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## A Study on the Factors Boosting Customer Experience in the Adoption of Smart Locker in Klang Valley

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### Abstract

The Covid-19 pandemic has heightened customers adoption of online shopping while sparked interest in businesses that make “good” use of the new technologies to provide convenience to the customers. Indeed, the adoption of self-service technologies such as smart locker services has gained wide acceptance within the business world as a viable competitive strategy to enhance customer experience. Although the popularisation of the smart locker adoption has been observed, there are still lacking studies discussing the adoption of smart lockers in the retail industry in Malaysia. This research sought to investigate the factors boosting customer experience in the adoption of the smart locker. The findings would contribute to the understanding of factors that can boost customer experience in the adoption of self-service technology like a smart locker. Data from 200 respondents in Klang Valley Malaysia were collected and analyzed using SPSS. Adapted scales were used to measure time convenience, cost efficiency, location convenience and customer experience, and their relationships were tested using Pearson Correlation and Multiple Regression analysis. The findings revealed that all three factors had a significant effect on consumers' experience. Cost efficiency was the most important factor affecting customer experience, followed by time convenience and location convenience. Results indicate that consumers in the retail industry are more concerned with the total cost during their purchase. Retailers who can provide cost-efficiency solutions can create a better shopping experience, leading to higher customer satisfaction and loyalty. The results of this study can be used as a reference for future research on consumers' behaviour toward other new technologies adopted in various industries. This study is limited to only respondents in Klang Valley, in which people from different states can be included for future research to increase the generalisability of the study. Also, other determining factors such as ease of use, privacy, security, or size of the smart locker can be included for future research.

**Keywords:** Smart Locker, Customer Experience, Time Convenience, Cost Efficiency, Location Convenience

### Introduction

The fourth industrial revolution (IR 4.0) has changed the way people use technology in their daily lives. Technology offers many opportunities and benefits by adopting innovative

industries such as the Internet of Things (IoT), big data, and virtual reality (Chia et al., 2019). Indeed, many companies have started to accelerate the digitalization of customer interaction and supply chain, which is likely to experience revenue growth (Lagorio & Pinto, 2020). Hence, incorporating innovative technologies in enhancing customer experience is vital for a company to stay competitive, particularly in the retail industry that always faces stiff competition among competitors. Furthermore, the global pandemic has caused massive disruption in the retail industry, varying from operational disruptions, a rise in unemployment, a decline in consumer confidence, and disruptions in the supply chain due to the movement restrictions to minimize the spread of infections (Tee et al., 2022). With numerous movement restrictions and temporary store closures being imposed in Malaysia, customers are now relying heavily on online retailing. While tremendous growth in the retail industry, the disruption in the supply chain led to an increase in shipping costs, and delays in parcel delivery have been observed (Refaningati et al., 2020; Lagorio et al., 2020). Therefore, the retailers are actively searching for solutions to their operational disruptions, and one of the many ways is through smart locker services (Chen et al., 2020).

Smart locker is one of the various types of Internet-of-Things (IoT), also known as parcel locker, automated parcel locker, and unmanned parcel locker, which can be operated via customers' smartphones (Rai et al., 2021; Vikingson & Bengtsson, 2015). Most businesses, especially retailers, have continuously accelerated the usage of Internet-of-Things (IoT) to serve their customers continuously. The retailers continuously invest in IoT and automation technologies such as self-service to improve operational efficiency while maintaining social distance and less human contact during the COVID-19 pandemic (Aziz & Nasir, 2021). Similarly, in Malaysia, due to the movement control order (MCO), self-service technologies have become more popular among the retailers, providing convenience to the customers while reducing the physical contact during the purchases (Aziz & Nasir, 2021). Nevertheless, most previous studies (Ghansah et al., 2020; Lim et al., 2021; Mokhtar & Ismail, 2018; Tee et al., 2019, 2021) primarily investigated the utilization of IoT in the perspective of educational institutions, home development, and hospitality services. A limited study was done in the retail businesses; hence, it is worth examining the adoption of the smart locker and the impact on the customers' experiences, specifically in the retail industry. In addition, in times like the current pandemic, most people prefer to shop online, resulting in increases in delivery services and delay in parcel shipments. Hence, a smart locker that offers several benefits, such as reducing the logistics flow in the urban area, minimizing failed deliveries, offering flexibility and convenience in terms of collection hours and costs, was a solution for the disruptions in the supply chain (Deutsch & Golany, 2018; Iwan et al., 2016). The adoption of the smart locker is believed to positively impact customer experience, especially with the ongoing global pandemic.

