recall that a brand is a member of a certain product category" (Aaker, 1991). According to Aaker (1991), consumers must first be aware of the brand to have a set of brand associations. Brand awareness is an essential antecedent of customer value and is thus considered one of the fundamental perceptual indicators of tourist behavior in the tourism and hospitality literature (Tran et al., 2019; Tran et al., 2021).

*Brand image* is defined as a "set of brand associations that are anything linked in memory to a brand, usually in some meaningful way" (Aaker, 1991) and can be described as a set of beliefs

about a particular brand (Tran & Tran, 2017). Brand image often comes into play (Keller, 1993), and Nguyen et al. (2023) show that brand image drives brand equity.

*Perceived quality* is defined as the customer's perception of a product or service's overall quality or superiority to its intended purpose relative to alternatives (Wang et al., 2017). The perceived quality of a hotel has been discovered to impact its performance significantly. Hotels are expected to deliver quality services to meet customers' expectations, as perceived quality is based on their expectations (Tran et al., 2022).

*Brand loyalty* is defined in the tourism literature as the intention of tourists to return to a hotel and a willingness to recommend it to others (Tran et al., 2023). Indeed, hotel brand loyalty is vital for achieving repeat visits and positive word of mouth among visitors (Li & Petrick, 2008).

### **2.1.2 Technological Competence**

According to Scientific Research Publishing (2021), technological competence is the basis of knowledge, skills, and technological abilities. Hotels' technological competence refers to businesses' ability to understand and apply modern technological innovations in hotel business and management (Ritter & Gemünden, 2004). The technological progress of market globalization and the fluctuation of hospitality demand lead to increased competition, pushing hotel managers to make forward-looking changes in brand development (Chen, 2011).

With the rapid changes in the industrial environment, hotel development has become a critical concern, and technological upgrading has received increased attention regarding hotels' long-term viability (Úbeda-García et al., 2018). Using technical solutions and innovative technologies to promote company development is critical to hotel competitiveness. It provides customers with freshness and makes hotels run more efficiently (Wu & Cheng, 2018). Hotel managers with technological expertise can improve proactively, and technology applications can carefully target customer preferences and technical interfaces (Victorino et al., 2005).

### **2.1.3 Service Innovation**

Service innovation is conceptualized as a service concept, client interaction channel, service delivery system, or technological concept that is new or considerably changed individually. Furthermore, combining such modifications could lead to one or more new service functions for the firm and the market (Hertog et al., 2003). Service innovation introduces new or novel ideas that provide new ways of delivering a benefit, new service concepts, or new service business models through continuous operational improvement, technology, investment in employee performance, or customer experience management.

Many studies and literature support the factors affecting service innovation (Prasad & Dev, 2000; Victorino et al., 2005; Sharma et al., 2019). The service industry generally covers a broad scope of activities and initiatives. Nevertheless, this study mainly focuses on the hospitality industry, which only specializes in luxury hotels, which form a significant part of the industry.

## **2.2. Research hypothesis development**

### **2.2.1 The influence of technological competence on dimensions of brand equity**

Increased competition results from technological advancements in market globalization and unpredictable hospitality demand, forcing hotel management to undertake forward-thinking improvements in brand development (Chen, 2011). According to Lee et al. (2003), new technologies can improve brand image and perceived quality while also serving as a source of

long-term consumer engagement. As various authors have suggested, scholars should investigate the role of current technology solutions in understanding customers and their relationships with brands and organizations (e.g., Reid, 2002).

The hospitality literature supports the essential role of technology in company productivity (Sigala, 2003; Siguaw et al., 2000) and the improvement of business operations (Law & Jogaratnam, 2005). Implementing new technologies in hotel companies results in notable advantages in management knowledge (Li et al., 2012), competition, increasing profitability, cost reduction, efficiency, and information-sharing (Lee et al., 2003; Ham et al., 2005). In addition, Lee et al. (2003) found that, according to hotel managers' opinions and beliefs, technology can enhance service quality, lift the hotel's overall image, and encourage customer loyalty. In particular, new technologies can improve brand image and perceived quality, which might create long-lasting client relationships (Lee et al., 2003).

