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Article

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Suggested Citation: Chuong, Huynh Ngoc et al. (2024) : Exploring a new service prospect: customer' intention determinants in light of utaut theory, Cogent Business & Management, ISSN 2331-1975, Taylor & Francis, Abingdon, Vol. 11, Iss. 1, pp. 1-17, <https://doi.org/10.1080/23311975.2023.2291856>

This Version is available at:

<https://hdl.handle.net/10419/325912>

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To cite this article: Huynh Ngoc Chuong, Vo Tran Phuong Uyen, Nguyen Dang Phuong Ngan, Nguyen Thi Bao Tram, Le Nguyen Bao Tran & Nguyen Thi Thu Ha (2024) Exploring a new service prospect: customer' intention determinants in light of utaut theory, Cogent Business & Management, 11:1, 2291856, DOI: [10.1080/23311975.2023.2291856](https://doi.org/10.1080/23311975.2023.2291856)

To link to this article: <https://doi.org/10.1080/23311975.2023.2291856>



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Published online: 24 Jan 2024.



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Exploring a new service prospect: customer' intention determinants in light of utaut theory

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ABSTRACT

Based on the UTAUT theory, this study aims to determine the determinants of customers' intention to use Smart Locker service and specify the relationships between these factors forming on the Resource Matching theory and the Perceived Value theory. The authors applied the SEM model to estimate the primary dataset from 277 potential Ho Chi Minh City customers. This paper showed that there are 8 factors affecting the intention to use Smart Locker of Ho Chi Minh city customers, namely: Convenience (CVN), Privacy Security (PV), Reliability (REL), Functionality (FUN), Service Diversity (SD), Social Influence (SI), Facilitating Conditions (FC), Perceived Value (VAL). The influence of security, service diversity, and social influence on customers' intention to use the Smart Locker is mediated by perceived value 'Social Influence' (SI) and it has both direct and indirect impact on the intention to use Smart Locker through 'Perceived Value'. The 'Perceived Value' (VAL) factor has a significant direct effect, while the 'Privacy Security' (PV), and 'Service Diversity' (SD) factors have indirect effects on the 'Intention to Use' (INT) Smart Lockers. Since then, the authors point out limitations hindering customers' intention to use Smart Locker and offer some solutions for logistics firms to improve their ability to attract customers' intention in Vietnam.

ARTICLE HISTORY

Received 1 June 2023
Revised 1 August 2023
Accepted 1 December 2023

KEYWORDS

Smart locker; intention to use; last-mile delivery; SEM; new service prospect

REVIEWING EDITOR



Kaouther Kooli,
Bournemouth University,
Bournemouth, United Kingdom

SUBJECTS

Social Sciences; Economics, Finance, Business & Industry; Business, Management and Accounting; Marketing; Marketing Management; Brand Management; Entrepreneurship and Small Business Management; Economics

1. Introduction

The accelerating expansion of E-commerce amidst the COVID-19 crisis has been a driving force behind the economic recovery on the global scale. According to Businesswire (2022), the global B2B e-commerce market held a market value of USD 8,523.3 Billion in 2021 and is estimated to reach USD 18,771.4 Billion by the year 2027. This proves that the method of shopping on E-commerce platforms has changed customers' buying habits, preferences and experiences towards online channels and putting pressure on retail stores around the world. Furthermore, the explosion of E-commerce has contributed to promoting the outstanding growth of delivery services. Particularly, the most important element of parcel delivery is the 'consumer', as they are seeking for the simplest and most convenient way to shop online. Several studies have indicated that customers expect to be able to search, buy, receive and return items anywhere else instead of their house due to not always being available at home, lacking time to take orders or missing the order tracking status. Not only do customers face problems with parcel delivery, but logistics companies are also struggling to tackle with traffic congestion issues, which stagnate delivery times and creates inefficient last-mile delivery services.

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In terms of the definition of 'last-mile delivery', Gevaers et al. (2011) referred it as all logistics activities related to the delivery of goods by a transport service provider, such as parcels purchased online are delivered to households in urban areas. In this sense, last-mile delivery begins when a shipment starts at a point of origin, goes through a long-distance transportation, and ends when the shipment successfully reaches the consumer's pick-up point. Boysen et al. (2021) introduced the concept of last-mile delivery in terms of means of transport and necessary procedures, which requires one or more means of transport (e.g. delivery vans and/or drones), warehousing (e.g. storage yards, containers and/or parcel lockers), and delivery options (e.g. home delivery or customer self-service) to meet last-mile delivery demand.

Pronello et al. (2017) shared the same viewpoints when claiming that last-mile delivery is one of the most costly but inefficient and polluted activities in the entire logistics domain, which significantly contributed to the increase in commercial vehicle traffic volumes throughout the city area.

Smart Locker is a system of parcel lockers integrated with Internet of Things (IoT) technology to identify QR codes or barcodes generated for each individual's order, which the transportation company only provides to the shipper and recipient. Smart Locker is often merged into public buildings (such as supermarkets, post offices or apartment buildings). It has various sizes suitable for all kinds of goods in order to increase convenience as well as security for the delivery process. According to Wang et al. (2014), Smart Lockers are defined as boxes owned by retailers or logistics service providers and used by many customers, often integrated into public facilities (such as supermarkets, post offices, etc.). Customers can receive goods by scanning barcodes, QR codes or one-time passwords. Moreover, Van Duin et al. (2020) also gave an overview of the design of a Smart Locker, whose current general dimensions are 1710mm x 525mm x 1758mm, it has a touch screen that is used to draw signatures and a camera is mounted above the cabinet for safety purposes.

Zenezini et al. (2018) indicated that Smart Locker not only benefits the customers, but the providers and delivery men could also take advantage of economies of scale by collecting and delivering to the same location to reduce last-mile delivery costs while eliminating re-delivery problems. In addition, Chen et al. (2018) had also clarified that Smart Locker also contributes to improving environmental issues by reducing rush hour traffic jams, noise pollution and greenhouse gas emissions thanks to minimizing traffic volumes. Some papers confirm that many private companies are now promoting a new approach to improve their services to recipients, while reducing the cost of failed deliveries. Besides, Mangiaracina et al. (2019) reviewed studies on innovative last-mile delivery solutions and found out 10 possible solutions, namely reception boxes, parcel lockers, pick-up points, crowdsourcing logistics and drones. Among these, Smart Locker appeared to be the one of the most potential solutions thanks to its easy accessibility to choose where and when to pick up parcels. Additionally, this approach could contribute to alleviating environmental burdens for logistics firms as well as minimizing delivery risks.