Several studies on the adoption of smart lockers (Buldeo et al., 2021; Deutsch & Golany, 2018) found that smart lockers offer strategic logistic solutions for businesses primarily in the emerging Asian market where the e-commerce businesses grow tremendously in this region (Aziz & Nasir, 2021; Chia et al., 2019). Although the popularisation of the smart locker adoption has been observed, there are still lacking studies discussing the adoption of smart lockers in the retail industry in Malaysia. Therefore, this study aims to investigate the factors boosting customer experience in using the smart lockers, and three factors were identified: Time convenience, cost efficiency and location convenience.

## Literature Review

Using Technology Readiness Index (TRI) to underpin this study, three main predictors (i.e., time convenience, cost efficiency, and location convenience) influenced customer experience using smart lockers. TRI includes four dimensions (i.e., optimism, innovativeness, discomfort, and insecurity) that affect an individual's technology adoption (Parasuraman, 2000). The score from these four dimensions also reflects the technology readiness in predicting consumer behaviour (Lam et al., 2008; Rosalina et al., 2020). This study adopts the measures for 'optimism' in TRI. It suggests that time convenience, cost efficiency, and location convenience would affect customer experience due to utilizing the smart technology and, hence, using it more often.

## Customer Experience

The customer experience (CX) refers to the total cognitive and affective perception of the company's performance. A pleasant customer experience leads to customer satisfaction which is vital for customer retention and loyalty (Kadirova et al., 2015). In the retail industry, customer experience can occur through direct and indirect contact with the retailers (Bascur & Rusu, 2020; Vanharanta et al., 2015). Self-service technology was found to enhance the customer shopping experience in the retail industry (Hanif & Gafar, 2017). Moreover, the innovative retail technology is more likely to generate an exciting shopping experience and lead to positive word-of-mouth (WOM) for the retailers (Inman & Nikolova, 2017). Innovative retail technology can enhance customer experience through superior and personalized services from customers' perspectives. In concur with Roy et al.'s (2017) and Ha's (2020) studies, an intelligent retail technology positively influences customer satisfaction, perceived enjoyment, and WOM intentions towards the particular retailers. A high level of satisfaction and perceived enjoyment in utilizing new technologies (e.g., self-service technology) determines the users' shopping experiences (García-Fernández et al., 2018). In this study, three main factors have been identified to boost customer experience: time convenience, location convenience, and cost-efficiency.

## Time Convenience

Time convenience, also known as access convenience, is part of service convenience attributes. This statement is in line with the study by (Farquhar & Rowley, 2009; Berry et al., 2002). They conceptualize service convenience as decision convenience, access convenience, transaction convenience, benefit convenience, and post-benefit convenience. This study focuses on access convenience, which refers to the consumers' perceived time and effort in obtaining service delivery, and it is also known as time convenience. Berry et al (2002) mentioned that the growing operation of self-service technologies helps reduce the time and costs of accessing the services and reduce the dependency on service providers. Hence, utilization of smart locker services is expected to add value to retailers' services, particularly in providing access convenience (i.e., time convenience) to the consumers. Additionally, Nguyen et al (2012) found that time convenience in the retail setting would be an essential attribute of service convenience to enhance the customers' perception of the overall service quality in the retail industry.