Previous studies (e.g., Alnsour et al., 2019; Johansson, 2010; Gustafson & Chabot, 2007)) also confirmed the impact of social media (one of the technological aspects) on brand awareness. With today's 4.0 technology and the explosion of social networks, it is easier for hotel businesses to reach customers through advertising on social media (e.g., Facebook pages). During short periods, they should explain its specification and importance using the available Facebook tools, such as pictures, videos, status..., etc. Based on research findings that will increase and improve brand recall. Previous studies empathize with social media's essential role in brand recall (Underwood, 2003; Einwiller, 2001; Chen, 2001). From that, this study proposes the following hypotheses:

- H1a: Technological competence implementation has a significant positive direct effect on hotel brand awareness.
- H1b: Technological competence implementation has a significant positive direct effect on hotel brand image.
- H1c: Technological competence implementation has a significant positive direct effect on hotel perceived quality.
- H1d: Technological competence implementation has a significant positive direct effect on hotel brand loyalty.

### **2.2.2 The influence of service innovation implementation on dimensions of brand equity**

The primary service hotels offer is customer service (Horng et al., 2018). The hotel industry places a premium on labor intensity, immediate consumption, and a pleasant staying experience. Due to these unique traits, the hospitality industry faces significant pressure to provide exceptional service to clients (Horng et al., 2018).

Experience determines how much value is created for customers (Pine & Gilmore, 2014). Customers want hotels to provide excellent lodgings and aid them in having a wonderful vacation. To satisfy consumers' functional and pleasant requirements, hotels must combine multiple services or employ novel ways to link current services (Horng et al., 2018). Service innovation improves service firms' customer value (O'Cass & Sok, 2013). Developing new services provides customers a unique consumer experience and excellent core values (Möller et al., 2008; O'Cass & Sok, 2013; Paswan et al., 2009). It allows hotels to differentiate themselves from competitors and enhances their service quality and reputation (Ottenbacher & Gnoth, 2005). Thus, to maintain a leading position in the market, hotels must be able to continuously update their services to remain ahead of competitors (Agarwal et al., 2003). This

increases customer awareness of the brand and improves brand image and perceived service quality.

The two most essential dimensions in business strategies adopted nowadays are innovation activities and brand equity, mainly product or service innovation and brand equity, precisely because it is a crucial determinant of brand equity (Staake et al., 2009). Innovation activities do not always have the expected results, as some negatively affect organizations (Rizova, 2006). When the innovations implemented by companies fail, consumers usually have a terrible experience, creating annoyance and frustration when getting such services (Mccoll-Kennedy & Sparks, 2003).

Furthermore, according to Roehm & Brady (2007), consumer frustration is primarily generated by high expectations for a specific brand of products or services. As a result, the disappointment and dissatisfaction caused by poor service innovation significantly impact the purchase intention and evaluation of small business innovations and customer happiness (Andreassen, 2000). As a result, this behavior may result in client loss since a lack of service innovation may negatively influence brand equity (Sparks & McColl-Kennedy, 2001).

The degree to which a customer is loyal to a particular brand depends on, among other issues, the degree to which they are satisfied with the quality of the product or services (Morgan et al., 2005). When hotel guests perceive the quality of the purchased service exceeds their needs, wants, and expectations, they will repeatedly patronize the service. From this discussion below, this study proposes the following hypotheses:

- H2a: Service innovation implementation has a significant positive direct effect on hotel brand awareness.
- H2b: Service innovation implementation has a significant positive direct effect on hotel brand image.
- H2c: Service innovation implementation has a significant positive direct effect on hotel perceived quality.
- H2d: Service innovation implementation has a significant positive direct effect on hotel brand loyalty.

### **2.2.3 The influence of brand equity dimensions on overall hotel brand equity**

Brand awareness is the first step in building brand equity (Tran et al., 2019). Brand and customer-based equity cannot exist without understanding. Brand awareness may result in brand equity in several ways, such as creating a brand node in a consumer's memory, familiarising consumers with a brand, acting as a sign of quality and commitment, and being an adequate reason for the consumer to consider the brand in his consideration set (Tran et al., 2021). Brand equity develops when customers are well-informed and have strong, favorable, and distinct brand connections in their minds (Tran et al., 2019). The results from the studies (e.g., Saydan, 2013; Shabbir et al., 2017) confirm that brand awareness positively impacts overall brand equity. Vinh et al. (2019) also confirmed the positive influence of brand awareness on overall brand equity in the tourism and hotel industry. Thus, the following hypothesis is proposed:

- H3: Hotel brand awareness has a significant positive direct effect on overall hotel brand equity.

