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Research Paper

Out of Satisfaction or Out of Self-Protection? Examining Customers' Willingness to Pay for Self-Service Technologies at Restaurants in the COVID-19 Era

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Abstract: Although the COVID-19 pandemic has revolutionised the use of self-service technologies (SSTs) in restaurants to decrease physical contact and enforce social distancing, very few studies have sufficiently investigated the concept of health risk reduction and if customers are willing to pay for it. As such, this present study used the expectation-confirmation model (ECM), in the context of the information technology (IT) model, as well as additional factors that affect customer satisfaction and health risk reduction to better understand their willingness to pay (WTP) for SSTs. The moderating effect of health risk reduction on the correlation between customer satisfaction and WTP was also examined. An online questionnaire was used to collect the required data, which were then analysed using the partial least squares structural equation modelling (PLS-SEM). The results indicate that, with the exception of perceived convenience, all the factors had a significant impact on customer satisfaction. The study also reveals that health risk reduction had a stronger impact on customers' WTP for SSTs than customer satisfaction. However, health risk reduction did not moderate the correlation between customer satisfaction and WTP. This present study also discusses the theoretical and managerial implications of its findings.

Keywords: Self-service technologies, willingness to pay, COVID-19 pandemic, customer satisfaction, ECM-IT, health risk reduction

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Introduction

Technological advancements have shifted the fundamental service delivery process from traditional face-to face services to self-service technologies (SSTs) (Park et al., 2021). According to Meuter et al. (2000), SSTs are technological interfaces that allow customers to acquire a service without the direct involvement of a service employee. The SST industry has drastically grown in popularity throughout the years due to their perceived benefits, namely lower labour costs, shorter waiting time, and improved customer satisfaction (Leung et al., 2021; Liu et al., 2019). As such, the hotel and airport industries have adopted self-check-in and self-check-out kiosks while restaurants have rolled out tabletop multi-touch screens and ordering menu kiosks (Nilsson et al., 2021). For instance, in 2014, Chili's Grill & Bar, one of the largest casual-dining franchises in the United States (US), installed 45,000 touch-screen tablets that allowed customers to order food and pay their bills (Ravindranath, 2014). Similarly, more than 12,000 McDonald's outlets in the US installed digital menu boards and self-ordering kiosks by the end of 2019 as part of its "Experience with the Future" initiative (Wolfe, 2018). A report released by Market Research Future (MRFR) predicts that the SST industry will eventually be worth USD72.51 billion and grow at a compound annual growth rate (CAGR) of 11.27% by 2030 (Market Research Future, 2022). Therefore, SSTs may very well dominate the service industry in the future.

Multiple extant studies have demonstrated factors influencing customer satisfaction, such as perceived ease of use, usefulness, enjoyment, convenience, control, and personalisation, and their subsequent impact on the behavioural intentions of customers towards SSTs (Collier & Kimes, 2013; Eriksson & Nilsson, 2007; Ghosh, 2020; Wang, 2012). However, the intriguing question of whether satisfied customers are willing to pay (WTP) for SSTs or pay to "serve" themselves remains unanswered. It is important to understand customers' WTP for SSTs as it closely correlates with return on investments (ROIs) and profitability from a business standpoint. For instance, if consumers expect to pay less for SSTs than human-delivered services, the savings acquired by adopting SSTs do not exceed the revenue lost by discrepancies in the prices that customers are WTP for SSTs and human-delivered services. This would discourage businesses from investing in SSTs while a high WTP would motivate businesses to invest in it (Chuah et al., 2022).

The COVID-19 pandemic, that took the world by storm, significantly increased the adoption of SSTs by restaurants (Oliveira et al., 2020) and technology-facilitated self-services or contactless technologies that simultaneously decrease human contact and health risks, thereby transforming the hospitality industry from a high-touch service to a high-tech service (Shin & Kang, 2020; Zeng et al., 2020). However, most extant studies did not examine health risk reduction and if customers are WTP

for it. According to Casidy and Wymer (2016), customer perceptions of risks such as financial, performance, social, and psychological, moderate the effect of WTP and its antecedents, such as customer satisfaction and loyalty. Therefore, it is worth examining if health risk reduction moderates the correlation between customer satisfaction and WTP in the context of a public health crisis and whether health risk reduction decreases the impact of customer satisfaction on WTP to the extent that it causes even dissatisfied customers to be WTP for SSTs if they want to decrease the risk of contracting a viral infection.

Therefore, to bridge the gaps in this body of literature, the objectives of this study were fourfold:

1. To examine the factors that influence customer satisfaction towards SSTs.
2. To investigate the impact of customer satisfaction on customers' WTP for SSTs.
3. To investigate the impact of health risk reduction on customers' WTP for SSTs.
4. To examine the moderating effect of health risk reduction on the correlation between customer satisfaction and customers' WTP for SSTs.

The findings of the present study provide several contributions to the existing body of literature. For instance, perceived enjoyment was found to have the strongest effect on customer satisfaction followed by personalisation, perceived control, perceived usefulness, and perceived ease of use. Furthermore, health risk reduction was found to have a greater impact on customers' WTP for SSTs than customer satisfaction but it did not moderate the effect of customer satisfaction on WTP. These findings add to the body of literature using the expectation-confirmation model (ECM) in the context of the information technology (IT) domain (ECM-IT) and validates the proposed framework in the era of COVID-19 as well as provides valuable insights to restaurant managers on the importance informing customers of the ability of SSTs to decrease health risks.