As a result, the adoption of Smart Locker is one of the promising and innovative solutions for last-mile delivery service providers in several Asian countries. However, Vietnamese people in general and Ho Chi Minh citizens in particular are still unfamiliar with this form of delivery and lots of concerns regarding convenience, reliability and security remain unsolved. Thus, a new service like Smart Locker can become a potential service for logistic firms to exploit the new market and attract more customers.

Many researches conducted on Smart Locker service has been studied before, but there is a certain limitation regarding the number of studies carried out in least developed nations due to resource-poor settings. In this study, Ho Chi Minh City, Vietnam, which is the country's fastest-growing economy hub and has had a significant impact on the country's GDP growth, served as the study's location (Chuong et al., 2024; Hai et al., 2022). E-commerce platforms, delivery services, and the growth of new metropolitan regions here are all quite advanced. Therefore, Smart Locker was studied in this area to see what factors affect the intention to use this service of customers in Ho Chi Minh City and offer solutions to develop services in this area. Furthermore, this paper expects to offer the significant contributions depend on the Unified theory of acceptance and use of technology (UTAUT) and the empirical evidence in Vietnam market. Since then, we hope to enhance the frontier of knowledge in Smart Locker among the general public as well as suggest various alternatives to encourage customers' intention to use this cutting-edge service in Vietnam.

2. The unified theory of acceptance and use of technology (UTAUT) and hypothesis development

There are various interpretations of intention approached from different perspectives of researchers. Intention represents an individual's willingness to perform a particular behavior. According to *the theory of planned behavior* proposed by Icek Ajzen (1991), intention to use includes the motivational factors affecting behaviors. The stronger the intention influences behaviors, the more likely it is to encourage actual actions of buying or using. Teo and Zhou (2014) stated that perceived usefulness (PU), perceived ease of use (PEOU) and attitude towards using computers are important determinants influencing intention to use technology among university students. Since then, based on the theory of reasonable action (TRA) of Fishbein and Ajzen, the technology acceptance model (TAM) considers two basic factors that affect customers' intention to accept or reject the Information systems, including: Perceived usefulness and Perceived ease of use. According to TAM, perceived usefulness and perceived ease of use have a direct influence on attitude; attitude affects intention to use and intention to use affects behavior to accept information technology systems or services (Wu & Wang, 2005). The unified theory of acceptance and use of technology (UTAUT) was developed through the integration of eight theories and models: the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Planned Behaviour (TPB), a combined Theory of Planned Behaviour/Technology Acceptance Model (C-TPBTAM), the Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT). It showed that four pillar determinants of customers' intention: performance expectancy, effort expectancy, social influence and facilitating conditions (Venkatesh et al., 2003). The authors apply the UTAUT theory and recent studies to develop the hypothesis of this paper.

2.1. Convenience

Convenience is defined as the ease of connecting to the Smart Locker service. The measurement of convenience includes two core aspects related to geographical and temporal flexibility (Collier et al., 2014; Lin & Hsieh, 2011). For example, regarding geographical flexibility, Smart Locker services located near customers' residences, workplaces and intersections would be more suitable for those with hectic lifestyles such as commuters or students (Yuen et al., 2019). In addition, in terms of temporal flexibility, customers now can cut their downtime by picking up their parcels from the Smart Locker service at any time (Collier & Sherrell, 2010). Furthermore, these systems do not only create convenient pick-up points for customers, but they also have great potential in eliminating failed home deliveries, reducing delivery costs, delivery congestion, and greenhouse gas emissions (Iwan et al., 2016). Overall, Smart Locker service can bring convenience to customers, thereby improving their perceived value (Bulmer et al., 2018).

Based on the above assessment, this study proposes that geographical location and time can positively impact customer perceived value by improving functionality (e.g. eliminating waiting time at home) and other problems commonly encountered with traditional delivery services. Therefore, the following hypothesis is proposed:

H1a: The convenience of Smart Locker service has a positive impact on customers' perceived value.

Triandis (1979) suggested that when an individual has a small degree of complete control over a behavior, they must consider 'Facilitating Conditions'. These conditions are claimed as extrinsic factors, refer to the availability of resources needed to engage in a behavior, including time availability, technology accessibility, present or absent crowds, financial payment options, and other specialized resources required to create favorable conditions for a behavior (Bobbitt & Dabholkar, 2001).

To figure out the effects of convenience, the authors analyze how geographical and temporal flexibility affect customers' evaluation of self-service experiences. The underlying theme of convenience with self-service transactions is the customer's ability to choose when and where to transact. Then we examine how the components of convenience determine the benefits of using self-service technology. Therefore, the following hypothesis is proposed:

H1b: The convenience of Smart Locker service has a positive impact on customers' facilitating conditions.

2.2. Privacy security

Privacy Security is defined as a service attribute integrated into the design of a Smart Locker in order to enhance customers' control over their financial or personal information when using such services (Barua et al., 2018; Featherman et al., 2010). The performance of privacy security is reflected by four measurement factors (Barua et al., 2018; Featherman et al., 2010). The first factor concerns customers' assessment of overall risk when using the Smart Locker service. The second and third ones are concerned with the user's ability to be safeguarded against any information misuse as well as the security of the user's private data. The fourth component has to do with how customers feel psychologically when utilizing Smart Locker services, specifically whether or not using them results in a loss of privacy or personal information control.

The advantages of Smart Locker service compared to home delivery is the elimination of human interactions during collection (Featherman et al., 2010). This protects customer privacy by preventing the disclosure of customer information and package information to the delivery staff or the carriers. The end customer will be notified of the delivery via phone call or email (Okholm et al., 2013). In addition, Smart Lockers often contain encrypted personal data and a required password to enter through multi-factor authentication before customers could assess their parcel (Vacca, 2016). Therefore, the following hypothesis is proposed:

H2: The privacy security of Smart Locker service has a positive impact on customers' perceived value.

2.3. Reliability

Reliability is defined as the consistency and accuracy of Smart Locker service, which can increase customer perceived value (Narteh, 2015). The measure of reliability is reflected by two factors: accurate and error-free service, Smart Locker's technical readiness to provide highly reliable service than the traditional method (Barua et al., 2018; Demoulin & Djelassi, 2016; Narteh, 2015).

