Journal of Organizations, Technology and Entrepreneurship
https://www.acadlore.com/journals/JOTE

The Moderating Role of Trust in the Adoption of Self-Service Payment Systems by Consumers

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Received: 03-11-2024 **Revised:** 05-01-2024 **Accepted:** 05-10-2024

Citation: Le, N., Mai, N. T. B., Ngo, N. T., & Dang, H. T. T. (2024). The moderating role of trust in the adoption of self-service payment systems by consumers. *J. Organ. Technol. Entrep.*, *2*(2), 65-83. https://doi.org/10.56578/jote020201.

Abstract: In an age where online shopping and innovative services are rapidly evolving, consumer adaptation to shopping trends, store layouts, and payment modalities is critical. Among these adaptations, self-service checkout systems have been introduced in Vietnamese supermarkets to streamline the post-shopping payment process and alleviate cashier counter congestion. This research was conducted to assess factors influencing consumer intentions towards using self-service payment systems. Data from 497 consumers were collected through non-probability sampling and analyzed using the Smart PLS 4.0 software to test various hypotheses. It was found that consumers' perceptions of usefulness and ease of use, along with their attitudes towards usage, significantly influence their intention to adopt these systems. Importantly, trust was identified as a positive moderator, enhancing the relationship between consumers' attitudes towards usage and their intentions to engage with self-service payment systems. These findings suggest managerial implications for increasing system acceptance and understanding consumer needs related to self-service payment options in Vietnamese markets. The results contribute to the broader discourse on technology acceptance, particularly within the framework of the Technology Readiness and Acceptance Model, and underscore the importance of trust in the successful deployment of technological solutions in retail settings.

Keywords: Technology Readiness and Acceptance Model; Technology Acceptance Model (TAM); Auto payment; Trust; Intention to use; Smart-PLS

1. Introduction

Fast moving consumer goods (FMCG) companies are gaining popularity in Vietnam, with brands like Aeon Mall, Lotte Mart, and Emart establishing themselves as major players. To stay competitive, these companies continuously adapt their policies to meet consumer preferences and retain their customer base. They implement automated systems to make shopping convenient and efficient, enhancing customer service. Automated payment systems offer significant benefits to businesses, including cost reduction, improved efficiency, increased employee productivity, and enhanced service quality (Meuter et al., 2000). In the current technological revolution, digital transformation is one of the conditions and factors that contribute to the competitive advantage of businesses in the retail sector. At the seminar "Towards a Cashless Society" on November 19, 2021, Mr. Nguyen Anh Duc, CEO of Saigon Co.op, stated that cashless payment presents many opportunities but also many challenges. There have been significant changes in consumer payment behavior at Saigon Co.op's system during the recent pandemic. The proportion of customers making cashless payments at Saigon Co.op supermarkets and stores increased from 4% to 40% during the COVID-19 pandemic and at times reached 50%. According to a report on "New Trends in the Lifestyle of Vietnamese People Before and After COVID-19" by Q&Me (2023), the habit of shopping at supermarkets remains high, with 65% of people engaging in this behavior. It is precisely because a significant number of consumers choose to shop at supermarkets instead of traditional markets that long queues for payment can be easily observed, especially during peak hours. According to the Labor newspaper of the Vietnam General Confederation of Labor (2023), consumers experience fatigue, impatience, and sighs while waiting at the payment counters in major supermarkets in Hanoi during the days leading up to the Lunar New Year, sometimes having to

wait for almost an hour just to make a payment. Digital transformation is a key of the competitive advantage of retail businesses during the current technological revolution. Cashless payment offers both opportunities and challenges, as noted by Mr. Nguyen Anh Duc, CEO of Saigon Co.op, at the seminar "Towards a Cashless Society" (2021). The COVID-19 pandemic has significantly changed consumer payment behavior, with the proportion of cashless payments at Saigon Co. increasing from 4% to 40%, reaching 50% at times. Shopping at supermarkets remains popular, with 65% of people engaging in this behavior (Q&Me, 2023). However, the preference for supermarkets over traditional markets results in long queues for payment, particularly during peak hours (Nguyên, 2019). Customers experience fatigue, impatience, and frustration while waiting to make a payment, sometimes enduring waits of almost an hour in major supermarkets in Hanoi during the days leading up to the Lunar New Year (Labor newspaper, Vietnam General Confederation of Labor, 2023) (Bộ thông tin và truyền thông, 2024; Vũ, 2021).

According to Statista (2022), the global self-checkout market was valued at USD 4 billion in 2021 and is expected to reach USD 13.54 billion by 2030. The adoption of self-payment technologies by retailers has led to a 46% decline in cashier positions worldwide. This shift is driven by consumer preferences for self-payment options. Self-checkout systems are predicted to experience the largest job decline, with fewer than 335,000 jobs in 2031 compared to 2021 (Richter, 2023). The global market value of self-payment systems exceeded USD 2.5 billion in 2019 and is projected to grow further (McKinsey & Company, 2020). In 2021, there was a significant demand for digital transformation in the retail sector, with a record-breaking global investment of over USD 100 billion in retail technology transactions. Vietnam is a leading country in mobile POS payments, with popular applications like Momo, Viettel Pay, and ZaloPay. By 2025, the number of digital commerce users in Vietnam is estimated to reach 70.9 million, compared to 51.8 million in 2021 (Statista, 2022). The Vietnamese government has implemented policies to promote electronic and mobile payments, which are crucial for improving customer experience in retail businesses such as supermarkets and convenience stores.

Currently, limited research exists on this topic globally, but studies by Davis et al. (1989) and Venkatesh et al. (2003) have employed the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Technology Acceptance Model (TAM), to explore consumer acceptance and usage of new technologies. These models explore factors such as effort expectancy, social influence, performance expectancy, and facilitating conditions to determine consumer intention and behavior. Previous research indicates that perceived ease of use and usefulness both influence usage attitudes, which impact the intention to use new technology. Additionally, in previous studies, trust variables have been identified as playing a mediator role (Shankar & Datta, 2018) or as a direct independent variable impacting usage intentions (Penney et al., 2021). However, no research has explored the relationship between usage attitudes, technology usage intentions, and trust. The authors aim to investigate this relationship and provide managerial implications for the retail and consumer goods industries.

2. Literature Review

2.1 Theories

2.1.1 TAM

Davis et al. (1989) have developed the TAM, which elucidates the factors influencing users' acceptance of technology. Within the context of the study conducted by Kim et al. (2010), TAM posits that users' intentions to utilize a system are influenced by their perception of its ease of use and utility. The model comprises three key components: Attitude towards behavior, perceived usefulness, perceived ease of use, and intention to use. Perceived usefulness and perceived ease of use are widely recognized in the field of information science as crucial factors in technology adoption by users (Kelly & Palaniappan, 2023). Additionally, TAM acknowledges that consumers' intentions to adopt technology are shaped by their perceptions of its usefulness and usability (Ajzen, 1980).