Time convenience has commonly known as the factor that strongly increases the likelihood for customers to continue utilizing technology-based services. In the context of technology adoption, time convenience generates a more decisive influence on consumer adoption behaviour than money-saving benefits (Tee et al., 2014; Xu et al., 2019). Customers

are becoming more convenience-oriented nowadays since most individuals invest their time and effort to improve their quality of life and overall well-being. Hence, ensuring time convenience can improve consumers' service experience and engagement behaviours (Roy et al., 2020). Indeed, time convenience is used as one of many competitive advantages that offer a limited-service differentiation compared to other retailers in the industry because time constraints have been the top reasons for customers to appreciate the service quality companies offer.

Similarly, Wasan (2018) found that time convenience appeared highly valued by customers and positively influenced purchase intentions, satisfaction, and overall shopping experience. Xu et al (2019) also found that time convenience attributes enhance consumers' engagement behaviours such as involvement and referral behaviour, which in turn led to higher in-store loyalty and brand equity. In this case, the utilization of self-service technologies such as smart locker services offers better functionality and time convenience and personalized experience, especially during the COVID-19 pandemic (Wei et al., 2017). Chen et al (2020) stated that time convenience is the main benefit of using smart lockers since smart locker offers time convenience such as 24-hours accessibility for self-service parcel collection. Similarly, Wang et al (2019) also found that flexible operating hours in using smart locker services were more convenient than the conventional home delivery service. Hence, the following hypothesis is proposed for further investigation.

H1: There is a positive relationship between time convenience and the customer experience in using smart locker services.

### **Cost Efficiency**

Cost can also be defined as price or the amount of money required to exchange a product and service (Kotler et al., 2016). They claimed that cost refers to the sum of money or goods needed to obtain a combination of other goods and its accompanying services. The lower the perceived cost led to a lower perceived sacrifice required from the customers, and higher customer satisfaction or perceived value will occur through lower perceived cost (Lee et al., 2022). In the retail and service context, Al-msallam (2015) stated that the cost of a product or service influences the level of customer loyalty and satisfaction resulting from a pleasant customer experience. Besides monetary cost-saving, self-service technology (SSTs), such as smart locker services, can enhance the customer service experience by providing cost-efficient service (Lemon & Verhoef, 2016; Makarem et al., 2009).

Saha et al (2020) found that smart locker services offer delivery efficiency and cost-saving benefits, significantly correlated with positive shopping experience and satisfaction. Advanced technology in smart locker services can decrease operational costs through seamless interconnection (Müller et al., 2018). In addition, utilizing a smart locker reduces the incidence of missed or failed deliveries due to wrong addresses, customers not at home or overwhelming situations in the logistic centre, which eventually negatively affect customer shopping experience (Zenezini et al., 2018). Prior research indicates that price can constrain the attractiveness of purchase (Xu et al., 2019; Jones et al., 2019). Barker & Brau (2020) found that most customers are very concerned about the shipping cost for online shopping, and they are likely to perceive free shipping as one factor that influences their shopping experience with respective retailers.

Moreover, Bijvank (2018) argued that unmanned delivery options such as smart lockers allow both retailers and customers to enjoy monetary and environmental efficiency, particularly reducing environmental costs such as traffic congestion and pollution during the

delivery process. A smart locker is a suitable last-mile delivery option for customers as it offers cost efficiency and a greater customer experience. Therefore, the following hypothesis was formed for further investigation.

H2: There is a positive relationship between cost efficiency and the customer experience using smart locker services.

### Location Convenience

Location convenience is another term for accessibility. Lee et al. (2010) found that transportation costs and time are the most vital elements in providing location convenience, influencing the consumer's selection of the retail store. Jones et al (2003) claimed that location is important, especially for service firms, as it usually requires direct contact between the customer and the firm. Similarly, Chen et al (2011) stated that location convenience offers customer convenience in reducing the total travel cost between their points of origin, such as home or office, to the facility. Location convenience relates to other convenience aspects such as time, place, acquisition, use, and execution scopes.