Literature Review

Self-service technologies (SSTs)

Self-service technologies (SSTs) are technological convergences that "enable customers to perform entire services on their own without direct assistance from employees" (Bitner et al., 2002, p. 96). Multiple industries have hopped on the bandwagon and adopted SSTs. Examples of this include automatic teller machines (ATMs) in banks, barcode scanners at supermarkets, facial recognition in the airline industry, self-check-in and check-out facilities in the hotel industry, and smart vending machines in the food and beverage industry. Furthermore, restaurants are increasingly replacing human services with SSTs such as tablets, kiosks, and mobile applications, that allow customers to browse through menus and conveniently select and modify their meals.

Self-service technologies (SSTs) enable companies to enhance customer experience by providing more efficient and consistent services while lowering operational costs (Collier & Sherrell, 2010; Liu & Hung, 2022). Customers also have greater control of their service-related interactions as they can access information about a product and purchase it at their own pace, thereby, avoiding bad experiences such as waiting in a long queue or feeling pressured to hurry (Kokkinou & Cranage, 2013). It also provides customers with a more personalised ordering experience as they are allowed to customise the products according to their preferences by inputting exact specifications into a mobile application or kiosk (Fisher & Beatson, 2002). Furthermore, customers can co-create values with businesses by participating in the delivery of services as "workers" (Feng et al., 2019).

Willingness to Pay (WTP)

According to Monroe (2003), the standard economic view of WTP is the maximum amount that a customer is willing to pay to use a product or service. This reflects the inherent value of a product or service in monetary terms. Willingness to pay (WTP) is considered "the cornerstone of marketing strategies" and drives crucial marketing decisions (Schmidt & Bijmolt, 2019) as it is a potent indicator of customer demands and loyalty in the future (Sukhu et al., 2017). A survey by Blackhawk Network (2016) found that WTP for an experience affected the loyalty of 69% of patrons at the evaluated restaurant. Nevertheless, investing in SSTs that customers are not WTP for may affect the profitability of a business. For instance, consumers who are less technologically savvy may find it difficult to conduct service transactions on their own and may ask for discounts as compensation for "serving themselves" and the inconvenience caused. Furthermore, as SSTs are a useful tool for decreasing overheads, customers may expect the cost savings to be passed along to them via price reductions (Ivanov & Webster, 2021; Kokkinou & Cranage, 2013). Therefore, it is vital for businesses to understand the WTP for SSTs of their customers and the associated factors to determine the feasibility of implementing SSTs.

Theoretical Background and Hypothesis Development

Expectation-confirmation Model in the Context of IT (ECM-IT)

Extant studies have used multiple methods to identify the post-purchase behavioural processes of consumers (Churchill & Surprenant, 1982). Of these models, the expectation-confirmation model (ECM) has been extensively used to explain consumer satisfaction (Oliver, 1993). The model posits that consumer satisfaction is the result of discrepancies between two major constructs, namely, initial expectations or pre-purchase expectations and post-purchase expectations (Churchill & Surprenant, 1982). Bhattacherjee (2001) developed and empirically tested an ECM-

IT model with a strong emphasis on the psychological motivations of users such as post-usage expectations, and concluded that post-usage expectations, rather than pre-usage expectations, are the primary determinants of a user's degree of satisfaction with an IT (Wang, 2012).

There are a few differences between the ECM-IT model of Bhattacherjee (2001) and the ECM model. Firstly, ECM-IT prioritises post-purchase expectations while ECM prioritises pre-purchase expectations, which serves as a frame of reference with which to determine the degree of disconfirmation and satisfaction in the post-purchase stage (Hong et al., 2006). Secondly, ECM-IT uses perceived usefulness as the measure for post-adoption expectations as it measures expectations and is the most consistent antecedent of a customer's intention to adopt an IT (Davis, 1989; Karahanna et al.,1999). Thirdly, ECM-IT does not include perceived performance as it assumes that the confirmation construct captures the effect of the perceived performance (Bhattacherjee, 2001).

Extant studies have added perceived ease of use into the original ECM-IT framework as it is widely used to explain IT adoption and usage behaviour, particularly in studies based on the technology acceptance model (TAM), where one of the constructs, the perceived usefulness, was used as the main construct of ECM-IT (Hong et al., 2005). Perceived enjoyment has also been found to better explain technology adoption than perceived usefulness (van der Heijden, 2004). As such, it has been incorporated into ECM-IT as an additional post-usage expectation (Kang et al., 2009; Thong et al., 2006). Studies on SSTs have also added perceived convenience and perceived control into ECM-IT as additional post-purchase expectations that affect customer satisfaction as these constructs are better able to reflect the uniqueness of SSTs and are recognised in the SST literature (Bateson, 1985; Collier & Sherrell, 2010; Wang, 2012). Personalisation is yet another construct that is commonly associated with SSTs (Chen et al., 2021; Riegger et al., 2021) and is a pertinent determinant of customer satisfaction and continued technology usage (Albashrawi & Motiwalla, 2019). Therefore, this present study incorporated personalisation into ECM-IT as an additional post-purchase expectation that affects customer satisfaction.