Brand image is also an essential source of brand equity (Shabbir et al., 2017). Brand image creation negatively affects brand equity (Vinh et al., 2019). Consumers frequently make purchasing decisions based on their impressions of a company's brand (Tran et al., 2022). Consumers' willingness to pay premium pricing is positively related to a strong brand image (Cretu & Brodie, 2007). A distinctive image distinguishes the brand and its value in the consumer's mind, potentially increasing brand equity (Tran et al., 2021). Brand image is reflected in the resources connected with functional features that attract tourists from a cognitive perspective (Horng et al., 2012). There have also been studies in the tourism and hotel industries that confirm the favorable impact of brand image on overall brand equity (Tran et al., 2019; Ruan et al., 2020). From this discussion below, this study proposes the following hypothesis:

H4: Hotel brand image has a significant positive direct effect on overall hotel brand equity.

Perceived quality is a factor that distinguishes brand equity. In several ways, perceived quality adds value to a brand. Consumers have a good reason to pick one brand over another regarding perceived quality (Tran et al., 2022). Furthermore, consumers recognize the brand's differences and excellence throughout their brand experience (Nguyen et al., 2023). As a result, brand equity will be enhanced by perceived superiority. Previous studies (e.g., Saydan, 2013) have found that hotel-perceived quality positively and directly impacts brand equity. Earlier studies (e.g., Tran et al., 2019) in the tourist and hotel business confirm the favorable impact of perceived quality on overall brand equity. Therefore, this study proposes the following hypothesis:

H5: Hotel perceived quality has a significant positive direct effect on overall hotel brand equity.

Brand loyalty is an essential aspect of brand equity. Brand loyalty adds value to a company by providing a steady stream of customers over time (Aaker, 1991). Loyal customers are less inclined to switch brands only because of price. They purchase more frequently than non-loyal customers (Tran et al., 2022). Furthermore, they have more positive reactions to a brand than non-loyal customers (Nguyen et al., 2023). As a result, it is claimed that brand loyalty correlates with brand equity. Indeed, empirical research (e.g., Tran et al., 2019; Vinh et al., 2019) has demonstrated that brand loyalty positively and directly impacts overall brand equity. Tran et al. (2019) observed that brand loyalty improved total brand equity in tourism and hospitality. Therefore, this study proposes the following hypothesis:

H6: Hotel brand loyalty has a significant positive direct effect on overall hotel brand equity.

Based on the relationships detailed above, a conceptual framework and hypotheses are illustrated in Figure 1.