2.1.2 UTAUT

Venkatesh et al. (2003) have introduced the UTAUT, an extensive conceptual framework that elucidates the patterns of adoption and utilization of information technology systems. UTAUT posits that the intention to use and the actual usage behavior are directly influenced by four fundamental factors: performance expectancy, effort expectancy, social influence, and facilitating conditions. Nevertheless, it is believed that additional variables such as gender, age, experience, and voluntariness indirectly influence the aforementioned main factors.

2.1.3 The concept of retail self-service check-out technologies

Self-service is the integration of technological devices that allow customers to serve themselves without relying on service personnel at the service provider's location (Lee et al., 2010; Meuter et al., 2000). Self-service payment refers to the act of consumers independently verifying items, enabling shoppers to scan, package, and pay for their purchases either independently or with minimal assistance (Alpert, 2008; Lee et al., 2010). Building upon the

aforementioned concept, in this study, self-service payment is a form of service integration where digital technology enables customers to pay their bills without the involvement of a cashier.

2.2 Research Hypotheses

2.2.1 Convenience with usage attitude

The convenience of consumers plays an important role in influencing their purchasing decisions (Beauchamp & Ponder, 2010). In the study by Kim et al. (2010), it was concluded that convenience is an important determining factor that is easily perceived in mobile payment usage. In the study by Chhonker et al. (2017), it was also found that factors such as convenience, perceived usefulness, ease of use, and social influence have an impact on attitude and intention to use. The study addresses the extent to which an individual can access self-service technology (SST) at any given time in a convenient location, emphasizing it as a key factor of SST adoption (Hsiao & Tang, 2015). Based on these findings, the authors propose the following hypothesis for this factor:

H1: Convenience positively impacts consumers' usage attitude towards the self-service payment system.

2.2.2 Technological knowledge with usage attitude

In their study, Kim et al. (2010) aimed to investigate the association between mobile payment knowledge and the intention to use mobile payment. Novice users of technology typically rely on the fundamental features and attractiveness of such applications. The study by Kim et al. (2010) sought to examine the link between payment knowledge and the ease of using mobile payments, suggesting that individuals with higher mobile payment knowledge are more inclined to adopt mobile payment systems compared to those lacking such knowledge. Previous research has indicated that individuals' level of technological awareness can vary based on their exposure to specific technologies. Building on these findings, the authors propose the following hypothesis:

H2: Technological knowledge has a positive and direct impact on consumers' usage attitudes towards the self-service payment system.

2.2.3 Personal innovativeness with usage attitude

The willingness of individuals to adopt new technologies is a crucial factor in user acceptance (Yi et al., 2006). Lewis et al. (2003) surveyed 161 professors at a large public university to investigate how personal, organizational, and social contexts influenced their technology interactions. The research findings demonstrated a significant relationship between personal innovativeness and perceived usefulness, as well as perceived ease of use. Personal innovativeness plays a significant role in consumers' intentions to adopt new mobile technologies. It is appropriate to examine personal innovativeness as a variable in novel situations (Kim et al., 2010). Other studies also suggest that personal innovativeness strongly influences the adoption of new information technologies in individuals' lives. Intuitively, a good first experience will lead to positive attitudes and increased self-efficacy, thereby encouraging future use, while a bad first experience can lead to dislike, reduced reduces self-efficacy and hinders future use (Wang et al., 2012). Therefore, consumers' innovativeness not only affects perceived usefulness and ease of use but also their usage attitudes. Based on these considerations, the authors propose the following hypotheses:

H3: Personal innovativeness positively *impacts consumers' perceived usefulness.*

H4: Personal innovativeness positively impacts consumers' usage attitudes.

H5: Personal innovativeness positively impacts consumers' perceived ease of use.

2.2.4 Perception risk and its impact on the attitude of use

For a technological product, the perception risk directly affects users' attitudes toward its use (Alalwan et al., 2016). A study by Li et al. (2019) also indicates that risk perception has a negative impact while directly influencing users' attitudes and intentions of use. When individuals anticipate the consequences or problems they may encounter, they experience anxiety, which negatively affects their attitude during usage. Fraud, privacy, and security concerns are risk factors perceived by users when using mobile money services, and they serve as significant barriers for users to accept them (Kelly & Palaniappan, 2023). In Kazancoglu & Yarimoglu (2018) 's study, the factor of perceived risk was mentioned, but the results indicated that this factor did not have a direct impact on intention to use. In the limitations section, the authors also highlighted limitations related to attitude towards use. If the perceived risk is too high, it becomes an obstacle that discourages users and reduces their intention to use the service. This demonstrates that risk perception is one of the decisive factors in determining the use of a particular service system. Therefore, the authors propose the following hypothesis:

H6: Perception risk negatively impacts the attitude of consumers towards the use of self-service payment systems.

2.2.5 Social influence and its impact on the attitude of use

According to Oliveira et al. (2016), numerous studies have demonstrated the significance of social impact on users' intentions to continue using mobile payments. The "social influence" refers to how recommendations or

perspectives from individuals in one's social circle or influential figures in society can influence customers' attitudes towards utilizing mobile payments. The viewpoints of individuals in their immediate social circle impact users' willingness to persist with mobile payments (Sleiman et al., 2022). Social influence consistently affects users' intentions to sustain mobile payments, underscoring its importance in influencing the adoption of future payment systems (Sleiman et al., 2022). If coworkers, relatives, or close acquaintances have previously embraced mobile payment, users are more inclined to follow suit (Kelly & Palaniappan, 2023). Consequently, the research team acknowledges the substantial role that social influence plays in shaping consumers' attitudes toward using self-service payment systems. Therefore, the authors propose the following theories:

H7: Social influence positively impacts the attitude of consumers towards the use of self-service payment systems.

2.2.6 Perceived usefulness and its impact on attitude of use and intention of use

Multiple studies have provided evidence showing a positive association between perceived usefulness and both attitude (Yi et al., 2006) and the intention to utilize SST (Kelly & Palaniappan, 2023). These findings suggest that individuals' awareness of the usefulness of a technology influences their attitudes towards the adoption decisions they make. Various issues make users consider technology adoption, among which is the timely provision of services to meet their service needs, such as mobile banking services provided to their users. Nevertheless, it is important to acknowledge that perceived usefulness may not consistently exert a positive influence on users' attitudes, particularly when there are unresolved concerns regarding the associated risks of the technology. Such uncertainties can impede users from forming a decisive opinion, either in favor of or against the technology. Consequently, it can be inferred that the perception of usefulness plays a significant role in shaping users' attitudes towards mobile money services.