Compared to the traditional delivery, Smart Lockers are more reliable because they reduce the risk of late delivery when the order is only notified to the customer when it is ready to receive (Demoulin & Djelassi, 2016). Furthermore, Smart Locker also cuts down the 'Not at home' issue and offers a simple delivery option that requires no on-site staff (Montreuil, 2016), thus minimizing the human intervention in manual errors, judgment errors and knowledge errors during the delivery process (Chang & Wang, 2011). Therefore, the Smart Locker service can maintain a high level of technical trust that positively affects customers when using this service. Therefore, the following hypothesis is proposed:

H3a: The reliability of Smart Locker service has a positive impact on customers' perceived value.

Caruana et al. (2000) conducted a study consisting of clients of an auditing firm and found that service quality is positively correlated with perceived value. Ismail et al. (2009) also showed that service quality features that are properly implemented (including assurance, sensitivity, reliability, responsiveness, and tangibleness) have increased the facilitating conditions of using the service, thereby increasing the perceived value of the individual. Therefore, the following hypothesis is proposed:

H3b: The reliability of Smart Locker service has a positive impact on customers' facilitating conditions.

2.4. Functionality

Although the variable 'Convenience' has already existed in the framework suggested by Yuen et al. (2019), which the proposed analytical framework of this study bases on. However, 'Convenience' only refers to geographical and temporal flexibility. Thus, we would like to add a variable 'Functionality', which is derived from the seven-dimension SSTQUAL scale. Functionality represents the functional characteristics of SSTs, including reliability, ease of use, and responsiveness (Lin & Hsieh, 2011). Ease of use and user-friendliness positively affect perceived attitudes towards participation (Yuen et al., 2019).

Lin & Hsieh (2011) provided a conceptual framework for SST focusing on many customer service elements. Functionality is one of the seven aspects of the seven-dimension SSTQUAL scale. Accordingly, functionality refers to how easy, clear and reliable the interaction of the self-collection system is. As a

result, functionality, along with design and security, are identified as important service factors in self-collection system (Ramadan et al., 2017). Functionality refers to user-friendly interactions in the system (clear and easy to use) (Wang et al., 2018). Therefore, the following hypothesis is proposed:

H4: The functionality of the Smart Locker service has a positive impact on customers' intention to use.

2.5. Service diversity

One of the widely used strategies by many companies and organizations to raise brand recognition and increase their capacity to connect with more target customers is 'Service Diversity'. Businesses can implement this strategy by adding a new element, feature, or application to an existing product line, such as integrating new technology, updating an outdated version, launching new items, offering customer support, etc. Therefore, the element of product and service diversity should be thought of as a core strategy with the purpose of grabbing users' attention and satisfying customers' growing demands.

Service diversity is the added value of Smart Lockers based on IoT technology besides essential functions and expanded service capabilities, such as providing services on mobile applications (Shang, 2017). Developers can add more practical services to IoT-based parcel locker functionality to boost turnover rates and lower vacancy rates, significantly enhancing customer satisfaction and ensuring rapid delivery (Zurel et al., 2018). In addition, some smart parcel lockers in Shanghai are used as breakfast pickup points, by integrating the functions of mobile phone apps (Pang, 2018). Beside that, some businesses add different size of Smart Lockers to meet different customer requirements or integrate functionality with these IoT-based lockers. For instance, nearby parcel lockers and a mall could collaborate to offer online buying and offline pickup (Hayel et al., 2016). Therefore, the following hypothesis is proposed:

H5a: The service diversity of Smart Locker service has a positive impact on customers' perceived value.

Venkatesh et al. (2003) defined facilitating conditions as the extent to which an individual believes that an organization or its infrastructure exists to support the use of the system. Facilitating conditions are external components or objective conditions in the user's environment that make the behaviors easy or difficult to be performed (Kidwell & Jewel, 2003).

The variety of services can be done online and offline simultaneously. Online advertising can show the intelligence and humanity of IoT-based parcel lockers using video ads on social media apps. Public offline mainly uses elevator ads to show users the development trend of IoT-based parcel lockers, reflecting their convenience and security capabilities. Finally, improve IoT-based parcel lockers intelligently designed to extend their functionality (Deutsch & Golany, 2018). Through the spread of parcel lockers, products can be closer to consumers, increasing brand recognition of products and services. Therefore, it can be said that service diversity makes it easier and more efficient to appear intent to use and perform a behavior. Therefore, the following hypothesis is proposed:

H5b: The service diversity of Smart Locker service has a positive impact on customers' facilitating conditions.

Ibrahim et al. (2020) examined the relationship between service diversity and intention to use. The empirical study aims to test and expand the perceived service quality measurement at fitness and sports centers, which researchers apply to assess service quality in two aspects, namely infrastructure and staff. The authors also added the quality dimension of service diversity to measure perceived service quality. They conducted personal interviews with customers of the fitness centers. The results of this study demonstrated that the diversity of the training program is more important than the two main aspects of perceived service quality measurement, which are facilities and staff.

H5c: The service diversity of Smart Locker service has a positive impact on customers' intention to use.

2.6. Social influence

Social influence is the degree to which someone thinks that others believe he or she should use a new system. Yen (2013) stated that social influence can impact intention to use through perceived value.

Based on social influence theory, the perceived value of customers will be impacted by the size of the number of users in the SNS (Brynjolfsson & Kemerer, 1996; Chuong, 2023). The larger the number of users is, the greater the impact on perceived value would be. For example, perceived value can be increased by allowing people to communicate and exchange information with each other. Yen (2013) can argue that perceived value plays a mediating role in influencing the relationship between social influence and intention to use. In other words, social influence can positively influence perceived value, including utilitarian, hedonic and social values. Therefore, the following hypothesis is proposed:

H6a: The social influence of Smart Locker service has a positive impact on customers' perceived value.

Wut et al. (2022) claimed that facilitating conditions are the instructions people receive from a firm when wanting its staff to utilize the latest technology. There is a crucial need for anyone working in service sectors to learn how to make use of technology in their job in order to keep up with the required effectiveness during the context of unexpected factors, and the pandemic situation is the main agent in this scenario. Therefore, the following hypothesis is proposed:

H6b: Social influence of Smart Locker service has a positive impact on customers' facilitating conditions.

