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Determinants of Customer Satisfaction and Willingness to Use Self-Service Kiosks in the Hotel Industry

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Abstract

As various industry adopted self-service kiosk (SSK) technology, the hospitality industry has implemented SSK in service procedure. However, what drives CS with SSKs has not been fully examined because the system is still new in the hotel industry. The purpose of this study was to identify how self-service kiosk (SSK) attributes like ease of use, speed of delivery, and monetary promotion affect customer satisfaction (CS) in hotel setting. The study also explored the association between CS and willingness to use an SSK in the future. The results of this study showed that ease of use and speed of delivery had a positive association with CS, but showed no significant relationship between monetary promotion and CS. In addition, CS was positively associated with the willingness to use SSKs in the future. The study contributes new knowledge about what drives CS with SSKs and, additionally, confirms the determinants needed to achieve successful CS with SSKs in hotel settings.

Introduction

As information technology (IT) has developed and expanded throughout various disciplines, service-related industries have started using IT to interact with customers more easily and quickly than in the past. As IT facilitates better transactions, industries have expanded their use of the technology and IT transactions have gradually increased in number [1]. Self-service technologies (SSTs) are among the most recent technological advances that many industries have actively adopted [2-4]. The introduction of SSTs has brought impressive changes because customers can complete transactions within SST interfaces without assistance from service providers [1]. Since the minimum wage has increased greatly across the nation, the introduction of SSTs helps in curtailing labor costs and enhancing productivity [5-8].

The use of SSTs in the retail industry and airline industry inspired major U.S. hotel chains like Marriot, Hyatt, and Hilton to employ self-service check-in systems [9,10]. Generally, the hotel industry focuses on interpersonal interaction but now customers have another option, self-check-in/out service. In the initial stage of the adoption process, it is difficult to predict which option customers will choose [11]. To address this issue, it became imperative to understand customers' perceptions of SSTs [12,13]. Considering the paramount importance of customer satisfaction (CS) in hotel service, another important question must be answered: What features make customers satisfied with the use of SSKs in the hotel setting?

Since the hotel industry has already adopted SSK technology, the evaluation of CS with SSKs is critical because CS directly affects customer loyalty, customer retention, and eventually a firm's profitability [14,15]. Despite the importance of CS, what drives CS with SSKs has not been fully examined because the system is still new in the hotel industry. Therefore, the current study aimed to address this gap and examine which attributes affect CS with SSKs. Moreover, once SSKs are adopted in hotels, it is important to maintain repetitive usage and sustain consumers' positive intentions to use SSKs in future visits. As this study assumes that satisfactory experiences increase willingness to use SSKs, the study also examined the association between CS and willingness to use SSKs in a future visit.

Consequently, the purpose of this study was to identify whether SSK attributes (i.e., ease of use, speed of delivery, and monetary promotion) affect CS with SSKs in the hotel context. This study also aimed to investigate whether CS has a subsequent impact on willingness to use an SSK in the future.

Literature Review

Customer satisfaction

The concept of CS is closely related to one the most popular marketing theories, expectation disconfirmation theory, or expectation confirmation theory (ECT). ECT examines the post-purchase or repurchasing intention based on prior experience with the product/service [16,17]. In ECT, Oliver [16] points out that CS results from confirmation between expected performance and real performance. This study also defined CS as consumers' fulfilment response [18], a judgment about a satisfying level of consumption-related fulfillment which the product/service offers.

Many firms put significant effort into tracking and maximizing CS to achieve better revenue [14,15]. In the satisfaction-profit chain (SPC), Anderson and Mittal [19] clearly show that CS influences organizational performance. Specifically, the performance of service attributes increases CS and, in turn, the enhanced satisfaction generates higher customer retention and loyalty. Consequently, better profits result from more loyal customers. In the view of SPC, the hotel industry should focus on not only deploying new technology itself but also what specific kiosk attributes produce CS which brings better revenue.

Product or service attributes as determinants of CS

Each product or service can be viewed as a bundle of product/service

attributes. The attributes differ across industries and the importance of each attribute also varies [12,20]. Beatson et al. [12] find that the type of attribute is also determined by the service-delivery mode. Specifically, each service-delivery mode has original attributes (e.g., SST versus interpersonal service). For interpersonal service, previous studies have reported that courtesy, professionalism, trust, and staff friendliness were significant determinants of CS [21,22]. On the other hand, Dabholkar's [6] attribute-based model, particularly focusing on attributes of self-service, introduces the following five attributes: speed of delivery, ease of use, reliability, enjoyment, and control. Based on relevance, ease of use and speed of delivery of those attributes were adopted as the attributes driving CS with SSKs [1,6,23].