H8: Perceived usefulness positively impacts the attitude of consumers towards the use of self-service payment systems.

H11: Perceived *usefulness positively impacts the intention of consumers to use self-service payment systems.*

2.2.7 Perceived ease of use and attitude towards use with intention to use

According to Davis (1989), perceived ease of use refers to the extent to which individuals can interact with a specific information system or technological device without exerting excessive mental effort. Other scholars have also highlighted the importance of perceived simplicity of use in adopting technology. For instance, Venkatesh et al. (2003) argues that ease of use consistently influences the acceptance and usage of newly emerging technologies. Several studies on mobile banking and e-commerce have found that perceived ease of use strongly predicts usage intention (Kim et al., 2010). In their study, Shankar & Datta (2018) note that perceived ease of use greatly impacts Indian consumers' intentions to utilize mobile payments. With a beta coefficient of 0.32 (Kazancoglu & Yarimoglu, 2018), perceived ease of use (PEU) significantly influences both customer satisfaction and behavioral intention (Hong & Slevitch, 2018). Consequently, customers' intentions to use a technology are significantly influenced by their perception of its ease of use, with higher levels of perceived ease of use being associated with greater acceptance and usage. Based on these premises, the authors propose the following theories:

H9: Perceived ease of use positively impacts consumers' attitudes toward using self-service payment systems.

H12: Perceived *ease of use positively impacts consumers' intentions to use self-service payment systems.*

2.2.8 Attitude towards use with intention to use

Users' willingness to accept and utilize payment services can be influenced by their attitudes. As indicated by Abdinoor & Mbamba (2017), users who hold a favorable attitude toward mobile money exhibit higher usage frequency. Prior to the formation of positive behavioral intentions, it is essential to cultivate attitude loyalty, behavioral loyalty, as well as positive emotions and attitudes (Wang et al., 2012). The research (Kelly & Palaniappan, 2023; Yi et al., 2006) demonstrated a significant impact of users' attitudes on the utilization of payment services, as these attitudes directly affect the acceptance and adoption of the technology. Based on the previous studies, the authors propose the following hypotheses:

H10a: Attitude *towards use mediates the relationship between perceived usefulness and the intention to use self-service payment systems by consumers.*

H10b: Attitude towards *use mediates the relationship between perceived ease of use and the intention to use self-service payment systems by consumers.*

H13: Attitude towards use positively impacts consumers' intentions to use self-service payment systems.

2.2.9 Moderating variable: Trust

Lack of trust diminishes perceived usefulness, affecting users' inclination to use a particular good or service. This impact is particularly pronounced for items requiring high confidence (Castronovo & Huang, 2012). Trust has been extensively studied in various fields, including e-commerce, information technology, and information science (Singh & Sinha, 2020). Previous studies by Nicolaou & McKnight (2006), Lee & Song (2013), and Pavlou

(2003) have confirmed the direct positive influence of trust on behavioral intention. Additionally, research conducted by Francisco et al. (2015), Pavlou (2003), and Gefen et al. (2003) have demonstrated the beneficial impact of trust on perceived usefulness. The studies (Ha et al., 2023; To & Trinh, 2021) have shown that trust moderates the relationship between perceived usefulness and intention to use. Notably, despite recognizing trust as a crucial factor, it has yet to be thoroughly examined as a mediator between perceived utility and intention to use, as highlighted by Lee & Song (2013) and other researchers. Thus, this study aims to investigate the aforementioned relationship.

Current research focuses on two distinctions: perception and behavior and attitude and behavior. A low level of perceived utility contributes to a reduced level of trust, which impacts the user's willingness to use a particular item, thereby exacerbating the perception-behavior gap (Castronovo & Huang, 2012), especially for items that require high reliability. This reliance extends to the operator, associated agents, and services. Trust has been identified as a key determinant of consumer perception of a brand (Shankar & Datta, 2018). Moreover, consumers' intentions to adopt technology are significantly influenced by their level of trust (Penney et al., 2021). Despite the cognitive-behavioral gap, few studies have investigated the underlying mechanisms. Given the predicted influence of trust on users' inclination to utilize technology (Penney et al., 2021), as well as customer perceptions (Shankar & Datta, 2018). Based on the previous studies, the authors propose the following hypotheses:

H14a: Trust moderates *the relationship between perceived usefulness and the intention to use self-service payment systems.*

H14b: Trust moderates the relationship between perceived ease of use and the intention to use self-service payment systems.

Based on the above research hypotheses, the author group proposes the research model, as shown in Figure 1.

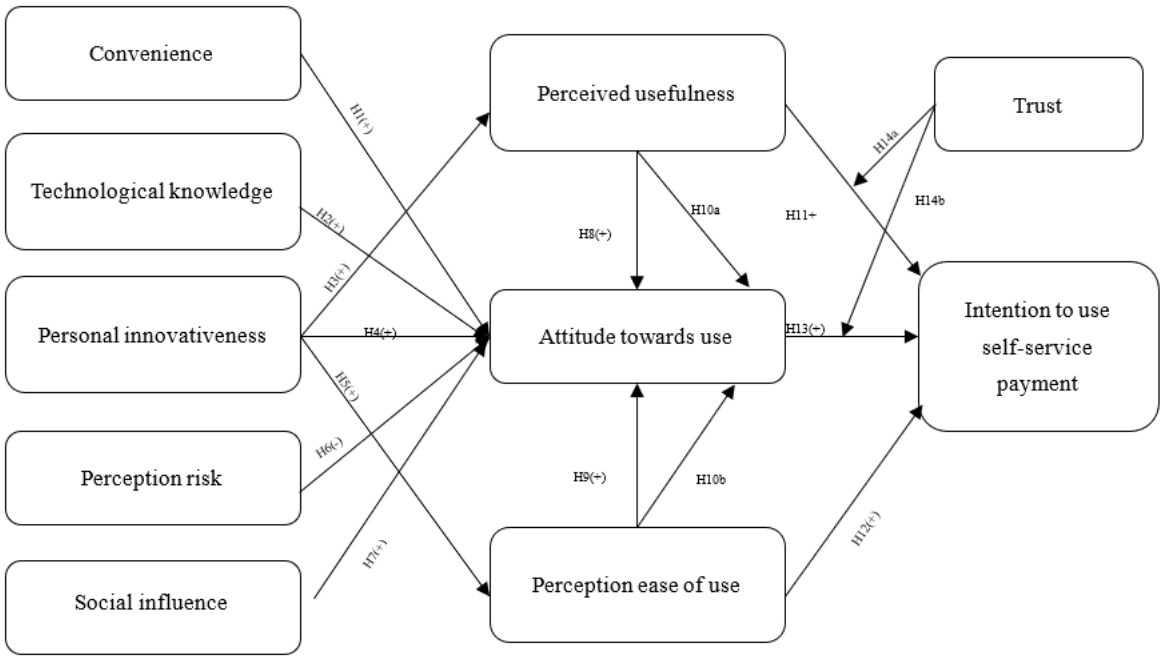

Figure 1. Proposed research model
Source: Authors' compilation

3. Methods

3.1 Research Procedure

This research utilizes both qualitative and quantitative research methods (Figure 2).