Perceived Usefulness

Perceived usefulness is defined as the degree to which a customer believes that using a particular system will enhance their job performance (Davis, 1989). It is one of the main drivers of customer decisions to adopt SSTs (Demoulin & Djelassi, 2016; Wang, 2017). In the context of the banking industry, Curran and Meuter (2005) found that consumers who perceive SSTs such as ATMs and online banking to be useful exhibit more favourable attitudes towards SSTs. Weijters et al. (2007) similarly provided evidence that perceived usefulness positively correlates with customer

satisfaction with SSTs in the retail industry. This is because SSTs provide benefits such as convenience and time savings to customers (Eriksson & Nilsson, 2007). The COVID-19 pandemic has also increased the usefulness of SSTs in terms of enforcing social distancing. Homburg et al. (2005) posited that customer satisfaction has a strong and positive impact on WTP. As such, it was hypothesised that:

H1. Perceived usefulness has a positive effect on customers' WTP for SSTs.

Perceived Ease of Use

Perceived ease of use is the degree to which a customer believes that the use of a particular system will be effortless (David, 1989). Much like perceived usefulness, perceived ease of use has been consistently identified as one of the driving forces influencing customer decisions to adopt SSTs (Weijters et al., 2007; Wang et al., 2017). For instance, when a consumer's perceived ease of use increases, their attitude towards SSTs becomes more positive (Lin & Chang, 2011). In the banking sector, Narteh (2015) found that perceived ease of use is a key dimension of service quality that determines customer satisfaction with ATMs. Interestingly, Robertson et al. (2016) discovered that the positive impact of ease of use on customer satisfaction with SSTs is stronger among interactive voice response users than for online users. Therefore, increased customer satisfaction leads to increased WTP (Homburg et al., 2005). As such, it was hypothesised that:

H2. Perceived ease of use has a positive effect on customers' WTP for SSTs.

Perceived Enjoyment

Perceived enjoyment is the degree to which a particular system is perceived to be enjoyable in its own right, apart from any anticipated performance consequences (Davis et al., 1992). Perceived enjoyment influences a customer's intention to use SSTs as well as enhances the value and readiness of customers (Guan et al., 2021). Park et al. (2021) pinpointed enjoyment as a requirement for the implementation of SSTs in restaurants as it increases a customer's perception of the service quality of SSTs by providing them with entertainment and pleasure (Leung et al., 2021), which in turn, increases customer's experience and satisfaction with the SST. This would, in turn, increase customers' WTP for SSTs (Homburg et al., 2005). As such, this study hypothesised that:

H3. Perceived enjoyment has a positive effect on customers' WTP for SST.

Perceived Convenience

Perceived convenience is defined as the extent to which a system provides users with a sense of control over the management, utilisation and conversion of their time and efforts to achieve their goal of accessing and using a service (Farquhar & Rowley, 2009). In the context of SSTs, convenience is a customer's belief that SSTs help complete the service delivery process (Ozturk et al., 2016). Collier and Kimes (2013) demonstrated that perceived convenience positively influences customer satisfaction with SSTs via increased perceived accuracy, speed, and exploration intentions. Meanwhile, Park et al. (2021) found that convenience is one of the most crucial SST attributes for restaurant patrons. King (2019), on the other hand, inferred that the entire SST process should be completely convenient and hassle-free to increase customer satisfaction with SSTs and their WTP (Homburg et al., 2005; Wang, 2012). As such, this study hypothesised that:

H4. Perceived convenience has a positive effect on customers' WTP for SST.

Perceived Control

Perceived control is the "belief in one's ability to command and exert power over the process and outcome of a self-service encounter" (Collier & Kimes, 2013, p. 492). According to Zhu et al. (2007), SST features have to be designed better to function well and increase a customer's perceived control over the service process and outcome. Extant studies have found that the voluntary use of SSTs by restaurant customers has a strong impact on their perceived control over SSTs (Shin & Dai, 2020). This is because SSTs allow customers to shop at their own pace, make their own choices, and enable them to choose what they want. This, undoubtably, increases a customer's perceived control over the SSTs and, in turn, increases their satisfaction (Wang, 2012). Collier and Barnes (2015) concurred with this assertion and noted that perceived control is a significant predictor of customer delight which, in turn, increases their WTP for SSTs. As such, this study hypothesised that:

H5. Perceived control has a positive effect on customers' WTP for SSTs.

Personalisation

In the context of technology, personalisation is the provision of personally relevant content, products and services based on the unique characteristics and needs of a user (Xiao & Benbasat, 2007). Customers increasingly favour personalised functions as it "treats different customers differently" and alleviates the cognitive burden of customers (Chen et al., 2021). However, familiarisation with the needs and wants of customers is required to implement personalised functions in SSTs and shape

them by working with the customer (Iqbal et al., 2018). Ahn and Seo (2018) found that incorporating personalisation elements in SSTs increases the perceived value and develop positive emotions among restaurant patrons. Moreover, higher levels of personalisation in SSTs are more likely to induce high levels of cognitive evaluations by customers such as a higher perception of the monetary value of using SSTs. Therefore, customers are more likely to be WTP for SSTs if they are more satisfied with the experience (Coelho & Henseler, 2012; Scherer et al., 2015). As such, this study hypothesised that:

H6. Personalisation has a positive effect on customers' WTP for SSTs.