Social influence is defined as the degree to which other people (family, friends, co-workers, etc.) believe (regardless of whether this trust is positive or negative) will affect someone's acceptance of whether or not using a new system (Alraja, 2016; Chuong & Hai, 2023; Venkatesh et al., 2003). Alraja (2016) also pointed out the importance of social influence in the widespread adoption and deployment of e-Government applications. Related to this study, citizens will have a stronger intention to use e-Government if the influence of important people (like family, friends, colleagues, etc.) is positive. Facilitating conditions is the availability of resources to support the adoption and usage of mobile technology (Kasri & Yuniar, 2021). Therefore, the following hypothesis is proposed:

H6c: The social influence of Smart Locker service has a positive impact on customers' intention to use.

2.7. Perceived value

Customer's perceived value is the benefit or value that consumers realize when using Smart Locker service. This activity is expressed through four factors: economy, function, utility and society (Collier et al., 2014). The above factors relate to price, performance, positive experience and positive externalities in using Smart Locker service.

Regarding the effect of perceived value and transaction cost on customers' intention, this study proposes that perceived value has a positive impact on customers' intention to use Smart Locker service. In this context, customers' intention is defined as the ongoing plan to use Smart Locker service in last-mile delivery (Yang & Chao, 2017). Perceived value theory suggests that the functionality or benefit generated from using a Smart Locker service is often compared to the functionality generated by alternative last-mile delivery methods such as: door-to-door delivery, home delivery and self-collection services (Zauner et al., 2015). Therefore, customers will continue to use Smart Locker services if they offer the best value compared to other last mile delivery options. Furthermore, previous research suggested that perceived value is a high goal, while customer intention is a subordinate goal (Chang et al., 2015). In other words, perceived value has a positive effect on customer intention because it brings the best value to the customers. Therefore, the following hypothesis is proposed:

H7: The perceived value of Smart Locker service has a positive impact on customers' intention to use.

2.8. Facilitating conditions

Facilitating conditions are considered as the degree to which an individual believes that technical and organizational infrastructure exists to support the use of the system (Venkatesh et al., 2003) or the customer's perception of the existence of technical and organizational infrastructure to implement and support a smart locker system.

According to Kidwell & Jewel (2003), facilitating conditions are the external, objective factors in a user's surroundings that influence how easy or difficult action is carried out. Taylor & Todd (1995) asserted that there are two components that make up facilitating conditions: those are technologically favorable conditions and resource favorable conditions. The article takes into account the supporting conditions, such as computer facilities and technical assistance, on the use of an e-filing system, within the context of Taylor & Todd (1995) study on intention to utilize information technology in business.

Facilitating conditions are measured by perceived accessibility to necessary resources, as well as the essential knowledge and support required to use e-services. It is also influenced by the perception of technology that fits the user's lifestyle. To encourage customers to use services that match their lifestyle, necessary information, resources, and continuing support must be made available. Therefore, the following hypothesis is proposed:

H8: Facilitating conditions of Smart Locker service has a positive impact on customers' intention to use.

From the hypothesis development, Figure 1 shows the proposed research framework, which concretizes the relationship among hypotheses about 'Convenience', 'Privacy Security', 'Reliability', 'Functionality', 'Service Diversity', 'Social Influence', 'Facilitating Conditions', 'Perceived Value'. Accordingly, 'Convenience', 'Privacy Security', 'Reliability' are factors representing the Resource matching theory, while 'Perceived Value' represents the Perceived value theory. 'Functionality' and 'Service Diversity' are two additional variables based on the seven-dimension SSTQUAL scale in self-service technologies (SSTs).

3. Methodology

3.1. Econometric methods

The methodology section of our study employed a survey research design to achieve our objectives. We utilized a modified Likert scale as the basis for our survey, which allowed respondents to indicate their level of agreement or disagreement with a series of statements. To assess the internal consistency of the survey items, we applied Cronbach's alpha. This statistical test allowed us to measure the extent to which the items in the survey were measuring the same construct or concept. To refine the scale, we used Cronbach's Alpha to evaluate the reliability of the measurement scale. The measuring variables are considered to meet the requirements when Cronbach's Alpha value (α) is in the range of 0.6 to 0.95 and the correlation coefficient of the total variables satisfies the value of ≥ 0.3 (Peterson, 1994; Slater, 1995; Tavakol & Dennick, 2011).

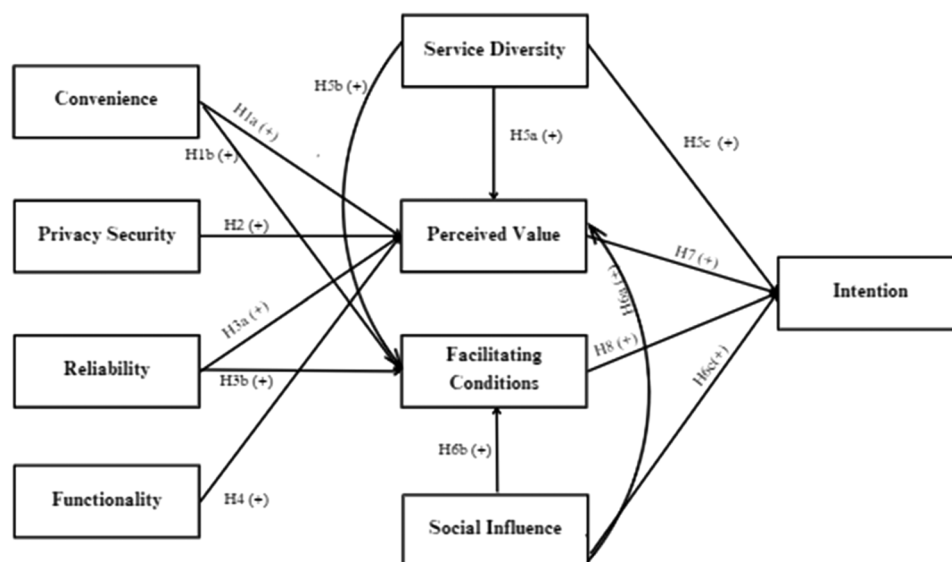


Figure 1. Proposed research model.

In order to validate the underlying factor structure of the variables we were investigating, we conducted confirmatory factor analysis (CFA). This analytical technique helped us determine whether the observed variables were representative of the latent constructs or factors we were studying.