Qualitative research: Relevant studies were searched and selected to build the conceptual model and expected measurement scales. Then, the author group conducted in-depth interviews with one Associate Professor, two faculty members from the Business Administration department at Vietnam City University of Industry, and ten customers to refine the content of the measurement scales to fit the research context.

Formal quantitative research: After adjusting the final measurement scales, the research team proceeded with the subsequent phase of the survey. In this phase, a formal survey was conducted using both online and offline methods, resulting in a total of 497 responses (150 online surveys and 347 offline surveys). The collected data were analyzed utilizing Smart PLS 4.0 software to assess both the measurement model and the structural model.

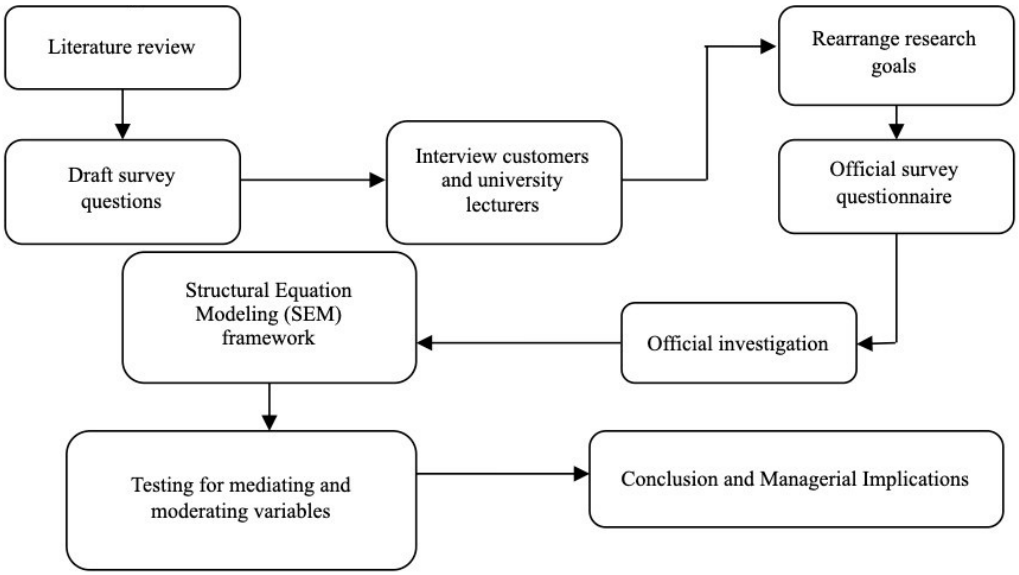

Figure 2. Research procedure
Source: Authors' compilation

3.2 Measurement Scales

After performing a literature review and in-depth interviews with experts and consumers to adjust the scales, the final measurement scales contain 41 observed variables, including 5 independent variables, 3 mediating variables, 1 dependent variable, and 1 moderating variable. The measurement scales were based on questions from relevant studies and constructed based on Likert's 5-point scale. The scale was used to measure satisfaction and agreement levels, gradually increasing with each question, aiming to investigate the opinions, attitudes, and intentions of the target group regarding the presented issues. The measurement scales of this study were adapted from reliable research articles, and Cronbach's alpha (CA) is consistently over 0.7.

Table 1. Research measurement scale

Factor	Encode	The Number of Observed Variables	Source
Convenience	CON	4	Kim et al. (2010); Sleiman et al. (2022)
Personal innovativeness	PI	4	Oliveira et al. (2016); Shankar & Datta, (2018)
Technological knowledge	TK	4	Kim et al. (2010); Ha et al. (2023)
Social influence	SI	5	Oliveira et al. (2016); Sleiman et al. (2022)
Perception risk	PR	4	Penney et al. (2021); Ha et al. (2023)
Perceived usefulness	PE	4	Shankar & Datta (2018)
Perceived ease of use	PEU	4	Shankar & Datta (2018); Kim et al. (2010)
Attitude towards use	AU	4	Li et al. (2019)
Trust	TR	4	Shankar & Datta (2018); Ha et al. (2023)
Intention to use self-service payment	ITU	4	Oliveira et al. (2016); Shankar & Datta (2018)

Source: Authors' compilation

3.3 Data Collection

According to Comrey & Lee (1992), they provide a perspective-based breakdown of sample sizes, indicating that 100 is considered poor, 200 is fair, 300 is good, 500 is very good, and 1,000 or more is excellent. For exploratory factor analysis (EFA), it is recommended to have a sample size of at least five times the total number of observed variables in the measurement scales (Hair et al., 2013). In the present study, Table 1 consists of 41 observed variables used in the analysis. Therefore, the minimum required sample size is computed as 41*5=205 respondents.

In this study, with 5 independent variables, 3 mediating variables, 1 moderating variable, and 1 dependent

variable, a total of 41 observed variables are included to ensure the appropriateness of the SEM model. For the SEM model, according to Hair et al. (2013), with a p-value of 0.05 and predicted path coefficients within 0.11–0.2, the sample size is estimated to be over 155 respondents. However, to ensure the accuracy of the research samples and eliminate incorrect, non-standard, and low-quality samples, the author group plans to study a sample of 490 consumers in Vietnam. This sample size is appropriate for the research by Comrey & Lee (1992) and Hair et al. (2013).

This study was conducted by surveying the intention to use self-service payment systems among consumers in Vietnam. Therefore, the non-probability sampling method (convenient sampling method) is applied to survey consumers who shop randomly in supermarkets in Vietnam.

3.4 Measurement Model

This study integrated two theories to explore the intention of consumers to use self-service payment systems, which are not popular with Vietnamese consumers. The proposed research model also explores the many complicated relationships. Because this study was exploratory research and contained many complicated relationships, a partial least squares structural model would be applied in this study to analyze the complex research model (Hair et al., 2013). Therefore, SmartPLS software would be used to test the hypotheses and interpret the results of the Structural Equation Model (SEM).

4. Results

4.1 Descriptive Statistics

After compilation, the author group obtained a total of 497 survey samples, excluding 19 that did not meet the requirements, resulting in 478 remaining samples. After data cleansing, the authors have a complete survey dataset consisting of 478 samples (Figure 3).