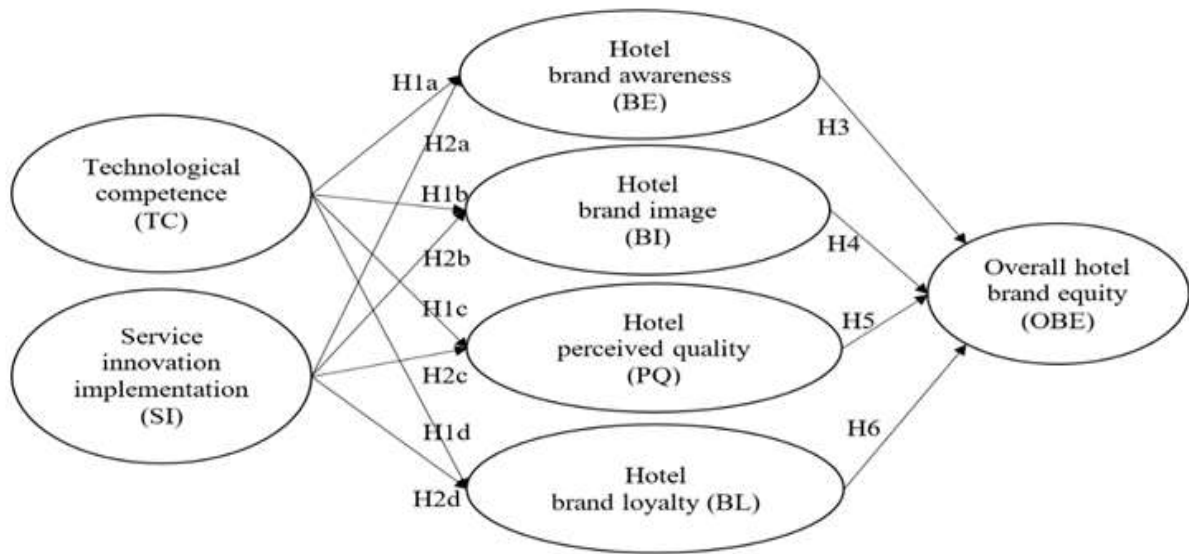


Figure 1: Proposed hypothetical model

### 3. Research methodology

#### 3.1 Measurement instrument development

This work has adapted the observed variables from tourism theory. Six measurement items for technological competence (TC) and three for service innovation implementation (SI) were adapted from Ruan et al. (2020). Similarly, four measurement items to measure hotel brand awareness (BE), three measurement items for hotel brand loyalty (BL), and three measurement items for overall hotel brand equity (OBE) were adapted from Tran et al. (2019). Finally, five measurement items to measure hotel brand image (BI) and five measurement items of hotel perceived quality (PQ) were adapted from the study by Ruan et al. (2020). The questionnaire was initially created in English, and then it was translated into Vietnamese to make the process of conducting the survey easier for Vietnamese respondents.

#### 3.2 Sample and data collection

Following the purpose of this study, this work concentrates only on the hospitality industry in Viet Nam. The target population is domestic tourists who have traveled to at least one experience using service to stay at 4-5 star hotels at three destinations: Hue, Da Nang, and Hoi An. The survey was conducted within two months, from March 2022 to May 2022. The 215 valid questionnaires were collected and used for data analysis, and the profiles of the respondents are presented in Table 1.

Table 1: Information of respondents

Items	Statistics	Percentage
<b>Gender</b>		
Male	81	37.7
Female	134	62.3
Other	0	0
<b>Age</b>		
From 18 – under 40	186	86.5
From 40 – under 60	29	13.5
Above 60	0	0

Marital Status		
Single	131	60.9
Married	84	39.1
Other	0	0
Occupation		
Pupil/ Student	49	22.8
Self-employed	50	23.3
Public servants	32	14.9
Laborer	60	27.9
The retired	24	11.2
Other	49	22.8
Monthly Income		
Under 5 millions VND	29	13.5
5 - 10 millions VND	53	24.7
10 - 15 millions VND	66	30.7
Above 15 millions VND	67	31.2
Place to live		
Northern	29	13.5
Central	153	71.2
South	33	15.3
Travel frequency		
Once	15	7.0
Twice	87	40.5
Three times	32	14.9
Four times and more	81	37.7

### 3.3 Data analysis

The data analysis used SPSS 20 for Windows and AMOS 28 and was carried out in three steps. As a first step, exploratory factor analysis (EFA) is used to determine the appropriate number of factors to be used in the analysis, while Cronbach's alpha is applied to measure the reliability coefficients for the items of each construct. In the second step, confirmatory factor analysis (CFA) is applied to the model to test the adequacy of the measurement models using maximum likelihood estimation. Finally, structural equation modeling (SEM) examines the hypothesized relationships among the constructs.

## 4. Results

### 4.1 Exploratory factor analysis (EFA) and Cronbach's alpha analysis

EFA was applied to identify retained factors and valid observed variables. The results of EFA (Table 2) showed that the total variance explained by the seven factors was 69.145% (> 50%), KMO= 0.809 (> 0.5), and p-value= 0.00 (< 0.005), indicating that the given data set is meritoriously adequate for factor analysis. So, the smallest number of common factors to retain is seven factors. Besides, twenty-nine variables of seven factors with factor loading greater than 0.5 are kept.



The reliability value of the seven factors is well above 0.7 (Table 2). All variables of each factor have a corrected Item-Total Correlation greater than 0.3, which is considered adequate for satisfactory reliability in basic research.

After analyzing the data through EFA and Cronbach's alpha test, these factors satisfy the conditions for inclusion in the model study, including 29 items of the seven factors.