Furthermore, we examined the relationships among our theoretical hypotheses and the structural model by employing the Structural Equation Modeling (SEM). SEM enabled us to analyze the complex interrelationships between variables and test the proposed relationships based on our theoretical framework.

By utilizing these methodological approaches, we were able to gather data, assess internal consistency, validate the factor structure, and analyze the relationships among variables, thus providing a robust foundation for our study's findings. We calculated and estimated data using Stata software.

3.2. Data collection

The target population of this research is Vietnamese consumers, aged from 18 to 65 years with diversity in occupations, incomes and accommodation types in Ho Chi Minh City, Vietnam. Data collection was carried out through an online survey which was directly distributed to respondents via social media platforms. The convenience sampling method was utilized to select participants, approaching them through college alumni connections and social media. The sample size was determined based on earlier research experiences to increase compatibility and suitability with factor analysis methods (Comrey & Lee, 1992). As a result, we collected 277 respondents (Table 1). There appears to be an imbalance in terms of respondents' gender, particularly, 71.5% of respondents were female, and 28.5% were male. However, the results showed that there was no difference between men and women in the course of the study (Appendix 2). Most respondents were 18-25 years old (81.2%).

4. Findings

4.1. Data description

Table 1 shows that personal or residential housing was the most common living situation (30.3% and 25.6%, respectively). In addition, 56% of respondents purchased items 3-6 times per month, while 35.7% purchased less than 3 times per month. Clothing was the most commonly purchased item (21.6%), while household appliances and other items were the least commonly purchased (9.3% and 0.7%, respectively). The most popular delivery method was direct delivery (41.4%).

4.2. Measurement model analysis and confirmatory factor analysis (CFA)

In general, the Cronbach's Alpha coefficient of the scale is larger than 0.8. The Table 2 results also show that the total correlation coefficient of the observed variables in the scales all reached values greater than 0.3. Thus, all observed variables are accepted and will be used in the next factor analysis. The data collected were tested for reliability and validity using confirmatory factor analysis (CFA) using Stata 16.0. The Figure 2 results of CFA show that the factors loading for the observed items are appropriate for the study, which ranges from 0.77 to 0.92, the highest load value is 0.92 and the lowest load value is 0.77.

Table 1. Respondents' demographics and the characteristics of last purchased products.

Characteristic			Characteristic		
		Percentage(%)			Percentage(%)
Internet shopping frequency (times per month)	< 3	35.7	Product type	Electronics	10.6
	3 - 6	56		Food/ health	10.6
	7 - 10	7.2		Jewelry	12.9
	> 10	1.1		Clothing	21.6
Delivery Place	At Post office	13.9		Cosmetics	17.9
	At Stores	12.6		Book & Toy	16.4
	At Workplace	27.8		Household appliances	9.3
	At Home	41.4		Other	0.7
	Smart Locker systems	3.8			
	Other	0.5			

Based on previous literature and empirical study, the CFA model is built. There is a satisfactory remark of the Model Fit Indices (Appendix 1).

4.3. Structural model analysis

Yoo et al. (2000) employed the Structural Equation Modeling (SEM) to assess both the direct and indirect influence of independent variables on dependent variables. This approach was utilized to examine the consistency of the study model with the collected data and to estimate the relationships between the variables. The researchers specifically applied SEM to analyze the determinants of intention of consumers in Ho Chi Minh City, Vietnam, to use smart locker services. The study evaluated the effects of various factors on consumers' intention, including privacy and security, reliability, service diversity, social influence, perceived value, and facilitating conditions. Each of these variables was measured using different items relevant to the respective factor. The results of the SEM test, depicted in the figure below, illustrated the impact of the independent variables on the dependent variables.

The SEM analysis illustrated in the Figure 3 indicates that the chi-square test yielded a highly significant result with a p-value of 0.000, indicating substantial differences between the observed and predicted data. Additionally, the comparative goodness of fit indices, CFI = 0.939 and TLI = 0.925, surpassed the critical threshold of 0.9, signifying a strong fit of the model to the data. Furthermore, the root mean square error base RMSEA = 0.56 and root mean square residual RMR = 0.55, both falling below the threshold of 0.8, demonstrating a satisfactory level of fit for the measurement model with the data. Overall, these findings suggest that the measurement model is coherent and consistent with the observed data.

5. Discussion

Based on the estimation results, we discuss the overall results of the factors affecting the customer's intention to use Smart Locker in Ho Chi Minh City, Vietnam as follows:

The relationship between 'Social Influence' and 'Perceived Value' in the customers' intention to use Smart Locker services

Table 2. Cronbach's Alpha analysis result.

Observations	Corrected Item - Total Correlation	Cronbach's Alpha	Observations	Corrected Item - Total Correlation	Cronbach's Alpha
Convenience (CVN), Cronbach Alpha = 0.8629			Service Diversity (SD), Cronbach Alpha = 0.9078		
CVN1	0.6498	0.8423	SD1	0.6154	0.9102
CVN2	0.6839	0.834	SD2	0.7709	0.8879
CVN3	0.7226	0.8259	SD3	0.8008	0.8838
CVN4	0.6987	0.8302	SD4	0.7256	0.8947
CVN5	0.6664	0.8395	SD5	0.786	0.8853
Privacy Security (PV), Cronbach Alpha = 0.9014			SD6	0.7841	0.8855
PV1	0.6877	0.8903	Social Influence (SI), Cronbach Alpha = 0.8712		
PV2	0.7359	0.8833	SI1	0.7652	0.8076
PV3	0.8053	0.8726	SI2	0.8007	0.7738
PV4	0.8101	0.8721	SI3	0.6975	0.8672
PV5	0.7995	0.8739	Facilitating Conditions (FC), Cronbach Alpha = 0.8743		
PV6	0.5769	0.9102	FC1	0.6846	0.8567
Reliability (REL), Cronbach Alpha = 0.8861			FC2	0.7484	0.8319
REL1	0.708	0.8697	FC3	0.7391	0.8364
REL2	0.7848	0.8406	FC4	0.7524	0.8304
REL3	0.7485	0.8553	Perceived Value (VAL), Cronbach Alpha = 0.8956		
REL4	0.7686	0.8479	VAL1	0.7299	0.8763
Functionality (FUN), Cronbach Alpha = 0.8866			VAL2	0.6984	0.8804
FUN1	0.7273	0.8617	VAL3	0.726	0.8764
FUN2	0.7648	0.8532	VAL4	0.6534	0.8894
FUN3	0.7663	0.854	VAL5	0.7664	0.8697
FUN4	0.7102	0.8664	VAL6	0.7559	0.8715
FUN5	0.6695	0.8755	Intention (INT), Cronbach Alpha = 0.9175		
			INT1	0.7527	0.9126
			INT2	0.7894	0.9029
			INT3	0.8617	0.8749
			INT4	0.8512	0.879