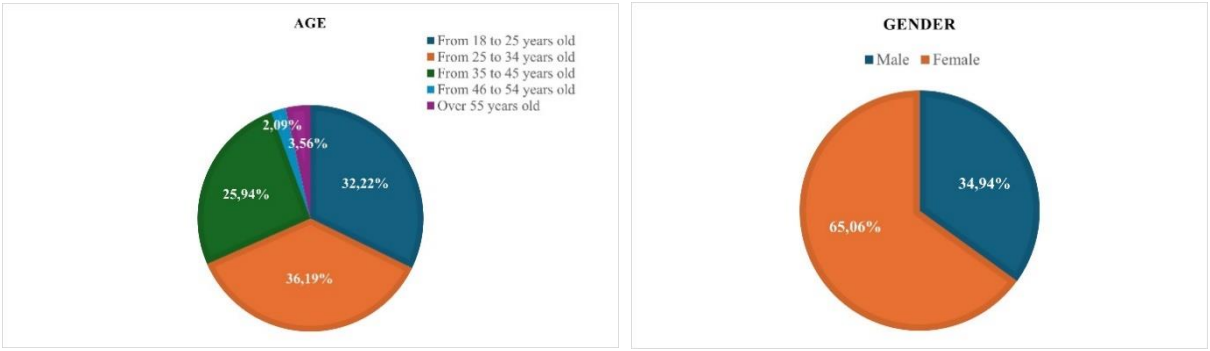

Figure 3. Percentage of gender and age
Source: SPSS 20

After consolidating the findings, the research team obtained a total of 478 valid responses while excluding 19 invalid ones. Table 2 provides an overview of the respondents, revealing that out of the 478 participants, 311 were female, accounting for 65.1% of the sample, which is a higher proportion compared to males. In terms of age distribution, the age group between 25 and 34 years old constituted the largest segment, with 173 respondents making up 36.2% of the sample. Following this, the age group between 18 and 25 years old consisted of 154 respondents, representing 32.2%. The subsequent age group, ranging from 35 to 45 years old, comprised 124 individuals (26.45%), while respondents above 55 years old constituted a smaller proportion of 17 individuals (3.6%), and the lowest proportion was observed among the age group between 46 and 55 years old, with only 10 respondents accounting for 2.1%.

Additionally, Table 2 indicates that 322 respondents were married (67.4%), while 156 respondents were unmarried (32.6%). These findings align with the nature of the survey, which primarily targeted consumers who had visited supermarkets. Concerning educational attainment, the majority of respondents held a university degree, with 224 individuals representing 46.9% of the sample. Postgraduate education followed closely behind, with 158 respondents constituting 33%. There was a slight variation in the proportions of respondents with vocational and secondary education, accounting for 16.5% and 2.3%, respectively, while the lowest proportion was observed among individuals with junior high and high school education, comprising only 1.3%.

With regards to income, the highest proportion of respondents, 170 individuals (35.6%), reported an income ranging from 300 USD to under 600 USD. Following this, 150 respondents (31.4%) had an income between 150

USD and less than 300 USD, while 121 respondents (25.3%) fell into the income bracket of 600 USD to less than 1,200 USD. A smaller proportion of 37 respondents (7.7%) reported an income above 1,250 USD.

Table 2. Descriptive statistics (n=478)

Quantitative Variable	Observed Variables	Quantity	Ratio
Gender	Male	167	34.9%
	Female	311	65.1%
Age	From 18 to 25 years old	154	32.2%
	From 25 to 34 years old	173	36.2%
	From 35 to 45 years old	124	25.9%
	From 46 to 54 years old	10	2.1%
	Over 55 years old	17	3.6%
Marriage Status	Married	322	67.4%
	Unmarried	156	32.6%
Qualification	Middle school, high school	6	1.3%
	Intermediate level	11	2.3%
	College	79	16.5%
	University	224	46.9%
	Postgraduate	158	33%
Income	From 150 USD to under 300 USD	150	31.4%
	From 300 USD to under 600 USD	170	35.6%
	From 600 USD to under 1,200 USD	121	25.3%
	Over 1,200 USD	37	7.7%

Source: Authors' compilation

Table 3. Total variance explained of the observed variables

Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy		**.863**
Bartlett's Test of Sphericity	Approx. Chi-Square	3999.465
	df	190
	Sig.	.000

Total Variance Explained

Factor	**Initial Eigenvalues**			**Extraction Sums of Squared Loadings**			**Rotation Sums of Squared Loadings[a]**
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**	**Total**
1	5.164	25.821	25.821	4.716	23.579	23.579	2.582
2	3.086	15.431	41.252	2.621	13.103	36.681	3.733
3	2.761	13.804	55.056	2.390	11.948	48.630	3.332
4	1.103	5.514	60.569	.660	3.298	51.928	3.138
5	1.032	5.159	65.728	.576	2.879	54.807	3.136
6	.740	3.700	69.428				
7	.639	3.194	72.622				
8	.614	3.070	75.692				
9	.552	2.762	78.454				
10	.520	2.602	81.055				
11	.495	2.476	83.531				
12	.479	2.393	85.924				
13	.462	2.312	88.236				
14	.434	2.168	90.404				
15	.399	1.997	92.401				
16	.354	1.772	94.173				
17	.316	1.580	95.753				
18	.314	1.568	97.321				
19	.269	1.346	98.667				
20	.267	1.333	100.000				

Note: Extraction method: Principal Axis Factoring; a: When factors are correlated, sums of squared loadings cannot be added to obtain a total variance; Source: SPSS 20

4.2 Trends in Common Method Bias (CMB) and Multicollinearity

SPSS 20 software was used to perform Harman's single-factor test to screen the data. The results showed that a single factor accounted for only 23.971% of the total variance (< 50%). According to Cooper et al. (2020), datasets do not commonly encounter issues of CMB when the difference is below 50%. The authors also conducted

tests of normality using kurtosis and skewness; the results fell within the range of ±1.96, indicating that the data were normally distributed. The authors also calculated the variance inflation factor (VIF) for all observed variables, ranging from 1 to 2.62 (< 3). Since all the results were below 3, multicollinearity did not occur (Hair et al., 2013).

4.3 EFA of Independent Variables

Based on the eigenvalue criterion greater than 1, Table 3 reveals that five factors were identified through EFA, effectively capturing the information derived from the 21 observed variables included in the analysis. Cumulatively, these five factors accounted for a substantial portion of the total variance, specifically 65.728%, surpassing the threshold of 50%. Consequently, these five factors collectively explained 65.728% of the variance present in the data associated with the observed variables utilized in the EFA.