Customer Satisfaction

Customer satisfaction is "a measure of how your organisation's total product performs in relation to a set of customer requirements" (Hill & Alexander, 2017, p. 2). Multiple marketing studies have found that customer satisfaction is one of the most significant variables affecting post-consumption behaviours (Chuah et al., 2017; Peng et al., 2022). Notably, Collier and Sherrell (2010) empirically proved that customer satisfaction has a positive effect on their intentions to continue using SSTs in a retail setting. Homburg et al. (2005), similarly, empirically examined the correlation between customer satisfaction and WTP and postulated a strong correlation between the two. Meanwhile, Hanks et al. (2015) concluded that the positive attitudes of restaurant patrons such as a high level of satisfaction increases their WTP a premium as well as share positive word-of-mouth recommendations to others and increases their resilience to negative information about the restaurant. As such, this study hypothesised that:

H7. Customer satisfaction has a positive effect on customers' WTP for SSTs.

Health Risk Reduction

The COVID-19 pandemic has greatly impacted the world, particularly consumer behaviour (Wang et al., 2021). It has provided new perspectives on the responses of customers to SSTs, where engaging with SSTs has transcended a service consideration and become one of health and psychological importance (Brem et al., 2021; Dahlke et al., 2021). More specifically, pandemic-related health concerns have caused customers to accept SSTs to minimise social contact and decrease health risks. Gursoy et al. (2021) found that most customers are WTP more at restaurants and hotels that have implemented safety precautions that minimise social contact, such as the use of digital menus that can be viewed on personal mobile devices by scanning QR codes, which is a form of SST.

More recently, both Chuah, Jitanugoon et al. (2022) and Hao et al. (2022) empirically proved that customers are WTP more for contactless technologies to decrease health risks during the COVID-19 pandemic. Health risk reduction could, potentially, moderate the correlation between customer satisfaction and WTP as a customer's perceived risks have been found to moderate the correlation between the antecedents of WTP and customer satisfaction (Casidy & Wymer, 2016). Therefore, customers are WTP for SSTs, even if they are not entirely satisfied with the service, if it decreases health risks. As such, this study hypothesised that:

H8. Health risk reduction has a positive effect on customers' WTP for SSTs.
H9. Health risk reduction weakens the correlation between customer satisfaction and WTP for SSTs.

Figure 1 illustrates the conceptual model as well as the nine hypotheses of this present study.

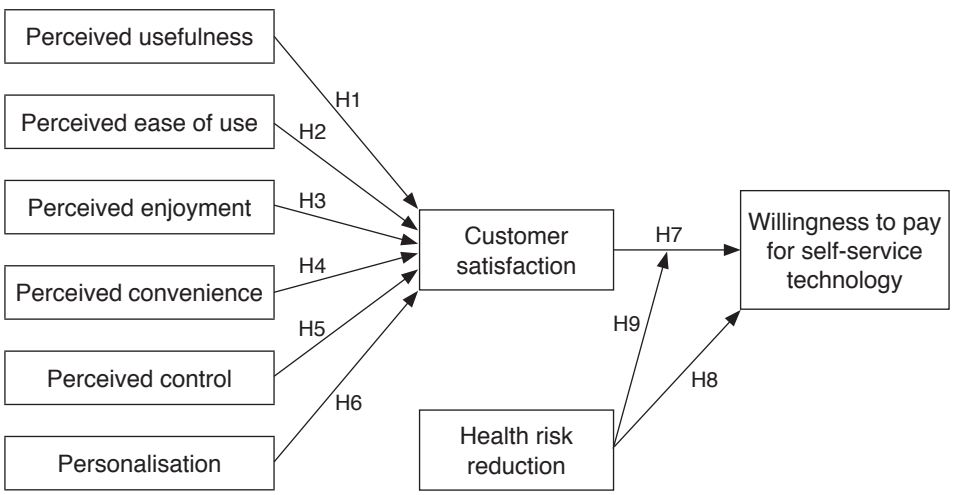

Figure 1. Conceptual model

Methodology

Data Collection and Sample Characteristics

The sample of this present study comprised restaurant customers, recruited via purposive and snowball sampling techniques, who had experienced SSTs in Malaysia. To ensure adequate statistical power, a priori power analysis was performed using the G*Power software. The minimum sample size required was 146, with f2 = 0.15, α = 0.05, and power = 0.95 (Faul et al., 2007).

A self-administered questionnaire, that had been created on Google® Forms and distributed online via various social media platforms from May 3 to June 2, 2022, was used to collect the necessary data. This method enabled data collection from large and geographically dispersed populations throughout Malaysia in a cost-effective manner. A screening question, *"Have you used SSTs in Malaysian restaurants in the past 12 months?",* was used to determine the eligibility of the respondents. The respondents were required to answer items in the questionnaire based on the SSTs that they most frequently used. A total of 255 responses were obtained over the month-long data collection period and after the removal of responses that exhibited straight-lining or failed to pass the screening question. Of the 255 respondents, most were female (65.1%), aged 20 to 29 years (86.7%), students (58.8%), possessed a bachelor's degree at least (73.3%), and earned less than RM2,000 a month (64.7%). Furthermore, 83.3% reported that they primarily scanned QR codes to order food while 69.7% reported using self-service kiosk and 69.3% used mobile ordering applications. Table 1 provides the demographic profile of the respondents.