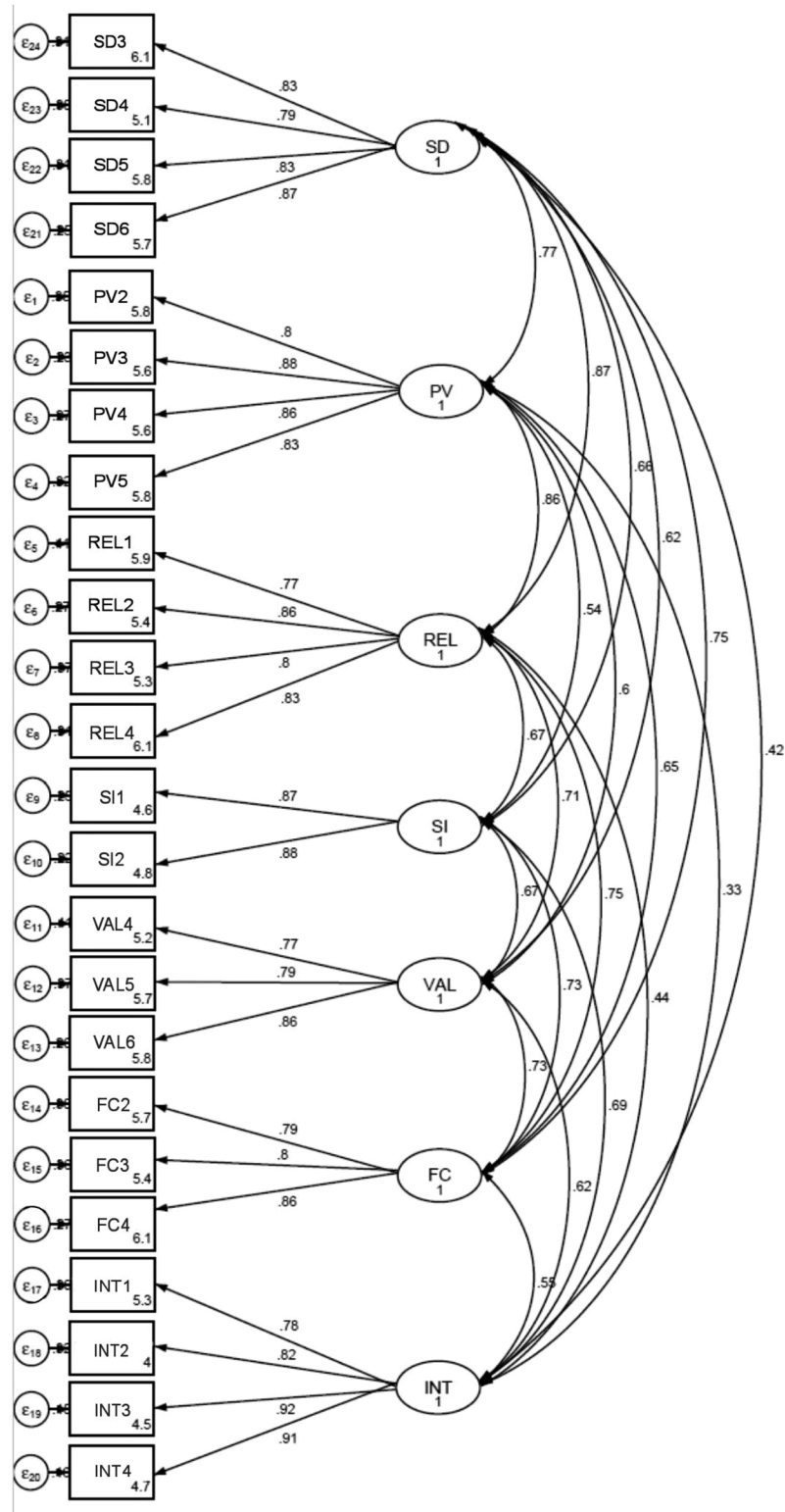


Figure 2. Confirmatory factor analysis model.

Table 3 shows that the estimates for the relationship between privacy security and perceived value is 0.226 and a p-value of 0.039. Accordingly, there is a significant impact of privacy security on consumers' perceived value (p-value < 10%). Therefore, improving the 'Privacy Security' of Smart Locker services is still a top priority that delivery companies need to address to have a positive impact on users. Providing clear and detailed information about security policies can increase users' trust in the service, which in

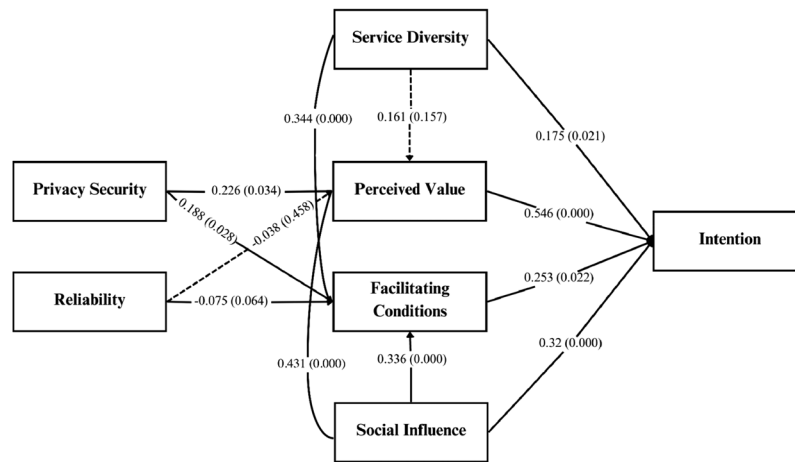


Figure 3. Parameter estimation of the theoretical model.

Table 3. Total results.