Based on the findings presented in Table 4, the author decided to exclude the observed variable SI1 from further analysis due to its factor loading falling below the threshold of 0.3. Consequently, there remained a total of 20 observed variables that were considered for the subsequent analysis involving the five independent factors. The results of the EFA, following the reanalysis with the remaining independent variables, demonstrated a KMO measure of 0.863, surpassing the recommended value of 0.5, indicating the adequacy of the sample for factor analysis. Moreover, Bartlett's test of sphericity yielded a significant result with a p-value of 0.000, further supporting the suitability of the data for factor analysis. Notably, all factor loadings exceeded the threshold of 0.3, indicating a satisfactory level of association between the observed variables and their respective factors. Importantly, the EFA results indicated the absence of cross-loading, wherein variables exhibit high loadings on multiple or closely related factors. Hence, the factors achieved convergence and demonstrated discriminant validity throughout the analysis.

Table 4. EFA Results of the independent variables

Pattern Matrix[a]					
	Factor				
	1	2	3	4	5
PR1	.854				
PR4	.826				
PR3	.806				
PR2	.633				
SI2		.786			
SI4		.779			
SI3		.738			
SI5		.715			
PI2			.829		
PI1			.660		
PI3			.636		
PI4			.631		
TK3				.815	
TK2				.803	
TK4				.640	
TK1				.414	
CON3					.759
CON4					.722
CON2					.542
CON1					.492

Note: Extraction method: Principal Axis Factoring; Rotation method: Promax with Kaiser Normalization; a. Rotation converged in 7 iterations

4.4 EFA of Mediating, Dependent, and Moderating Variables

Based on the eigenvalue criterion greater than 1, Table 5 illustrates that five factors were identified through EFA, effectively capturing the information derived from the 20 observed variables included in the analysis. Collectively, these five factors accounted for a substantial proportion of the total variance, specifically 67.751%, surpassing the threshold of 50%. Consequently, these five factors collectively explained 67.751% of the variance present in the data associated with the observed variables utilized in the EFA.

According to Table 6, no observed variables were excluded. The results of the EFA, after rerunning the analysis with the mediating, dependent, and moderating variables, showed a KMO measure of 0.888 (>0.5), and a significant Bartlett's test of sphericity with a p-value of 0.000 (<0.5). All factor loadings were greater than 0.3. According to the EFA results, there were no cases of cross-loading, where a variable had high loadings on multiple factors or closely related factors. Therefore, the factors ensured convergence and discriminant validity during the analysis.

Table 5. Explained total variance of the observed variables KMO and Bartlett's test

KMO Measure of Sampling Adequacy							.888
Bartlett's Test of Sphericity				Approx. Chi-Square			4667.580
				df			190
				Sig.			.000
Total Variance Explained							
Factor	**Initial Eigenvalues**			**Extraction Sums of Squared Loadings**			**Rotation Sums of Squared Loadings[a]**
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**	**Total**
1	7.220	36.102	36.102	6.817	34.085	34.085	4.475
2	2.295	11.473	47.574	1.841	9.205	43.289	5.238
3	1.611	8.054	55.628	1.225	6.125	49.415	3.300
4	1.329	6.644	62.272	.918	4.592	54.007	5.232
5	1.096	5.478	67.751	.698	3.488	57.495	3.940
6	.752	3.759	71.510				
7	.658	3.291	74.801				
8	.604	3.018	77.819				
9	.527	2.634	80.453				
10	.511	2.553	83.006				
11	.473	2.364	85.370				
12	.438	2.189	87.559				
13	.390	1.952	89.511				
14	.369	1.843	91.353				
15	.364	1.818	93.171				
16	.341	1.705	94.876				
17	.294	1.471	96.346				
18	.278	1.388	97.734				
19	.240	1.198	98.933				
20	.213	1.067	100.000				

Note: Extraction method: Principal Axis Factoring; a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance; Source: SPSS 20

Table 6. EFA results of the mediating, dependent, and moderating variables

Pattern Matrix					
	Factor				
	1	**2**	**3**	**4**	**5**
AU2	.883				
AU3	.748				
AU1	.740				
AU4	.510				
PEU3		.815			
PEU1		.814			
PEU4		.722			
PEU2		.652			
TR4			.814		
TR1			.744		
TR2			.691		
TR3			.668		
ITU3				.761	
ITU4				.738	
ITU1				.722	
ITU2				.706	
PE4					.923
PE3					.683
PE2					.570
PE1					.476

Note: Extraction Method: Principal Axis Factoring; Rotation method: Promax with Kaiser Normalization; a. Rotation converged in 6 iterations

4.5 Testing the SEM

In order for a scale to be deemed reliable, it is generally accepted that both the CA coefficient and composite reliability (CR) should exceed 0.7 (Hair et al., 2013). Moreover, the outer loadings should surpass 0.7, and the average variance extracted (AVE) should exceed 0.5 in order to ensure adequate reliability.

Based on the findings presented in Table 7, the author performed an evaluation of the scale's reliability after

excluding the observed variables SI1, TK1, and PE2. The reliability of the scale is considered satisfactory if the CA coefficient exceeds 0.7, the CR is greater than 0.7, and the AVE surpasses 0.5. Additionally, Table 8 demonstrates that all HTMT (Heterotrait-monotrait) values are below the threshold of 0.85, indicating that there is no substantial cross-trait contamination. Moreover, all observed variables exhibit discriminant validity.

Table 7. Outer loadings, reliability, and AVE

Scale	Loading	CA	CR (Rho_c)	AVE	VIFs	Scale	Loading	CA	CR (Rho_c)	AVE	VIFs
CON		**0.772**	**0.854**	**0.593**		**PI**		**0.809**	**0.872**	**0.630**	
CON1	0.723				1.425	PI1	0.836				1.639
CON2	0.776				1.556	PI2	0.790				1.760
CON3	0.770				1.543	PI3	0.805				1.539
CON4	0.810				1.533	PI4	0.741				1.648
PR		**0.859**	**0.904**	**0.703**		**TK**		**0.808**	**0.886**	**0.722**	
PR1	0.887				2.455	TK2	0.837				1.806
PR2	0.715				1.549	TK3	0.880				1.996
PR3	0.857				2.181	TK4	0.831				1.606
PR4	0.884				2.332	**PE**		**0.777**	**0.870**	**0.690**	
SI		**0.848**	**0.898**	**0.687**		PE1	0.818				1.461
SI2	0.880				2.323	PE3	0.882				1.966
SI3	0.785				1.745	PE4	0.790				1.680
SI4	0.821				1.802	**TR**	0.813	0.877	0.641		
SI5	0.826				1.991	TR1	0.820				1.789
PEU		**0.851**	**0.900**	**0.692**		TR2	0.782				1.664
PEU1	0.889				2.620	TR3	0.778				1.664
PEU2	0.790				1.736	TR4	0.823				1.926
PEU3	0.811				1.902	**ITU**		**0.861**	**0.906**	**0.706**	
PEU4	0.834				2.118	ITU1	0.849				2.058
AU		**0.835**	**0.889**	**0.668**		ITU2	0.808				1.828
AU1	0.798				1.826	ITU3	0.854				2.122
AU2	0.811				2.085	ITU4	0.849				2.069
AU3	0.877				2.244						
AU4	0.780				1.598						