Technology acceptance model

This study adopted the technology acceptance model (TAM) as a theoretical background; TAM is grounded in Fishbein and Ajzen [24] theory of reasoned action. The original TAM model implies that users' beliefs (perceived usefulness and perceived ease of use) form attitudes toward the adoption of new technology and intention to use it [23,25]. Furthermore, TAM has been widely employed in research associated with technology usage behavior and extended by adding other factors that affect intention to use in various industry settings [3,26,27]. The current study modified TAM to fit the objective of identifying the associations between attributes of SSKs and CS and CS and customers' willingness to use SSKs in the future. Speed of delivery and monetary promotion were added as possible CS drivers. Additionally, the concept of willingness to use an SSK was used instead of intention to use.

Willingness to use SSKs

As a broad term, willingness refers to "an individual's openness to opportunity, that is, his/her willingness to perform a certain behavior in a situation that is conducive to that behavior" [28]. The current study adopted this concept because the definition of willingness fully explains the situation in which customers have two options for their check-in/out: interpersonal service or use of SSKs.

However, previous studies offer no empirical evidence of an association between CS with SSKs and customer willingness to use SSKs in a future visit. Hence, this study attempted to explore customers' continuance decision as a proxy for their willingness to use an SSK. In expectation confirmation model (ECM), prior use of a product/service, determines the repurchase intention or continued usage [17]. For example, Wu et al. [29] find that when users have two options, such as a traditional environment and an alternative e-environment, and feel highly satisfied with the e-system, they prefer to use the new technology continuously. Such finding suggests that the CS experience positively affects consumers' willingness to use an SSK in future visits. Hence, the following hypothesis was formulated:

Hypothesis 1: Customer satisfaction is positively associated with willingness to use an SSK in future visits.

Perceived ease of use

Ease of use refers to the effort required to use technology and the complexity of the process of service delivery [6,30]. TAM suggests that this attribute is a critical factor in motivating customers to utilize new technology. Similarly, a number of studies has concurred that ease of use postively affects attitudes and intentions [3,6,23,26,27,31,32]. Several researchers have reported a positive influence of ease of use on CS [33-35]. That is, when customers navigate an interface and do not have difficulty or exert much conscious effort, they are more

satisfied with the use of technology. In contrast, Kim and Qu [3] argue that perceived ease of use does not have a significant influence on CS with SST. Thus, previous studies have reported inconsistent findings regarding perceived ease of use [3,33-36]. Therefore, whether perceived ease of use affects customer satisfaction in the hotel industry context must be clarified, and the following hypothesis was formulated:

Hypothesis 2: Perceived ease of use is positively associated with customer satisfaction with SSKs.

Speed of delivery

In modern society, time-saving is a real issue for customers, and they are likely to be sensitive to the speed of delivery [37]. As customers care a great deal about the time it takes to complete a transaction, self-service technologies have been developed to reduce the time needed [4]. Time-saving can be managed in two ways: waiting time for service and time during service encounters [38-40]. This study focuses on the latter case and defines speed of delivery as the time it takes to use an SSK for customer check-in/out [6].

Several studies have found that if SSTs can reduce service delivery time, customers tend to adopt them because they consider time-saving to be highly important [4,6,39]. In addition, Chen et al. [41] report that fast service delivery is considered an important factor in using an SSK for both business travelers and leisure travelers in terms of service quality. Based on these findings, this study investigated whether speed of delivery was an important driver of CS. Thus, the following hypothesis was proposed:

Hypothesis 3: Speed of delivery is positively associated with customer satisfaction with SSKs.

Monetary promotion

As a marketing strategy, the primary purpose of a sales promotion is to prompt immediate customer purchase behavior [42,43]. This study focuses only on monetary promotion which the hotel industry has mainly used such as a discount coupon or discounted price in terms of revenue management. Thus, monetary promotion is defined as an offer of special discounts, cheaper prices at an in-store point of purchase (POP), and discount coupons [44]. Zhou and Wong [44] reveal that such promotions positively influence impulse purchasing. In the SSK context, customers might operate SSKs impulsively because of promotional effects, although they did not originally intend to utilize SSKs. However, Ashworth et al. [45] report negative effects of promotion as some customers perceive products/services with a discount coupon or discounted price as low quality and avoid a purchase.