Previous researchers (Lotfi & Koohsari, 2009; Milioti et al., 2020; Montreuil & Faugere, 2017) defined location convenience as the ease of activities obtained from a particular place and with a suitable system of transport. In the context of Internet-of-Things (IoT), Pinochet et al (2018) describe that an efficient location of the device significantly influences the level of convenience for customers before and during the purchase as the convenience offered by IoT saves customers' time and effort in completing daily tasks. Lagorio and Pinto (2020) found that location convenience impacts customer experience through the safety of both smart locker and customers when collecting the parcel. Similarly, Lachapelle et al. (2018) found that smart lockers are usually located in an area with a higher population density as it increases the security and convenience for most customers. Indeed, the strategic location of the smart locker can attract more users with greater coherence with city planning and sustainability integration for residents in a particular area. Montreuil & Faugere (2017) stated that smart locker offers greater convenience for customers as the lockers are usually installed in the neighbourhoods close to the customers' homes and accessible anytime. Besides, smart locker services also offer delivery efficiency through predictable delivery points to reduce travel miles, urban congestion and gas emissions. Therefore, a smart locker is a better option than conventional home delivery due to its accessibility and convenience (Montreuil, 2016). Thus, the following hypothesis was formed for further investigation.

H3: There is a positive relationship between location convenience and the customer experience in using smart locker services.

Hence, the research framework is displayed as follows:

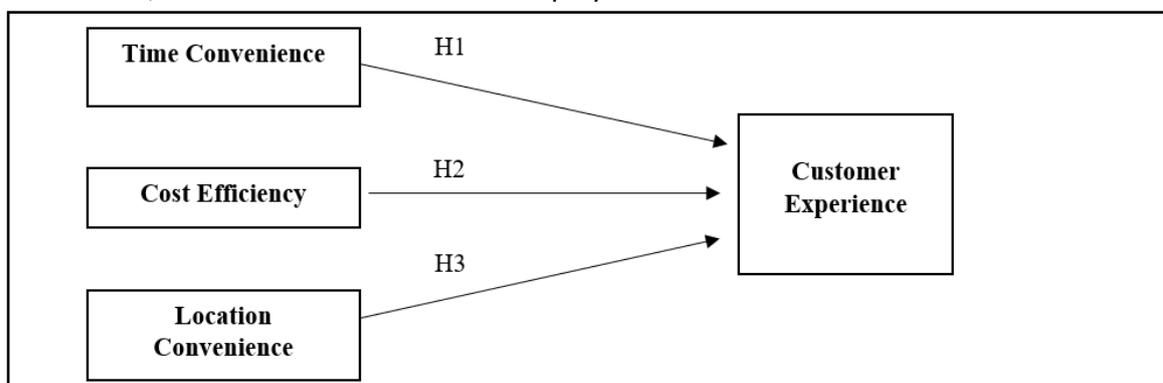


Figure 1: Research Framework

## Methodology

### Participants

Data were collected from 200 respondents in Klang Valley, Malaysia, via an online Google forms questionnaire. The sample consists of 149 (74.5%) male and 51 (25.5%) female. 142 (71%) respondents belong to the 19-30 years old group, followed by 34 (17%) from 31-40 years, 18 (9%) from 18 years, 5 (2.5%) from 41-50 years, and only 1 (0.5%) was over 50 years old. In terms of employment status, the majority (48.50%) of the respondents were students, followed by 81 (40.50%) respondents who were employed, 13 (6.50%) were self-employed, 8 (4%) were unemployed, and the remaining 1 (0.50%) were retired. In addition, half (50%) of the respondents have an undergraduate degree, followed by 53 (26.50%) respondents who hold a postgraduate degree, 26 (13%) have diploma qualifications, 15 (7.5%) have secondary/high school qualifications, and only 6 (3%) of respondents have Ph.D. qualification.

### Instruments

The items used to measure the four latent constructs were adopted from past studies. Items for customer experience were adopted from Roy et al. (2017), items for time convenience were adopted from Yuen et al. (2019) and Chen et al. (2011), followed by items for cost efficiency were adopted from Saha et al. (2020). Items for location convenience were adopted from Collier et al. (2015). Respondents were instructed to rate their point of view based on the five-point Likert scale ranging from 1= Strongly Disagree to 5= Strongly Agree.