Note: CA: Cronbach's alpha; CR: Composite reliability; AVE: Average variance extracted

Table 8. Measurement model: Heterotrait-monotrait ratios of first-order variables

	AU	CON	ITU	PE	PEU	PI	PR	SI	TK	TR
AU	0.817									
CON	0.315	0.77								
ITU	0.545	0.483	0.84							
PE	0.425	0.279	0.455	0.831						
PEU	0.51	0.374	0.604	0.515	0.832					
PI	0.246	0.212	0.23	0.182	0.239	0.794				
PR	-0.185	0.064	-0.044	-0.126	-0.121	0.034	0.839			
SI	0.254	0.596	0.389	0.252	0.325	0.277	0.132	0.829		
TK	0.272	0.154	0.149	0.189	0.155	0.547	0.119	0.203	0.85	

According to Fornell & Larcker (1981), the values of the observed variables are higher than those of the other variables in the column, indicating that discriminant validity is not violated.

4.6 Results of the SEM

The author utilized the bootstrapping method with a sample size of 10,000 to test the structural model. Following Chin (1998) and Hair et al. (2013), the authors examined the adjusted R-squared (R^2) values, statistical significance, and adequacy of path coefficients. Table 9 shows that all path coefficients in the model are significant, with 95% confidence intervals. The confidence intervals do not contain the value of 0. However, during the p-value analysis, it was found that the relationships PI -> AU, SI -> AU, and TR × PE -> ITU have p-values greater than 0.05, indicating that except for these three relationships, all other relationships are supported.

Table 9 also displays the standardized beta coefficients of the direct relationships, such as PEU => ITU (0.351), PEU => AU (0.327), AU => ITU (0.302), PI => PEU (0.243), PI => PE (0.186), TK => AU (0.182), PE => AU (0.162), CON => AU (0.114), PE => ITU (0.111), and PR => AU (-0.157).

Based on the findings presented in Table 9, it is evident that perceived usefulness (PE), perceived ease of use (PEU), and attitude towards use (AU) have positive and direct influences on the intention to use a self-service

payment system (ITU). Additionally, convenience (CON) and technological knowledge (TK) demonstrate positive and direct impacts on attitude towards use (AU), while personal innovativeness (PI) exhibits positive and direct effects on perceived usefulness (PE) and perceived ease of use (PEU). These results indicate that higher levels of convenience, technological knowledge, and personal innovativeness lead to more positive attitudes and intentions toward using the automated payment system. Furthermore, perceived risk (PR) demonstrates a negative and direct impact on attitude towards use, suggesting that higher perceived risk results in lower consumer usage intentions. Consequently, hypotheses H1, H2, H3, H5, H6, H8, H9, H11, H12, and H13 are all supported by the findings.

Table 9. The path coefficient results

Hypothesis	Relationship	β	The Average Sample Value	Confidence Interval	Standard Deviation	Statistics T	P value	VIF	Conclusion
Direct Influence									
H1	CON=>AU	0.114	0.116	[0.021-0.212]	0.050	2.296	0.022	1.647	Accepted
H2	TK=>AU	0.182	0.184	[0.095-0.275]	0.046	3.993	0.000	1.466	Accepted
H3	PI=>PE	0.186	0.188	[0.101-0.275]	0.044	4.255	0.000	1.000	Accepted
H4	PI=>AU	0.009	0.008	[-0.082-0.099]	0.046	0.193	0.847	1.517	Rejected
H5	PI=>PEU	0.243	0.247	[0.162-0.379]	0.043	5.635	0.000	1.000	Accepted
H6	PR=>AU	-0.157	-0.160	[-0.238-0.084]	0.039	3.983	0.000	1.079	Accepted
H7	SI=>AU	0.022	0.024	[-0.073-0.115]	0.049	0.456	0.648	1.663	Rejected
H8	PE=>AU	0.162	0.160	[0.078-0.242]	0,041	3.914	0.000	1.418	Accepted
H9	PEU=>AU	0.327	0.327	[0.237-0.414]	0.046	7.192	0.000	1.535	Accepted
H11	PE=>ITU	0.111	0.113	[0.037-0.189]	0.039	2.849	0.004	1.450	Accepted
H12	PEU=>ITU	0.351	0.352	[0.276-0.431]	0.039	8.960	0.000	1.628	Accepted
H13	AU=>ITU	0.302	0.300	[0.218-0.735]	0.041	7.381	0.000	1.511	Accepted
Indirect Influence									
H10a	PE=>AU=>ITU	0.049	0.049	[0.022-0.079]	0.014	3.397	0.001		Accepted (Partial Mediation)
H10b	PEU=>AU=>ITU	0.099	0.098	[0.066-0.134]	0.018	5.613	0.000		Accepted (Partial Mediation)
Moderating Relationship									
H14a	TR×PE=>ITU	-0.032	-0.031	[-0.098-0.037]	0.034	0.938	0.349	1.295	Rejected
H14b	TR×AU=>ITU	0.167	0.167	[0.083-0.245]	0.041	4.061	0.000	1.288	Accepted
Adjusted R-squared Coefficient									
R^2_{PE}=0.032									
R^2_{PEU}=0.059									
R^2_{AU}=0.348									
R^2_{ITU}=0.506									
Magnitude of Impact f^2									
$f^2_{CON=>AU}$=0.012 (very weak impact)									
$f^2_{TK=>AU}$=0.035 (weak impact)									
$f^2_{PI=>AU}$=0.000 (no impact)									
$f^2_{PI=>PE}$=0.036 (weak impact)									
$f^2_{PI=>PEU}$=0.063 (weak impact)									
$f^2_{PR=>AU}$=0.035 (weak impact)									
$f^2_{SI=>AU}$=0.000 (no impact)									
$f^2_{PE=>AU}$=0.029 (weak impact)									
$f^2_{PEU=>AU}$=0.109 (weak impact)									
$f^2_{PE=>ITU}$=0.018 (very weak impact)									
$f^2_{PEU=>ITU}$=0.155 (medium impact)									
$f^2_{AU=>ITU}$=0.123 (weak impact)									
$f^2_{TR×AU=>ITU}$=0.040 (weak impact)									
$f^2_{TR×PE=>ITU}$=0.002 (very weak impact)									

Source: Authors' compilation

The results also indicate that the standardized beta coefficients of the mediated relationships between PE => AU => ITU and PEU => AU => ITU are 0.049 and 0.099, respectively. Therefore, hypotheses H10a and H10b find support through the mediating role of attitude towards use (AU). Furthermore, the moderating role of trust (TR) in the relationship between AU and ITU is statistically significant, with a coefficient of $\beta = 0.167$. This result confirms hypothesis H14b, suggesting that higher levels of trust strengthen the impact of attitude towards use (AU) on intention to use (ITU). In summary, the outcomes of the PLS-SEM model indicate that 10 direct effects, 2

indirect effects, and 1 moderating effect are supported by the data (Figure 4).