As hospitality professionals often incorporate monetary promotions in revenue management, the effect of monetary promotion on CS with SSKs should be identified for revenue growth [46]. Therefore, this study attempted to investigate whether a monetary promotion advanced CS with SSKs; the following hypothesis was formed:

Hypothesis 4: Monetary promotion is positively associated with customer satisfaction with SSKs.

To provide a better understanding of this study, the conceptual framework is illustrated in Figure 1.

Methods

The current study employed a 3 x 2 between-subjects factorial design to test the associations between three independent variables (i.e., perceived ease of use, speed of delivery, and monetary promotion) and

one dependent variable, CS. The experiment involved manipulations of the three attributes with two levels (high, low) to assess the effects on CS.

Due to the recent adoption of SSKs, only a few customers are likely to have had a chance to use SSKs in hotels [6]. Thus, this study employed a role-playing method with a scenario-based survey describing a hypothetical experience of using an SSK in a hotel. All participants were randomly assigned to one of the two scenarios. First, the respondents were required to watch a one-minute video clip clarifying what SSKs are and enhancing respondents' understanding of the kiosk check-in procedure. After that, the respondents read a scenario and completed the survey questionnaire, which comprised the same pool of questions in both scenarios. The two scenarios delineated a hypothetical travel experience for leisure staying in a well-known mid-priced ($90-$150) chain hotel that first adopted the kiosk system in the U.S. hotel industry. Table 1 presents an overview of the different experimental manipulations with the provided information in each scenario.

The online survey method was adopted by means of Amazon Mechanical Turk (MTurk). The questionnaire included 13 items. The first section had eight items measuring attribute. The second section had five items in two categories: CS and customers' willingness to use

Figure 1: The proposed model.

an SSK. All items in the survey instrument were adopted from previous studies (Table 2), but the items were revised to fit the context of the current study [16,47,48]. However, no developed scales were available for monetary promotion. Thus, this study referred to Wirtz and Chew [49] to create the measurement items for monetary promotion. Moreover, because of the lack of measurement scales for customer willingness to use SSKs, the measurement items for the current effort were adopted from different fields and modified to fit the current context [28,50]. All items and measurement scales were successfully empirically tested in previous studies for internal consistency and reliability of measurement.

The participants were also asked about their socio-demographic information, including gender, age, education level, annual income level, and ethnicity, and general background information, such as past SSK experience in hotels and experience with different hotel categories, (e.g., budget, mid-priced, luxury) [51,52].

The reflections about attribute performance were measured on a 7-point Likert scale, 1 = strongly disagree and 7 = strongly agree. The willingness to use construct was measured using a scale ranging from 1= very unwilling to 7= very willing (Table 2).

A pretest was performed with 38 participants to evaluate the validity and reliability of the measurement items and scales and confirm the experimental manipulations between the two groups. Following analysis of variance (ANOVA), the manipulations between the groups was successfully confirmed (Table 3).

The current study used a self-selection non-random sampling technique to collect data. The target population was customers who have stayed in a hotel. The sampling frame was U.S. customers older than 18 years. Data analysis was performed by using SPSS 21.0. After the descriptive statistics had been completed, exploratory factor analysis (EFA), ANOVA, and multiple regression analysis were performed.
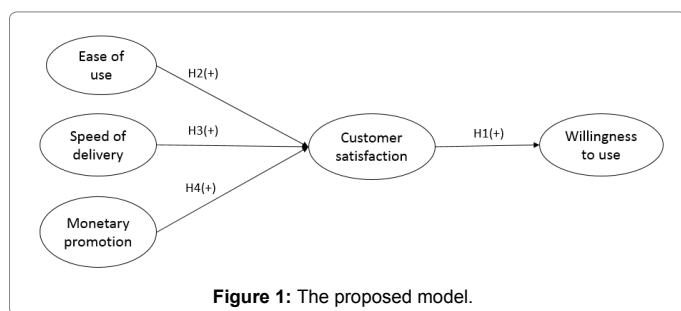
Scenarios	Attributes	Provided information
Scenario 1	Ease of use	• Straightforward and simple procedure
	Speed of delivery	• A couple of minutes
	Monetary promotion	• A 20% off dining coupon for self-check-in
Scenario 2	Ease of use	• Frozen screen to enter name • Several attempts to scan ID/passport
	Speed of delivery	• 20 minutes at check-in
	Monetary promotion	• No incentives

Table 1: Scenarios for treatment groups.