Table 1. Profile of respondents

Demographic	Categories	Frequencies	Percentage (%)
Gender	Female	166	65.1
	Male	85	33.3
	Others	4	1.6
Age	Below 20 years old	57	22.4
	20–29 years old	164	64.3
	30–39 years old	16	6.3
	40–49 years old	11	4.3
	50–59 years old	1	0.4
	60 and above	6	2.4
Occupation	Student	150	58.8
	Employed (Full-time)	19	7.5
	Employed (Part-time)	62	24.3
	Employer	16	6.3
	Unemployed/Retired/Housewife	8	3.1
Education level	Lower than high school	8	3.1
	High school	25	9.8
	College diploma/ Bachelor's degree	187	73.3
	Postgraduate degree	31	12.2
	Master's degree or above	4	1.6

Table 1. (con't)

Demographic	Categories	Frequencies	Percentage (%)
Monthly income	Below RM2,000	165	64.7
	RM2,001–3,000	37	14.5
	RM3,001–4,000	19	7.5
	RM4,001–5,000	8	3.1
	Above RM5,000	26	10.2
Types of SST used	Self-service kiosk	175	69.7%
	Tablet	158	62.9%
	Mobile ordering application	174	69.3%
	QR code ordering	209	83.3%
	Online reservation platform	130	**51.8%**

Measures

All the measurement items used in the present study were adapted from established literature. The items for perceived usefulness, perceived enjoyment, perceived convenience, and perceived control were obtained from Wang (2012) while the perceived ease items were adapted from Demoulin and Djelassi (2016). The items for personalisation were adapted from Lin and Hsieh (2011) while health risk reduction and customer satisfaction items were adapted from Shin and Kang (2020) and Zibarzani et al. (2022), respectively. Lastly, the items for WTP were adapted from Chuah, Jitanugoon et al. (2022). All the items, with the exception of WTP, were measured on a 7-point Likert scale, where 1 = "strongly disagree" and 7 = "strongly agree". The WTP items were measured on a symmetrical numerical rating scale, where 1 = "at least 11% less than services delivered by human employees", 2 = "6 to 10% less than services delivered by human employees", 3 = "1 to 5% less than services delivered by human employees", 4 = "Pay the same price as services delivered by human employees", 5 = "1 to 5% more than services delivered by human employees", 6 = "6 to 10% more than services delivered by human employees", and 7 = "At least 11% more than services delivered by human employees".

A panel of experts was consulted to validate the contents and face of the questionnaire. More specifically, five academics specialists of the hospitality industry were requested to evaluate how well the items reflected the full content of their respective constructs (content validity) as well as how well they captured the associated construct and not another construct (face validity). The clarity, wording, and order of the items were also examined. Three items were eliminated and some words were modified during this process. Table 2 provides the final measurement items.

Common Method Variance (CMV)

A pilot study involving 15 hospitality management faculty and graduate students was conducted to determine the clarity of the questionnaire as well as mitigate common method variance (CMV). Different anchor point descriptions were used and the anonymity of the respondents was assured (Malhotra et al., 2017; Podsakoff et al., 2003). Harman's single-factor test was then conducted to examine and fix statistical issues. The results indicated that no single factor captured more than half of the covariance among the measures and that the first factor only explained 26.475% of the variance. As per the recommendations of Kock and Lynn (2012), a full collinearity test was also conducted, with the results confirming that the pathological variance inflation factor (VIF) of all the constructs did not exceed five and ranged between 1.562 to 3.257 (Hair et al., 2017). Therefore, the results established that CMV was not a serious issue in this present study.

Data Analysis

Partial Least Square Structural Equation Modelling (PLS-SEM)

The Partial Least Square Structural Equation Modelling (PLS-SEM) method was used to test the hypotheses of the present study as the study's objective was to add to the existing ECM-IT theory rather than to confirm it, for which the covariance-based structural equation modelling (CB-SEM) method would have been better suited (Hair et al., 2019). The PLS-SEM method is also best for studies that involve complex models such as the examination of mediating and moderating effects (Sarstedt et al., 2020). It is also more lenient in terms of the required sample size, measurement model, and data assumptions. According to the two-stage analytical procedure, the measurement model was evaluated prior to the structural model.

Measurement Model

The validity and reliability of the measurement model were assessed to examine the quality of the hypothetically-defined constructs. As seen in Table 2, the convergent validity of the constructs was first evaluated using their factor loadings and average variance extracted (AVE). The factor loadings and AVE of all the constructs exceeded the 0.708 (Hair et al., 2017) and 0.5 (Fornell & Larcker, 1981) thresholds, respectively, indicating adequate convergent validity. The internal consistency reliability, which was represented by the composite reliability (CR) and Cronbach's alpha (α), was then evaluated. Both the CR and Cronbach's α of all the constructs exceeded 0.7, indicating satisfactory internal consistency (Hair et al., 2017).