### Data Analysis

This study utilized Statistical Package for Social Sciences (SPSS) version 26.0 to conduct reliability and normality test, followed by Pearson correlation and multiple regression analysis. Table 1 indicates the results of the reliability test. The Cronbach's Alpha value for all the independent and dependent variables ranges from 0.733 to 0.916 ( $>0.70$ ), showing that all these items have excellent reliability. Besides, the normality test was analyzed using skewness and kurtosis range. According to Griffin & Steinbrecher (2013), the acceptable value of skewness falls between the range of -3 and +3, while kurtosis ranges between -10 and +10. The normality test results show that both skewness and kurtosis values fall within the acceptable range; hence, the data is normally distributed.

**Table 1: Reliability Test**

Variables	N of Items	Cronbach's Alpha
All Variables	16	.916
Customer Experience	4	.866
Time Convenience	4	.733
Cost Efficiency	4	.859
Location Convenience	4	.808

Pearson correlation analysis was conducted to examine the strength and the direct relationship between variables (Tee & Chan, 2016). Sekaran and Bougie (2016) affirmed that the Pearson correlation matrix investigates the direction, strength, and significance between variables measured at an interval or ratio level. Table 2 shows the correlation between the three independent variables (i.e., time Convenience, cost efficiency and location

convenience) and the dependent variable (i.e., customer experience). All the relationships were found significant ( $p < 0.05$ ). Cost efficiency has the greatest positive impact ( $r = 0.698$ ) on customer experience, followed by time convenience ( $r = 0.663$ ) and location convenience ( $r = 0.438$ ).

**Table 2: Results for Pearson Correlation Analysis**

		CX	TC	CE	LC
CX	Pearson Correlation	1	.663**	.698**	.438**
	Sig. (2-tailed)		.000	.000	.000
	N	200	200	200	200
TC	Pearson Correlation	.663**	1	.683**	.477**
	Sig. (2-tailed)	.000		.000	.000
	N	200	200	200	200
CE	Pearson Correlation	.698**	.683**	1	.419**
	Sig. (2-tailed)	.000	.000		.000
	N	200	200	200	200
LC	Pearson Correlation	.438**	.477**	.419**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	200	200	200	200

\*\*Correlation is significant at the 0.01 level (1-tailed)

Note: CX=Customer experience; TC=Time convenience; CE=Cost efficiency; LC=Location convenience

Table shows that the model summary indicates the R square value is 0.560, mean that the three independent variables (time convenience, cost efficiency, and location convenience) accounted for 56% of the variation in the dependent variable (customer experience). Nevertheless, the remaining 44% of the variation can be explained by other factors not discussed in this study.

**Table 3: Model Summary**

Model	R	R Square	Adjusted R Square	SE of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1 <sup>a</sup>	.748	.560	.553	.57845	.560	83.168	3	196	.000

a. Predictors: (Constant), LC, CE, TC

**Error! Reference source not found.** specifies that the F statistic represents a regression relationship in this model. The significance regression equation is constructed as  $[F(3,196) = 83.168, P < 0.05]$ . since alpha ( $\alpha$ ) value is 0.05 and p-value is 0.01 ( $p < 0.005$ ) which means, the model was fit to the analysis.

Table 4: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	83.486	3	27.829	83.168	.000 <sup>b</sup>
	Residual	65.584	196	.335		
	Total	149.070	199			

a. Dependent Variable: CX

b. Predictors: (Constant), LC, CE, TC

Table indicates the coefficient values from the regression test. The results show that all the three independent variables (i.e., Time convenience, Cost efficiency and Location convenience) contributed significantly to the variance in customer experience ( $p < 0.05$ ). On top of that, cost efficiency is still the most important variable that boosts customer experience in using the smart locker, followed by time and location convenience. Above all, we can conclude that all the three hypotheses (H1, H2 & H3) are supported.