Construct	Item	Reference
Perceived ease of use	Using a self-service kiosk for check-in...., (1) was complicated (2) was confusing (3) took a lot of effort (4) required little work	Dabholkar and Bagozzi [47], Dabholkar [6]
Speed of delivery	Using a self-service kiosk for check-in...., (1) allowed me to save time during check-in/out (2) made my check-in/out less time consuming	Childers et al. [48]
Monetary promotion	(1) Self-service kiosk's monetary promotions were attractive. (2) Self-service kiosk's monetary promotion like coupons or promotional deals caused me to use an SSK.	Wirtz and Chew [49]
Customer satisfaction	(1) My choice to use a particular self-service kiosk for check-in/out was a wise one. (2) I was happy with the usage of the self-service kiosk in that particular instance. (3) Overall, I was satisfied with using the hotel self-service kiosk.	Oliver [16]
Willingness	Based on the described scenario.... (1) How willing would you be to use a self-service kiosk in a future visit? (2) I would be willing to use a self-service kiosk for check-in/out.	Pomery et al. and Kang et al. [28,50]

Table 2: Sources of measurement items.

Results

After screening unusable data, 397 usable responses remained out of 407 (50.6% male and 49.4% female). Table 4 presents characteristics of the sample. Approximately 45.8% of the participants were between 26 and 35 years old and 19.8% was between 36 and 45 years old. The majority of the respondents also had more than some college experience. In addition, 95% of the respondents reported that they had no previous experience with SSKs in hotels (Table 4).

To examine dimensionality of the measurement, EFA was conducted. Principal components factor analysis was employed and varimax rotation was used. In this analysis, items of monetary promotion were excluded because they were not adopted from other studies. Thus, the promotion variable was used as a dummy variable (1=for present condition and 0=when not offered) to examine the effect of promotion on CS.

As indicated in Table 5, four factors were identified. However, one item in ease of use was removed due to a low factor loading. Four factors with higher internal consistency (α>.9) were identified: ease of use (3 items), speed of delivery (2 items), CS (3 items), and willingness to use (2 items). For further analysis, the SPSS program aggregated items within each factor in a single measure as one factor.

To confirm the differences in the experimental manipulations across two scenarios, one-way ANOVA was employed. Although three experiment attributes were manipulated in Scenario 1, monetary promotion was excluded in Scenario 2. Because this study sought to check the association between monetary promotion and CS, the respondents of Scenario 2 were not asked questions about monetary promotion. As seen in Table 6, significant differences were found in ease of use (p < .001) and speed of delivery (p < .001). Thus, the results supported successful experimental manipulation.

Linear regression was applied to test Hypothesis 1. The dependent variable, willingness to use, was regressed by one independent variable, CS. The result showed that CS had a positive association with customers' willingness to use an SSK in the future (p<.001). Thus, Hypothesis 1 was supported (Table 7).

To assess Hypotheses 2, 3, and 4, multiple regression was adopted. CS was regressed by three independent variables, perceived ease of use, speed of delivery, and monetary promotion (dummy variable), including interaction terms. As noted in Table 8, ease of use was positively significant (β=.125, p<.01) on CS. The results also showed a strong relationship between speed of delivery and CS (β=.738, p<.001). However, no significant relationship was found between monetary

promotion and CS (β=.065, p>.05). Therefore, Hypotheses 2 and 3 were supported and Hypothesis 4 was not supported.

Discussion and Conclusion

The results of this study showed that ease of use and speed of delivery had a positive association with CS. This finding aligns with the claims of Wang and Weijters et al. that ease of use positively affects CS with SSKs. On the other hand, the finding of the current study is inconsistent with Kim and Qu, who reported that perceived ease of use did not have an impact on CS.