Lastly, the heterotrait-monotrait (HTMT) ratio criterion was used to examine the discriminant validity (Henseler et al., 2015). As seen in Table 3, all the HTMT

ratios did not exceed 0.9, indicating that discriminant validity had been established (Gold et al., 2001).

Table 2. Results of the measurement items

Variables	Items / Descriptions	Convergent validity		Internal consistency reliability	
		Loadings	AVE	CR	Cronbach's Alpha
Perceived usefulness	Using the SST improves my service transaction's ability.	0.894	0.821	0.948	0.927
	Using the SST enhances the effectiveness in my service transaction.	0.921			
	Using the SST is useful in handling my service transactions.	0.918			
	Using the SST increases my productivity of handling service transactions.	0.891			
Perceived ease of use	I find the SST easy to use.	0.946	0.899	0.947	0.887
	My interaction with SST is clear and understandable.	0.950			
Perceived enjoyment	I think using the SST is fun for its own sake.	0.894	0.848	0.943	0.910
	I think using the SST is interesting.	0.929			
	I think using the SST is enjoyable.	0.938			
Perceived convenience	Using the SST is a convenient way to conduct service transactions.	0.893	0.774	0.932	0.903
	The SST allows me to conduct service transactions whenever I choose.	0.863			

Table 2. (con't)

Variables	Items / Descriptions	Convergent validity		Internal consistency reliability	
		Loadings	AVE	CR	Cronbach's Alpha
	Using the SST makes my service transaction less time consuming.	0.870			
	The SST allows me to save time on service transactions.	0.894			
Perceived control	I feel I am in charge of my own service transaction when using the SST.	0.881	0.777	0.913	0.857
	I feel in control throughout the process of operating the SST.	0.893			
	The SST allows me to select any services I need.	0.870			
Personalisation	The restaurants' SST understands my specific needs.	0.909	0.857	0.947	0.916
	The restaurants' SST has my best interests at heart.	0.940			
	The restaurants' SST has features that are personalised for me.	0.928			
Customer satisfaction	I am satisfied with SST in the restaurants.	0.928	0.868	0.952	0.924
	My satisfaction with SST in the restaurants is high.	0.946			
	I am glad that I selected the restaurants with SST.	0.922			
Health risk reduction	I feel nervous about being served by human staff in the restaurant because of COVID-19.	0.914	0.811	0.945	0.923

Table 2. (con't)

Variables	Items / Descriptions	Convergent validity		Internal consistency reliability	
		Loadings	AVE	CR	Cronbach's Alpha
	Being served by human staff in the restaurant is a risky decision during COVID-19.	0.900			
	I feel uncomfortable being served by human staff in the restaurant because of COVID-19.	0.927			
	There is high probability that being served by human staff in the restaurant would lead to COVID-19.	0.861			
Willingness to Pay	How much are you willing to pay for SST compared to human-delivered service in restaurants?	N/A	N/A	N/A	N/A

Note: Loadings, AVE, CR, and Cronbach's Alpha are not available for single item measures.

Table 3. Discriminant validity (HTMT)

	CS	HRR	PCON	PCT	PE	PEOU	PERS	PU	WTP
CS									
HRR	0.523								
PCON	0.832	0.360							
PCT	0.868	0.468	0.819						
PE	0.840	0.427	0.831	0.795					
PEOU	0.826	0.430	0.857	0.788	0.776				
PERS	0.825	0.541	0.729	0.812	0.731	0.757			
PU	0.835	0.467	0.826	0.844	0.746	0.810	0.764		
WTP	0.511	0.528	0.436	0.513	0.466	0.466	0.542	0.467	

Note: CS = customer satisfaction, HRR = health risk reduction, PCON = perceived convenience, PCT = perceived control, PE = perceived enjoyment, PEOU = perceived ease of use, PERS = personalisation, PU = perceived usefulness, WTP = willingness to pay

Structural Model

As per the suggestions of Hair et al. (2017), the multicollinearity was examined before the path coefficients. The results revealed that the VIF of all the constructs did not exceed five and ranged between 1.304 and 3.618 (Hair et al., 2019). Therefore, multicollinearity would not create issues in the structural model.

The significance of the path coefficients was then analysed using the bootstrapping technique with 5,000 subsamples (Hair et al., 2019). As seen in Table 3 (Figure 2), perceived usefulness ($\beta = 0.168$, $p < 0.05$), ease of use ($\beta = 0.122$, $p < 0.05$), enjoyment ($\beta = 0.237$, $p < 0.001$), control ($\beta = 0.178$, $p < 0.01$), and personalisation ($\beta = 0.207$, $p < 0.001$) were significant predictors of customer satisfaction but perceived convenience was not ($\beta = 0.095$, $p > 0.05$). The results also showed that both customer satisfaction ($\beta = 0.318$, $p < 0.001$) and health risk reduction ($\beta = 0.358$, $p < 0.001$) had significantly positive impacts on WTP. Therefore, H1 to 8 were supported, with the exception of H4.