Table 5: Coefficient Value

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		Beta	Std. Error	Beta		
1	(Constant)	.103	.337		.306	.760
	TC	.375	.082	.311	4.589	.000
	CE	.421	.063	.442	6.738	.000
	LC	.156	.081	.105	1.920	.046

a. Dependent Variable: CX

## Discussion

The findings indicate a significant positive relationship between time convenience and the customer experience in adopting a smart locker. This result is in line with Nguyen et al. (2012) also found that time convenience (i.e., operating hours) does enhance the service quality and customers' experience in the retail industry. Xu et al (2019) also found that time convenience positively influences consumer behaviour in utilizing technology-based services, which ultimately increases the customer experience in the retail industry. Also, time convenience is non of the attributes of service convenience that positively increases customer engagement, such as referral behaviour which contributes to the company's competitive advantages (Roy et al., 2020). Moreover, Chen et al (2020); Wang et al (2019) also found that flexible operating hours boost customer satisfaction and experience in adopting self-service technology compared to the conventional home delivery service. Based on the above findings, the retailers are encouraged to utilize self-service technologies such as smart locker services to enhance the customer shopping experience, especially during the COVID pandemics. Most logistic companies face congestion in the delivery of their parcels schedule.

This study also indicates the positive relationship between cost efficiency and the customer experience in adopting a smart locker. Similar to the finding by Han et al. (2020) and Saha et al (2020), the (monetary and non-monetary) cost of a product or service did influence the customer shopping experience to the point that customers will not consider a

particular product or service if the cost is not worthwhile. Besides, Zenezini et al. (2018) found that missed or failed delivery negatively impacts customer shopping experience as it will incur extra monetary costs and time to re-arrange for parcel delivery. Indeed, the environmental cost due to traffic congestion and pollution can be reduced with the flexibility and convenience provided by smart locker services (Bijvank, 2018). This study indicates that cost efficiency was the most important factor influencing customer shopping experience. Thus, the retailers should pay more attention to reducing customers' total costs of ownership.

Lastly, location convenience was found to influence the customer experience in adopting a smart locker positively; nevertheless, the impact was lower than cost efficiency and time convenience. According to Lachapelle et al (2018), a strategic location of the smart lockers can attract more users to adopt the smart locker services while it does indicate a significant relationship between location convenience and customer experience. Although location convenience was less important in this study, this feature can improve the customer experience, especially for the users who stay in the city (Van Amstel, 2018). Location convenience can help the users avoid traffic congestion compared to the physical shopping experience. Besides, location convenience also benefits the logistic company in reducing the urban congestion since all the parcels can be delivered to one collection point, the smart locker area (Montreuil & Faugere, 2017). Therefore, the retailers should not ignore this feature in providing services to their customers.

### **Implications and Conclusions**

The findings of this study would continuously contribute to the discovery and understanding of factors that can boost customer experience in the adoption of self-service technology like a smart locker. It will offer comprehension to the service providers and the researchers who aim to explore deeper regarding this field of study. Since there are still limited studies investigating the adoption of smart lockers due to the lack of awareness of customers and the retailers on this service, this study offers fresh insights for the retailers to understand better the benefits of using smart lockers in enhancing the customers' shopping experience. Also, as technology is getting mature and advanced nowadays, this study can benefit logistic and supply chain companies to consider the application of smart lockers in enhancing their competitive advantages. As the utilization of automation and Internet-of-Things (IoT) will continue to develop and mature, more studies will be necessary for investigating the utilization of technology from different perspectives, such as different geographical areas and industries.

The main objective of this study is to identify the factors boosting customer experience in the adoption of smart lockers in the retail industry in Klang Valley, Malaysia. This study has some limitations that can be improved and investigated further for future studies. The respondents of this study are only limited to individuals who reside in the Klang Valley area. The generalisability of the findings in this study will be subject to question. Thus, it is recommended for future studies to expand the geographical area during the data collection to ensure the sample is more representative of the population. Other than that, it would be good if further research on other determining factors such as ease of use, privacy, security, or size of the smart locker. Lastly, increasing the sample size would provide better accuracy in the study's findings.

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