One interesting finding was that speed of delivery played the most significant role in driving CS with SSKs. Despite no existing previous literature regarding the relationship between speed of delivery and CS, the finding seems consistent with Chen et al. The study demonstrated that travelers considered speed of delivery as an important factor in the service quality of SSKs. Similarly, the current study uncovered that speed of delivery was the most influential factor in terms of impact on CS with SSKs. The result might be due to the age of the majority of

		SS	df	MS	F	Sig.
Ease of use	Between Groups	6.184	1	6.184	7.224	.011
	Within Groups	30.816	36	.856		
	Total	37.000	37			
Speed of delivery	Between Groups	12.518	1	12.518	18.408	.000
	Within Groups	24.482	36	.680		
	Total	37.000	37			
CS	Between Groups	14.331	1	14.331	22.760	.000
	Within Groups	22.669	36	.630		
	Total	37.000	37			
Willingness	Between Groups	9.964	1	9.964	13.268	.001
	Within Groups	27.036	36	.751		
	Total	37.000	37			

Table 3: ANOVA results for different attribute manipulation (n=38).

Category	Frequency	Percentage (%)
Gender		
Male	201	50.6
Female	196	49.4
Age		
18-25	38	9.6
26-35	182	45.8
36-45	79	19.8
46-55	43	10.8
56-65	41	10.3
66 years or older	14	3.5
Education level		
High school	30	7.6
Some college	114	28.7
College degree	187	47.1
Higher education	66	16.6
Household income		
Under $20,000	51	12.8
$20,000-$39,999	96	24.2
$40,000-$59,999	85	21.4
$60,000-$79,999	69	17.4
$80,000-$99,999	37	9.3
$100,000 or more	59	14.9
Ethnicity		
Caucasian	304	76.6
Hispanic	23	5.8
African American	28	7.1
Native American	3	0.8
Asian	37	9.3
Other	2	0.5
Past experience using an SSK		
Yes	20	5
No	377	95
Hotel type		
Luxury	4	20
Mid-priced	13	65
Budget	2	10
Not applicable	1	5

Table 4: Characteristics of sample (n=397).

	Rotating factor loadings				Cronbach's alpha
	1	2	3	4	
ease2	.875	.217	.323	.196	
ease1	.819	.331	.287	.298	.953
ease3	.695	.372	.264	.466	
cs1	.351	.727	.448	.323	
cs2	.354	.707	.422	.406	.980
cs3	.382	.685	.432	.405	
will1	.300	.330	.834	.263	
will2	.357	.352	.806	.239	.958
speed2	.382	.425	.334	.731	
speed1	.453	.475	.340	.645	.969

Note: cs=customer satisfaction, will=willingness to use, speed=speed of delivery, ease=ease of use

Table 5: EFA results.

		Sum of Squares	df	Mean Square	F	Sig.
ease	Between Groups	240.920	1	240.920	613.643	.000
	Within Groups	155.080	395	.393		
	Total	396.000	396			
speed	Between Groups	280.032	1	280.032	933.756	.000
	Within Groups	118.460	395	.300		
	Total	398.492	396			

Note: ease=ease of use, speed=speed of delivery

Table 6: ANOVA results.

Model	B	SE	Beta	t	Sig.	VIF	ΔR^2
CS	.883	.027	.839	30.630	.000	1.000	.703

NOTE: CS = customer satisfaction, B = unstandardized coefficient, SE = standard error, Beta = standardized, N=397

Table 7: Hypothesis 1 test results.

	Step1 IVs and DV	Step2 Interactions (Ease X Speed, Ease X Promo, Speed X Promo)	Step3 Interactions (Ease X Speed, Ease X Promo, Speed X Promo, Ease X Speed X Promo)
Ease	.125**	.128**	.145*
Speed	.738***	.721***	.737***
Promo	.065	.079	.072
Ease X Speed		.022	.012
Ease X Promo		.054	.061
Speed X Promo		-.049	-.044
Ease X Speed X Promo			-.027
	568.146***	288.068***	246.377***
$\bar{R}^2$	.813	.816	.816
ΔR^2	.811	.813	.813

Note: *p<.05, **p<.01, ***p<.001, IV= Independent variable, DV=Dependent variable, Effects reported are standardized Betas, DV=CS, Ease=ease of use, Speed=speed of ease, Promo=promotion

Table 8: Results of multiple regression tests.

respondents. Almost 70% of the participants belonged to Generation X and Generation Y. It seems plausible that prompt service is highly important to the younger generations because they do not have patience for delays and have high demand for immediacy. Just as Ledingham revealed that customers tend to utilize SSTs when they believe the technologies facilitate service delivery, the current study also confirmed that customers seemed highly satisfied with the rapid service.