Little et al.'s (2006) orthogonalising method was then used to analyse the moderating effect of health risk reduction on the correlation between customer satisfaction and WTP. As seen in Table 3, health risk reduction had an insignificant moderating effect ($\beta = 0.087$, $p > 0.05$). Therefore, H9 was not supported. The coefficient of determination (R^2) was evaluated to examine the predictive accuracy of the model. As seen in Figure 2, the R^2 ranged from 0.348 (WTP) to 0.773 (customer satisfaction), indicating that the corresponding predictor constructs explained a moderate to substantial amount of variance in the endogenous constructs (Chin, 1998). The effect size (f^2) was also examined to determine the relative effect of a predictor construct on an endogenous variable. According to Cohen (1988), f^2 values of 0.02, 0.15, and 0.35 indicate small, medium, and large effects, respectively. As seen in Table 4, all the factors affecting customer satisfaction had small effect sizes that ranged from 0.011 (perceived convenience) to 0.086 (perceived enjoyment). The effect sizes of customer satisfaction (0.118) and health risk reduction (0.148) on WTP were, similarly, small. Only the moderating effect of health risk reduction on the correlation between customer satisfaction and WTP was trivial (0.014).

Lastly, blindfolding was used to examine the predictive relevance of the model. As shown in Table 3, the predictive relevance (Q^2) of all the endogenous constructs exceeded zero and ranged between 0.3 to 0.658, indicating that the model had high Q^2 (Hair et al., 2017). Overall, the model was deemed to be fit, with a saturated standardised root mean square residual (SRMR) value of 0.042, which is well below the 0.08 threshold (Hu & Bentler, 1998).

Table 4. Results of hypothesis testing

Hypotheses	Path Coefficient (β)	*t*-value	*p*-value	f^2	95% confidence intervals	Decision
H1 PU → CS	0.168	1.788	0.037	0.037	[0.015, 0.325]	Supported
H2 PEOU → CS	0.122	1.787	0.037	0.021	[0.004, 0.230]	Supported
H3 PE → CS	0.237	3.685	0.000	0.086	[0.135, 0.348]	Supported
H4 PCON → CS	0.095	1.366	0.086	0.011	[–0.013, 0.221]	Unsupported
H5 PCT → CS	0.178	2.926	0.002	0.045	[0.075, 0.278]	Supported
H6 PERS → CS	0.207	3.061	0.001	0.072	[0.096, 0.316]	Supported
H7 CS → WTP	0.318	4.069	0.000	0.118	[0.191, 0.449]	Supported
H8 HRR → WTP	0.358	5.469	0.000	0.148	[0.243, 0.458]	Supported
H9 HRR x CS → WTP	0.087	1.547	0.061	0.014	[–0.202, 0.119]	Unsupported

Note: CS = customer satisfaction, HRR = health risk reduction, PCON = perceived convenience, PCT = perceived control, PE = perceived enjoyment, PEOU = perceived ease of use, PERS = personalisation, PU = perceived usefulness, WTP = willingness to pay

Discussion and Conclusion

The COVID-19 pandemic revolutionised the use of contactless technologies, such as SSTs, as a means of reducing physical contact and enforcing social distancing (Wang et al., 2022). Accordingly, hospitality companies cannot afford to ignore the role that SSTs play in building their resilience and helping them recover from the far-reaching consequences of the COVID-19 pandemic (Osei et al., 2020). The present study adapted and extended the ECM-IT framework of Bhattacherjee (2001) by adding health risk reduction as a possible moderator of the correlation between customer satisfaction and their WTP for SSTs. Furthermore, in addition to perceived usefulness, which is already a part of Bhattacherjee's (2001) ECM-IT framework, this present study added perceived ease of use, perceived enjoyment, perceived convenience, perceived control, and personalisation to the framework as

factors affecting customer satisfaction. The conceptual model was then empirically tested using data gathered from 255 restaurant patrons in Malaysia.

Much like the findings of extant studies, this present study found that perceived enjoyment was the most important factor influencing customer satisfaction, followed by personalisation, perceived control, perceived usefulness, and perceived ease of use (Coelho & Henseler, 2012; Curran & Meuter, 2005; Narteh, 2015; Weijters et al., 2017). Consumers were also found to prioritise enjoyment over usefulness when using SSTs in restaurants, which was consistent with the findings of Wang (2012) in the context of convenience stores. This intriguing finding could be attributed to the sample of this study, which was predominantly youngsters, such as millennials and Gen Zs. More specifically, as this demographic grew up with technology, they have a greater affinity for interactive and engaging technologically-driven experiences (Pichler et al., 2021). As such, the hedonic or fun aspects of STTs may be more appealing to them than the utilitarian aspect. However, perceived convenience was found to have an insignificant effect on customer satisfaction with SSTs, which differed from the findings of Collier and Kimes (2013). This could be because people are becoming accustomed to using SSTs as SSTs continue to develop rapidly. As such, convenience is no longer a benchmark of customer satisfaction (Tanoto et al., 2021).