**Table 2: Result of EFA, Cronbach's alpha, CR and AVE**

	Component						
	1	2	3	4	5	6	7
TC1		.796					
TC2		.677					
TC3		.764					
TC4		.655					
TC5		.732					
TC6		.835					
SI1						.690	
SI2						.777	
SI3						.794	
BA1				.792			
BA2				.815			
BA3				.835			
BA4				.845			
BI1	.837						
BI2	.836						
BI3	.788						
BI4	.851						
BI5	.834						
PQ1			.775				
PQ2			.802				
PQ3			.710				
PQ4			.714				
PQ5			.735				
BL1					.803		
BL2					.790		
BL3					.785		
OBE1							.844
OBE2							.832
OBE3							.720
<b>Eigenvalue</b>	7.727	2.770	2.318	2.299	2.067	1.543	1.329
<b>Variance Explained</b>	26.644	26.644	26.644	26.644	26.644	26.644	26.644
<b>Cronbach's alpha</b>	0.910	0.874	0.862	0.877	0.773	0.762	0.730
<b>Construct reliability (CR)</b>	0.909	0.875	0.863	0.877	0.772	0.759	0.738
<b>Average variance extracted (AVE)</b>	0.668	0.542	0.559	0.641	0.531	0.514	0.490

#### 4.2 Confirmatory factor analysis (CFA)

CFA was used to check the quality of all measurement models. Access the overall goodness-of-fit of the model. CFA results are  $\chi^2 = 846.980$  ( $p = 0.00$ ),  $df = 356$ ,  $\chi^2/df = 2.379$ , AGFI = 0.779 ( $> 0.5$ ), PGFI = 0.671 ( $> 0.5$ ), IFI = 0.871 ( $> 0.8$ ), PNFI = 0.698 ( $> 0.5$ ), PCFI = 0.762 ( $> 0.5$ ) and RMSEA = 0.074 ( $< 0.08$ ). All criteria met the recommended values in the measurement model. Therefore, the indicators are acceptable, so the model is suitable for the collected data.

Regarding construct reliability (CR), the CR of all constructs exceeds the recommended level (0.7). Moreover, the average variance extracted (AVE) of seven constructs is more than 0.5, except for the AVE of OBE, which is 0.490, which is approximately 0.5. It's still acceptable. These results indicate that the measurement items are reliable and valid (Table 2). Furthermore, The discriminant validity results revealed that all factor correlations are significant and discriminant (Table 3).

**Table 3: Result of discriminant validity**

$\sqrt{AVE}/R^2$	BA	BI	PQ	BL	TC	SI	OBE
<b>BA</b>	<b>0.800</b>						
<b>BI</b>	0.121	<b>0.817</b>					
<b>PQ</b>	0.100	0.149	<b>0.748</b>				
<b>BL</b>	0.059	0.033	0.180	<b>0.729</b>			
<b>TC</b>	0.348	0.138	0.227	0.140	<b>0.736</b>		
<b>SI</b>	0.128	0.071	0.326	0.059	0.120	<b>0.717</b>	
<b>OBE</b>	0.003	0.001	0.000	0.027	0.009	0.000	<b>0.700</b>

#### 4.3 An assessment of the structural model

The postulated structural model is tested by using the seven constructs of interest. SEM analysis is performed against the proposed conceptual model. SEM results are:  $\chi^2 = 897.429$  ( $p = 0.00$ ),  $df = 365$ ,  $\chi^2/df = 2.459$  ( $< 3$ ), GFI = 0.810 ( $> 0.8$ ), AGFI = 0.773 ( $> 0.5$ ), PGFI = 0.679 ( $> 0.5$ ) and RMSEA = 0.077 ( $< 0.08$ ). Thus, the indicators are acceptable, so the model is suitable for the collected data.