Relationships	β	p	Significant	Conclusion
SD \rightarrow VAL	0.161	0.157	No	Not supported
PV \rightarrow VAL	0.226	0,034**	Yes	Supported
REL \rightarrow VAL	-0.038	0,458	No	Not supported
SI \rightarrow VAL	0.336	0,000***	Yes	Supported
PV \rightarrow FC	0.188	0,028**	Yes	Supported
REL \rightarrow FC	-0.075	0,064*	Yes	Supported
SD \rightarrow FC	0.344	0,000***	Yes	Supported
SD \rightarrow INT	0.175	0,021**	Yes	Supported
PV \rightarrow INT	0.546	0,000***	Yes	Supported
FC \rightarrow INT	0.253	0,022**	Yes	Supported
SI \rightarrow INT	0.32	0,000***	Yes	Supported

Note: *, **, *** indicate significance level at 10%, 5%, 1% respectively.

turn increases the perceived value of the service and indirectly increases satisfaction with the service. This result is aligned with the findings of Barua et al. (2018) and Featherman et al. (2010) that privacy security has a positive impact on consumers' perceived value when choosing the services. Hence, the hypothesis H2 is accepted. Since the impact of social influence on perceived value has p-value = 0.000 (p-value < 10%) with a level of impact of $\beta=0.431$, there is a positive relationship between social influence and consumers perceived value of using smart locker service. The study of Yen (2013) also stated that social influence can affect intention to use through perceived value. In other words, social influence can positively influence perceived value, including utilitarian, hedonic and social values. Therefore, the hypothesis H6a is accepted.

The impacts of 'Reliability' and 'Service Diversity' on the customers' intention to use Smart Locker service

Figure 3 showed that the 'Reliability' variable the impact of the 'Reliability' factor is not statistically significant with a coefficient of $\beta = -0.038$ and a p-value of 0.458 greater than 10%. This finding contradicts previous studies, which have shown that users' perception of 'Reliability' of Smart Locker services will increase their perceived value and thus increase satisfaction with the service. Therefore, there is not enough statistical basis to accept hypothesis H3a. Moreover, Shang (2017), Zurel et al. (2018) and Pang (2018)'s research highlights 'Service Diversity' as an important factor in consumers' perception of the value of Smart Locker services. However, our own practical research results do not support this finding, as the factor 'Service Diversity' does not significantly impact the perceived value of consumers (p-value = 0.157 > 10%). Therefore, there is not enough statistical basis to accept hypothesis H5a.

The relationship between 'Reliability' and 'Facilitating Conditions' in the customers' intention to use Smart Locker services

The 'Reliability' factor has a positive impact on the 'Facilitating Conditions' factor, with a level of impact of $\beta=0.188$ (p-value = 0.028 < 10%). Also, the findings of Ažman and Gomišček (2015) demonstrated that if

the service quality features are properly implemented, it will increase the facilitating conditions of using the service. In conclusion, the research accepts hypothesis H3b. According to Deutsch and Golany (2018), there has been an impact of service diversity on the 'facilitating conditions' factor. Our results also demonstrate that the 'Service Diversity' can affect the 'facilitating conditions' factor with a coefficient $\beta=0.344$ at a significant p-value = 0.000 (<10%). Therefore, our research accepted the hypothesis H5b. Table 3 also illustrates the relationship between 'Social influence' factor and the facilitating conditions of using the smart locker service with the level $\beta=0.336$ at the significance level of 0.000 (p-value < 10%). Therefore, the study accepted the hypothesis H6b. On the other hand, the result shows a significant impact of 'Privacy Security' factor to the facilitating conditions with the coefficient $\beta=0.188$ and p-value = 0.028 (<10%). However, there was no previous research that investigated the relationship between these variables.

The relationship between 'Service diversity' and 'Facilitating Conditions' in the customers' intention to use Smart Locker services

Service diversity has affected the facilitating conditions and intention to use the new service. The results above have indicated that there was a positive relationship between 'Service Diversity' factor and the consumers' intention to use the smart locker service with the coefficient $\beta=0.175$ at p-value = 0.021 (<10%). Hence, the hypothesis H5c was accepted. The hypothesis H8 is accepted since facilitating conditions of the service can positively affect the intention of consumers with the impact level of $\beta=0.253$ at p-value = 0.000 (<10%). This result is align with the findings of Venkatesh et al. (2003) and Kidwell and Jewel (2003) that facilitating conditions of Smart Locker service has a positive impact on customers' intention to use the service.

The relationship between 'Social Influence' and 'perceived value' in the customers' intention to use Smart Locker services

The 'Social Influence' factor not only significantly impacts the consumers' perceived value of smart locker service, but also affects the consumers' intention to use this service. With a significance level of 0.000 (p-value < 10%) and an impact of $\beta=0.336$, there is a positive correlation between social influence and intention among consumers. In addition, social influence possibly affects someone's acceptance of whether or not using a new system. Therefore, the study accepted the hypothesis H6c. The results concluded that there is a significant impact of perceived value on the intention to use the smart locker service with the coefficient of $\beta=0.546$ and a p-value of 0.000 less than 10%. Many researchers also considered the perceived value factor as an essential factor for motivating customers to use the smart locker service (Yang & Chao, 2017, Chang et al., 2015). In the same quest, Zauner et al. (2015) found that customers will continue to use Smart Locker services if they offer the best value compared to other last mile delivery options. Hence, the hypothesis H7 was accepted.

6. Conclusion

Driven by a desire to gain a deeper understanding of customers' use of Smart Lockers, which have the potential to provide numerous benefits to users, this study investigates the factors that influence customers' intention to use Smart Lockers for last-mile delivery. Based on the theories (resource matching theory, perceived value theory, and theory of planned behavior) as well as the technology acceptance and use model (UTAUT), this study presents a theoretical model for understanding customers' intention to use Smart Locker services.

This research provides valuable insights that contribute significantly to the advancement of theory and managerial implications for businesses that wish to enhance customers' intention to use Smart Lockers. From the theoretical standpoint, it improves the literature by combining three theories, including resource matching theory (Chen et al., 2018), perceived value theory (Yuen et al., 2019), and theory of planned behavior (Ajzen, 1991). This innovative method offers a comprehensive description of customers' intention to use Smart Lockers.