The study also attempted to determine whether monetary promotion influenced CS with SSKs. Contrary to expectations, the study did not identify a significant impact of monetary promotion on CS. Such finding differs from Zhou and Wong, who reported that offering in-store special discounts promoted impulsive purchasing because customers received a direct benefit. However, the finding of this study presents no support for that. A possible reason might be related to the speed of delivery. Speed of delivery in this study was the most powerful factor in producing CS. Thus, once customers are satisfied with the fast service of SSKs, they might not care whether a monetary promotion is distributed.

In addition, the current study clearly showed that CS has a subsequent impact on willingness to use SSKs. Such finding agrees with Anderson and Sullivan, Bhattacherjee, in which prior experience affected repurchase intention and continuance use. The result of this study suggests that when customers are satisfied with the kiosk service, they are willing to use it again. In terms of technology adoption, this is consistent with Wu et al. finding that once the use of a new technology option is satisfying, customers keep using the system. With a high correlation, this study indicates that continuance usage occurs if customers are satisfied.

Theoretical Implications

First, this study has contributed to the existing body of knowledge regarding CS with SSKs in the hotel setting. No studies have investigated the impacts of ease of use, speed of delivery, and monetary promotion on CS with SSKs in such context. With the greater use and popularity of SSKs in the hotel industry, the findings provided empirical evidence of the association between SSK attributes and CS. Furthermore, once hotels start providing kiosk service, continuing usage of SSKs is an important issue to hotel management due to costs and even profitability. This study brought the concept of willingness to use from the marketing field and explained the customer's choice to use self-service over personal service. Thus, this study has provided insights about the new concept of willingness to use in the hotel setting. Last, the study empirically supported TAM by confirming the linkages between attribute performance and CS and CS and willingness to use in the future. In particular, the study proved CS related to new technology acceptance under the modified TAM.

Practical Implications

The findings of this study have a number of practical implications for both hotel managers and kiosk designers/manufacturers. First, this study advised hotel managers to prepare kiosk instructions for customers who have never used kiosks. Moreover, hotel managers should consider adoption of SSKs for better CS if interpersonal check-in with service providers takes a long time. The diffusion of kiosks will be beneficial in improving the speed of service and even decreasing waiting time. Furthermore, hotel managers can employ marketing to advertise the benefits of the kiosks to promote their use over interpersonal service. Highlighting such benefits as ease of use and fast service, they can change customers' views and attract non-users.

Additionally, the manufacturers/designers should provide an interface which is easy to navigate and provides quick service delivery. In particular, they should be cautious about service failures like a frozen page and kiosk malfunctions because service failures are directly related to the two attributes influencing CS and willingness to use SSKs in the future. As the current findings suggest, customers' willingness to use is related to satisfactory experiences with kiosk check-in, and a service failure might result in bad perceptions of the experience.

Therefore, both hotel managers and manufacturers must cooperate to deal with service failures; for example, manufacturers can train frontline employees to solve simple software errors. Then, the hotel can deploy these employees in every shift to help customers who experience problems with self-check-in.

Limitations and Suggestions for Future Research

The current study had several limitations that should be acknowledged. First, the study used the self-selection non-random sampling method, which involves issues with generalizability and sample representativeness. Since data were collected through MTurk, the respondents were given a reward as compensation. Thus, the sample may have approached and completed the survey questionnaire with the purpose of earning the reward. Second, the research design of the current study employed a role-playing method using scenario situations and manipulated experiments. Thus, the collected data may not reflect actual experiences but hypothetical experiences. Future research should involve the actual use of SSKs. Third, the described scenarios consisted of only two conditions, high and low. Therefore, future research should include other possible combinations that may occur in reality. Fourth, the study only focused on the impact of SSK attributes on CS; however, such personal characteristics of respondents as technology readiness and self-confidence toward new technology may also influence CS with SSKs. Future studies should consider personal characteristics as possible factors in forming CS. Last, the scenarios of the study used leisure travelers and the mid-priced ($90-$150) hotel context. Other visitors such as business travelers or tour groups might produce different results. Future studies should include these groups as well as other types of hotels, like budget or luxury hotels.

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