The hypotheses were tested based on a p-value of less than 0.05 to be accepted (Table 4). All hypotheses except hypothesis H3 ( $p = 0.295 > 0.05$ ) satisfy the requirement of the p-value. As shown in Table 4, TC directly impacts BA (SEs = 0.287,  $p = 0.000$ ). TC has a directly positive impact on BI (SEs = 0.336,  $p = 0.000$ ). TC also directly influences PQ (SEs = 0.378,  $p = 0.000$ ). Also, TC positively affects BL (SEs = 0.337,  $p = 0.000$ ). SI directly impacts BA (SEs = 0.297,  $p = 0.000$ ). SI has a directly positive impact on BI (SEs = 0.208,  $p = 0.004$ ). SI also directly influences PQ (SEs = 0.499,  $p = 0.000$ ). Also, SI positively affects BL (SEs = 0.185,  $p = 0.020$ ). As confirmed by previous research, BI directly impacts OBE (SEs = 0.346,  $p = 0.000$ ) (Tran et al., 2019). PQ also directly influences OBE (SEs = 0.269,  $p = 0.000$ ), tested by the study (Vinh et al., 2019). Similarly, BL positively affects OBE (SEs = 0.255,  $p = 0.003$ ), as identified by previous research (Tran et al., 2019).

**Table Error! No text of specified style in document. : Hypothesis testing**

Hypothesis	Casual Path	Standardized Estimates	Standard error	CR	p-value	Test results
H1a	TC → BA	0.287	0.085	4.061	***	Accept
H1b	TC → BI	0.336	0.083	4.772	***	Accept
H1c	TC → PQ	0.378	0.072	5.268	***	Accept
H1d	TC → BL	0.337	0.101	4.297	***	Accept
H2a	SI → BA	0.297	0.073	3.924	***	Accept
H2b	SI → BI	0.208	0.068	2.889	0.004	Accept
H2c	SI → PQ	0.499	0.067	6.033	***	Accept
H2d	SI → BL	0.185	0.082	2.329	0.020	Accept
H3	BA → OBE	0.086	0.048	-1.048	0.295	Reject
H4	BI → OBE	0.346	0.047	7.149	***	Accept
H5	PQ → OBE	0.269	0.059	3.526	***	Accept
H6	BL → OBE	0.255	0.049	2.974	0.003	Accept

\*\*\*: P-value <0.001

## 5. Conclusion, Implications, Limitations, And Future Research

### 5.1 Conclusion

The fierce competition in today's business environment means that tourism and hospitality businesses must work hard to maintain and develop their competitiveness. To a certain extent, a hotel's success depends on building its brand equity to its customers by enhancing brand awareness, brand image, hotel perceived value, and hotel brand loyalty. Therefore, this study examines the application of technology and service improvement as precursors of hotel brand equity components, affecting overall hotel brand equity. Based on the theories summarized from previous studies, this study has developed a conceptual model with 215 domestic visitors who have used service in 4-5 star hotels in Vietnam. This study offers theoretical and managerial contributions to enhancing hotel brand equity by analyzing relevant factors: technological competence, service innovation implementation, hotel brand awareness, hotel brand image, hotel perceived quality, hotel brand loyalty, and overall hotel brand equity.

### 5.2 Implications

#### 5.2.1 Theoretical implications

This study is one of the few studies that integrate the two antecedent factors, technological competence, and service innovation implementation, into the components of hotel brand equity and the model from these components to the overall hotel brand equity. Since then, this study has proposed a new integrated hotel brand development model. This model provides an essential theoretical basis to meet the unique needs of customers and the sustainable development of hotel brands and fills in the research gaps on hotel brand equity.

The results highlight the leading factors of technological competence and service innovation performance and their positive interaction on 4-5 star hotel brand equity. This study demonstrates that implementing service innovation and technology are stimuli capabilities that can improve hotel brand awareness, image, perceived quality, and brand loyalty. The study also shows two relationships that have never been tested before: the influence of two antecedent factors, technological competence and service innovation implementation, on hotel brand awareness. Through research, determine the positive impact of these two factors on hotel brand awareness and confirm that the application of technology applications and improvement of

hotel services by hotel businesses increases customer awareness about the brand and improves hotel brand image.

Similar to previous studies, this study confirms that technology can improve service quality, enhancing the hotel's overall image and encouraging customer loyalty. In particular, new technologies can improve hotel brand image and perceived quality and create lasting customer relationships (Lee et al., 2003). This study also confirms the effect of service innovation implementation on the factors of hotel brand image, hotel perceived quality, and hotel brand loyalty, which has been confirmed in the studies of Morgan et al. (2005) and Staake et al. (2009). This implies that implementing service innovations in the hospitality industry will increase customer awareness of the brand and improve hotel brand image and perceived quality. When hotel guests find that the quality of service exceeds their needs, wants, and expectations, they will repeatedly patronize the service, increasing hotel brand loyalty.