The outcomes of this research provided the determinants of customer's intention to use Smart Locker services in Ho Chi Minh City, Vietnam. Six dimensions - perceived value, facilitating conditions, service diversity, social influence, privacy security, and reliability - were found to significantly affect

customer's intention. Among them, the path of perceived value and social influence were the strongest positive predictors, surpassing others factors. These dimensions play a key role in the user's intention for Smart Locker services. People who use the Smart Locker services place a high priority on perceived value and social influence (Yang & Chao, 2017). Furthermore, customers are more likely to continue using the Smart Locker service if it provides the best value compared to other final delivery options (Zauner et al., 2015). Therefore, businesses should focus on improving the perceived value of customers and fostering positive social influence. For example, communicating the advantages of Smart Locker service to potential users or engaging with satisfied customers to promote positive word-of-mouth. Furthermore, business should build a strong online presence and encouraging social media sharing can enhance social influence, attracting new customers based on their peers' positive experiences.

The 'Privacy Security' has a positive effect on 'Perceived value' in the intention to use Smart Locker. The higher the security level, the more customers will feel safe and confident in using the Smart Locker. Thus, businesses need to prioritize ensuring the security of customers' personal information. Moreover, they should invest in robust management systems and control software systems for Smart Lockers. Additionally, it is important to make trustworthy security commitments to customers to increase their acceptance of the service.

Another important discovery is that 'Service Diversity' has a positive impact on 'Perceived value'. This suggests that by integrating IoT technology into lockers, customers are able to actively monitor and engage with their shopping experience, leading to an increased desire to use Smart Lockers. Accordingly, businesses should focus on designing, upgrading, and improving phone and website applications that link to Smart Lockers, in order to meet the needs of users in the age of technology.

Besides, the paper has a few limitations that can be improved for future research. Yuen et al. (2019) gathered data from 10 Chinese cities with the most significant volume of online shopping transactions, where the Smart Locker service is well-developed and widely available. The limited available Smart Lockers in Vietnam have hindered potential customers. Future research can improve this paper by scaling up the observations and delving deeper into customers' intentions for the new services.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This research was funded by University of Economics and Law (UEL), Vietnam National University HoChiMinh City (VNU-HCM).

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Data availability statement

The primary dataset is available from the corresponding author on reasonable request.

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Appendix 1

Table A1. CFA Model Fit.

Fit index	Model Fit Output Values	Model estimation	Evaluation	References
CMIN/DF	2-5	2.462	Satisfactory	(Hu & Bentler, 1999)
GFI	0-1	0.898	Satisfactory	(Hu & Bentler, 1999)
TLI	>=0.9	0.924	Satisfactory	(Hu & Bentler, 1999)
CFI	<=0.95	0.937	Satisfactory	(Hu & Bentler, 1999)
RMSEA	<=0.08	0.073	Satisfactory	(Hu & Bentler, 1999)

Appendix 2

Table A2. T-test results on the level of intention to use Smart Locker service by gender.

Gender	N	Mean	Std. Err	Std. Dev
Mea	79	4.0759	0.1136	1.0099
Women	198	4.2273	0.0579	0.8148

Pvalue = 0.1946

QUESTIONNAIRE

Section 1:

Have you ever shopped online?

- ☐ Used to
☐ Never

How often do you shop online?

- ☐ Less than 3 times/month
☐ From 3 to 6 times/month
☐ From 7-10 times/month
☐ More than 10 times/month

What kind of products do you usually buy online?

- ☐ Essential goods (food, medicine, ...)
☐ Clothes/Shoes
☐ Jewelry
☐ Cosmetics
☐ Books/Toys
☐ Electronics (phones, computers, ...)
☐ Houseware

What delivery methods have you chosen when shopping online?

- ☐ Use Smart Locker service (Smart Locker)
- ☐ Delivery to home
- ☐ Delivery at school or work place
- ☐ Come and pick up goods directly at the store
- ☐ Come pick up at the post office

Section 2: SMART LOCKER SERVICES**Have you heard of Smart Locker service?**

- ☐ Never heard of it
- ☐ I've heard of it but haven't used the service yet
- ☐ Already or currently using the service

After watching the video 'Introduction to Smart Locker service', do you want to experience it**If given the opportunity, do you intend to use Smart Locker service?**

(Scale: 1. Totally disagree, 2. Disagree, 3. Neutral, 4. Agree, 5. Totally agree)

I want to use Smart Locker service to receive parcels for my next online purchase

I will consider using Smart Locker service as my first choice for online purchases

I would recommend Smart Locker service to my friends and relatives

I will say positive things about Smart Locker service to my friends and relatives.

Section 3: DETERMINANT OF SMART LOCKER INTENTION**Do you intend to use Smart Locker service, IF?**

(scale: 1. Totally disagree, 2. Disagree, 3. Neutral, 4. Agree, 5. Totally agree)

You will choose delivery service if the convenience of the service:

The service is located near the place of residence or work

Allocate enough time to pick up the parcel

Fast delivery/receiving time

Can control the delivery time

Accept returns with no hassle

You will choose the delivery service if the service's security level:

Feel secure when using service

Personal information is not used for other purposes

Personal information is kept strictly confidential

No loss of control over information

Goods are well protected

Minimize direct contact

You will choose delivery service if the reliability of the service:

Provide accurate service

Service rarely fails

More reliable than traditional delivery

You can safely send goods through the service

You will choose delivery service if the service's functional utility:

Fast delivery time

Clear service process

Easy to use

Every function is faultless

Many utilities

You will choose delivery service if the service's diversity:

Has a convenient order tracking phone app

Save more time picking up goods

Minimize damage to goods

Reduce order dropouts

No leaks or incorrect information

Goods are hard to lose

Your decision to use delivery service is influenced by:

People who influence my behavior think I should use the service

People important to me think I should use the service

The service is becoming more and more widely used, so I want to try it too

You will choose to use the delivery service if:

Have the necessary resources to use

Have the necessary knowledge to use

There is support from the service

The form is suitable for a variety of goods.

Section 4:

Your gender is:

☐ Male

☐ Female

Your age is:

☐ Under 18

☐ 18 - 25

☐ 25 - 35

☐ Over 35

What is your current residence?

☐ Dormitory

☐ Motel room

☐ Apartment

☐ Garden house

Your occupation is:

☐ Student

☐ Office work

☐ Freelancer

☐ Other

Your income is:

☐ Under 6 million/month

☐ 6 - 8 million/month

☐ 8 - 15 million/month

☐ 15 - 20 million/month

☐ Over 20 million/month