The present study also found that health risk reduction had a greater impact on a customer's WTP for SSTs than to customer satisfaction. Although this differed from the findings of some studies that concluded that customer satisfaction is the primary determinant of a customer's WTP for products or services (Casidy & Wymer, 2016; Homburg et al., 2005), it corroborated the findings of others who examined contactless technologies in the COVID-19 era (Chuah, Jitanugoon et al., 2022; Hao et al., 2022). The findings of this present study also endorsed Chuah, Aw et al.'s (2022) view that the COVID-19 pandemic has increased the health and safety concerns of consumers. As such, consumers do not mind paying higher prices for contactless solutions if it gives them peace of mind and helps mitigate the risk of infection. Nevertheless, this present study found that health risk reduction had an insignificant moderating effect on the correlation between customer satisfaction and WTP. This could be because satisfaction is a non-compensatory factor when consumers are deciding whether to pay for SSTs or not. Therefore, dissatisfied SST consumers are unlikely to pay more solely to decrease their health risks.

Theoretical Implications

This present study adapted Bhattacherjee's (2001) ECM-IT framework and extended it by adding a new construct — health risk reduction. The addition of this rarely studied but managerially relevant construct enabled the present study to provide a more holistic understanding of the factors driving customers' WTP for SSTs. This is

evidenced by the substantial explanatory power of the proposed model as it was able to explain nearly 78% of the variance in customers' WTP for SSTs. The results also revealed that health risk reduction was more influential in determining customers' WTP for SSTs than to customer satisfaction.

Additionally, this present study contributes to the body of literature on technologies or SSTs by revealing that consumer priorities have shifted from satisfaction to health risk reduction. Extant studies prioritised perceived risk and its effect on customer decision-making (Giovanis et al., 2018; Jeon et al., 2020) as travelling or dining out often involves risks and uncertainties. However, in the era of COVID-19, consumers are more worried about their health and safety than other risks (Shin & Kang, 2020). Therefore, this present study also enriched the theory of perceived risk by exploring the crucial role of customers' decision-making processes in reducing health risks.

Secondly, although some studies have recently discussed the ECM-IT model (Al-Nabhani et al., 2022; Wang, 2012), this present study validated it in the COVID-19 era and confirmed its relevance for studying customers' WTP for SSTs in the context of a public health crisis. Future studies on the COVID-19 era could also use it to, potentially, explain the adoption of various contactless technologies such as facial recognition-based check-ins and check-outs or payments at hotels and robotic services in restaurants and hotels, to name a few. As this present study has proven that the COVID-19 era significantly affected consumers' WTP for SSTs in restaurants, it may inspire future studies to investigate other financially-related constructs, such sales and profitability of firms, rather than just general attitudinal variables.

Managerial Implications

The findings of this present study have valuable managerial implications. For instance, the marketing activities of restaurant managers intending to promote SSTs to attract customers and convince them to pay for them should highlight the ability of SSTs to decrease the risk of viral infections. This can be accomplished by illustrating that SSTs are able to adhere to social distancing guidelines and, thus, decrease physical contact and prevent the spread of the virus. However, managers should not compromise on customer satisfaction as customers are not WTP for health risk reductions if they are unsatisfied. Therefore, managers should prioritise the functionality of SSTs and perform regular maintenance to provide customers with a smooth and efficient SST experience.

Furthermore, as perceived enjoyment is the most significant factor influencing customer satisfaction, restaurant managers should also prioritise making SSTs enjoyable to increase customer satisfaction. This can be accomplished by designing self-ordering tablets or kiosks user interfaces that are more interactive and engaging

by incorporating gamified elements into the SST device or machine. Restaurant managers should also emphasise the personalisation component of SSTs as it is the second most significant factor affecting customer satisfaction. For instance, self-ordering tablets or kiosks could be programmed to personalise customer orders and suggest add-ons that complement their orders. As perceived control is the next significant factor affecting customer satisfaction, designing SSTs that give customers more control over the machines is another important consideration for restaurant managers. For example, customers should be given the option to personalise their orders if they so desire, to pay via SSTs using their preferred payment method, and to add order-related remarks for the kitchen staff. It is believed that providing customers with an enjoyable and personalised SST experience as well as giving them control of SSTs will shape their satisfaction with SSTs. Therefore, restaurant managers should prioritise applying these constructs when implementing SSTs and put less emphasis on perceived usefulness and ease of use as they have less of an impact on customer satisfaction.

Restaurant managers may also advertise differences between the time taken to place an order via SSTs and human employees as SSTs help customers save time. This can be accomplished by frequently reviewing and maintaining SST devices or machines and designing them to limit the time taken to complete the service process. The design of the SST devices or machines should also be simple and easy for consumers of all ages to understand, with easy-to-read fonts and clear directions on how to use the SST devices or machines to increase customers' perceived ease of use.

Limitations and Future Research

Firstly, the respondents of this present study solely comprised SST users in restaurants. Therefore, future studies may examine consumers' WTP for SSTs in other services. Secondly, only ECM-IT was used as the underlying theoretical framework. Therefore, future studies may include other theories such as the theory of reasoned action (TRA), the unified theory of acceptance and use of technology (UTAUT), and the diffusion innovation theory (DOI) to further enhance SST-related studies. Thirdly, this present study only quantitatively examined customers' WTP for SSTs. Therefore, future studies may include a qualitative analysis to obtain a more in-depth understanding of customer perspectives. Lastly, although the findings of this present study can be generalised to all restaurants, the patrons of different types of restaurants such as fast-food restaurants and fine-dining restaurants have different levels of satisfaction and WTP for SSTs. Therefore, future studies may investigate potential differences in consumer behaviours at different types of restaurants to obtain more specific insights.

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