Similar to previous studies (Tran et al., 2019; Vinh et al., 2019), this study reconfirms the effect of components on overall hotel brand equity. Four dimensions have measured hotel brand equity: hotel brand awareness, hotel brand image, hotel perceived quality, and hotel brand loyalty. Thus, hotel brand equity is significantly impacted by its components. This implies that when marketers concentrate their efforts primarily on hotel brand awareness, brand image, perceived quality, and brand loyalty, it will have great significance in brand equity.

Contrary to expectations, this study did not find a relationship between hotel brand awareness and overall brand equity. This can be explained by the fact that most respondents that tourists choose a hotel because of its convenient location, superior service, and application of modern and advanced technology, rather than paying attention to the name/logo of the hotel or famous brands. However, this finding does not mean that hotel brand awareness does not positively affect overall hotel brand equity; it only reflects that this is not reliable enough to confirm this effect. Hotel brand awareness can indirectly influence overall hotel brand equity through other components. This result implies that although marketers spend a lot of organizational resources on developing hotel brand image, hotel perceived quality, and hotel brand loyalty, they should not ignore hotel brand awareness.

### **5.2.2 Managerial implications**

For hotel managers, the findings of this study might provide insight and guidance for good management. Firstly, managers must determine which technologies are unique to customers to rebuild customer-based brand equity. This necessitates managers to identify and promote innovations that improve the customer experience (Kaushik et al., 2015). Hotels must use advanced technology to attract customers and enhance the hotel's brand value (Ruan et al., 2020). Professional training should be provided. It helps improve the hotel staff's technical knowledge to become proficient in technical operations and apply technology in customer booking, experience, and check-out, such as online room selection, service priorities, and improving customer interaction efficiency (Shin, 2019).

Furthermore, hotels should consider the far-reaching effects of intelligent technology on hotel brand awareness, brand image, perceived quality, and brand loyalty. For example, the provision of amenities in the bedroom or public areas in the hotel should be replaced by smart amenities. Devices such as integrated room keys and credit cards should be widely applied to enhance the customer experience. From that, it could improve customers' evaluation of the hotel's brand equity innovation.

Secondly, the success of service innovation is determined by the hotel's real innovation in terms of both staff and products. Therefore, both personnel and management must be involved in innovating services. Staff service conceptions of consumer preferences, such as delivering food adaptations and itinerary planning, must be improved. Furthermore, it is vital to establish a positive environment for hotel employees to encourage them to use fresh ideas and flexible thinking (Ruan et al., 2020). Employees will be able to form long-term relationships with customers and hotel innovations will be improved, resulting in increased overall hotel brand equity with customers due to service enhancements (Ruan et al., 2020). In addition, creating unique hotel content and service procedures is a practical approach to condense the hotel's brand's awareness, image, and quality, increasing loyalty to the hotel brand. This necessitates the hotel's use of cutting-edge service design. Upgrading and moving services are two examples of creative applications that are particularly essential. By introducing supplementary services to core products, service innovation can improve their attractiveness. For example, there are loyalty programs where specific participants can give feedback, read their vacation posts and blogs, or provide exceptional services to customers related to personalized service.

Finally, this study finds significant direct effects of hotel brand image, hotel perceived quality, and hotel perceived quality on overall hotel brand equity. This reaffirms the importance of maintaining and growing hotel dimensions to develop overall hotel brand equity in the hospitality industry.

### 5.3 Limitations and future research

There are some limitations associated with this study that need to be discussed. First, the sample used in the study is relatively small and not representative enough. Thus, it does not allow for the model's generalization beyond the context of the Vietnamese hotel industry. Future research needs to consider other types of tourists, such as international tourists, whose psychological involvement may differ to obtain more varied results.

Second, this study has not considered the mediating role of hotel brand equity components in the relationships between antecedents and overall hotel brand equity. Therefore, future research should check indirect connections to explain them more comprehensively.

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