Furthermore, according to Hair et al. (2013), the effects of independent factors on dependent factors (f^2) range from weak (0.02) to strong (above 0.35). The results in Table 9 show that perceived ease of use has a moderate effect on the intention to use ($f^2_{PEU \Rightarrow ITU} = 0.155$). Additionally, the attitude towards use and perceived usefulness have weak effects on the intention to use ($f^2_{AU \Rightarrow ITU} = 0.123$; $f^2_{PE \Rightarrow ITU} = 0.018$). Personal innovativeness has a weak effect on perceived ease of use and perceived usefulness ($f^2_{PI \Rightarrow PEU} = 0.063$; $f^2_{PI \Rightarrow PE} = 0.036$). Perceived ease of use, technological knowledge, perceived usefulness, and convenience have weak effects on the attitude towards use ($f^2_{PEU \Rightarrow AU} = 0.109$; $f^2_{TK \Rightarrow AU} = 0.035$; $f^2_{PE \Rightarrow AU} = 0.029$; $f^2_{CON \Rightarrow AU} = 0.012$). Perceived risk has a negative and weak effect on the attitude towards use ($f^2_{PR \Rightarrow AU} = 0.035$). Moreover, the variable of trust moderates the relationship between attitude towards use and intention to use with a coefficient of $f^2_{TR \times AU \Rightarrow ITU} = 0.04$. The results are consistent with the standardized beta coefficients mentioned above.

In summary, the model results support the following hypotheses:

H1. Convenience positively *impacts the attitude towards use.*

H2. Technological knowledge *positively impacts the attitude towards use.*

H3. Personal innovativeness positively impacts perceived usefulness.

H5. Personal innovativeness positively *impacts perceived ease of use.*

H6. Perceived risk positively impacts *the attitude towards use.*

H8. Perceived usefulness positively *impacts the attitude toward use.*

H9. Perceived ease of use positively *impacts the attitude towards use.*

H10a. Attitude towards use partial *mediates the relationship between perceived usefulness and the intention to use a self-service payment system.*

H10b. Attitude towards use partial *mediates the relationship between perceived ease of use and the intention to use a self-service payment system.*

H11. Perceived usefulness positively impacts the intention to use a self-service payment system.

H12. Perceived ease of use positively *impacts the intention to use a self-service payment system.*

H13. Attitude towards use positively *impact on the intention to use a self-service payment system.*

H14b. Trust significantly *moderates the relationship between attitude towards use and intention to use a self-service payment system, indicating that higher levels of trust amplify the impact of attitude on the intention to use a self-service payment system.*

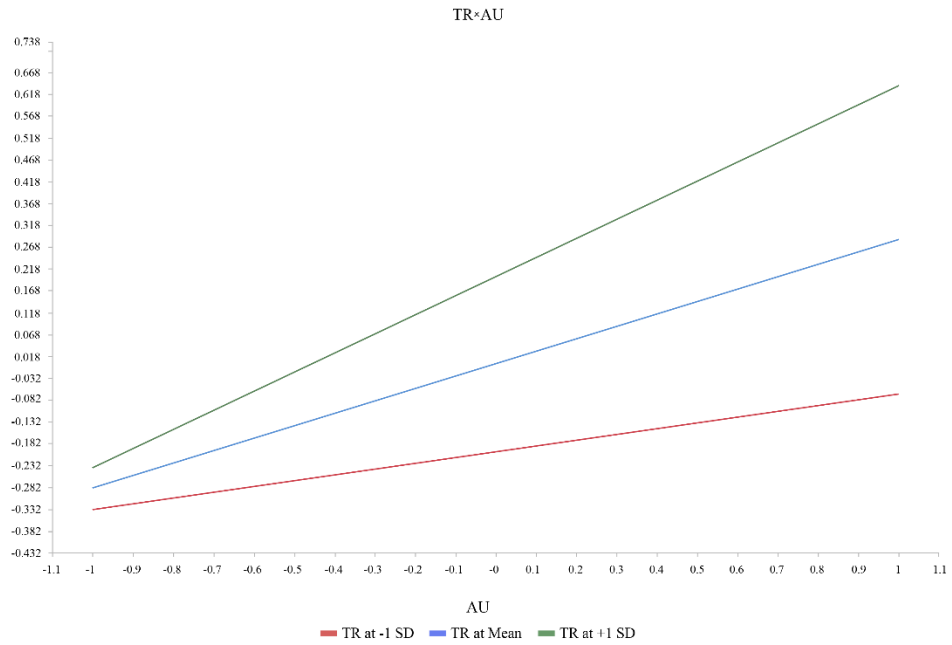

Figure 4. The moderating effect of TR on AU to ITU
Source: SmartPLS

4.7 The Predictive Ability of the Model

If the value of Q2 is greater than 0, it indicates that the model has predictive relevance (Shmueli et al., 2019). In Table 10, the Q2 values for all observed variables, PE, PEU, AU, and ITU, are greater than 0, indicating that the model has a suitable predictive ability. The number of observed variables with PLS-SEM_MAE scores lower than LM_MAE is 5 out of 15 observed variables. Therefore, the proposed model has low predictive ability.

Table 10. The predictive ability of the model

	Q^2 Predict	PLS-SEM_MAE	LM_MAE
PE1	0.008	**0.721**	**0.743**
PE3	0.030	**0.759**	**0.779**
PE4	0.022	0.856	0.819
PEU1	0.042	0.818	0.793
PEU2	0.038	0.658	0.588
PEU3	0.027	0.684	0.678
PEU4	0.037	0.855	0.808
AU1	0.105	**0.736**	**0.757**
AU2	0.059	**0.745**	**0.748**
AU3	0.134	0.832	0.796
AU4	0.120	**0.723**	**0.764**
ITU1	0.177	1.007	0.955
ITU2	0.091	0.882	0.837
ITU3	0.150	0.852	0.814
ITU4	0.114	0.890	0.815

Source: Authors' compilation

4.8 Discussion of Research Findings

With beta values of 0.114 and 0.182, respectively, the results of the study confirm H1 and H2, which propose that technological knowledge (TK) and convenience (CON) have a direct and positive impact on attitude toward use (AU). This result is consistent with earlier research by Oliveira et al. (2016), Kim et al. (2010), and Sleiman et al. (2022). However, convenience alone affects users' perceptions of ease of use and intentions to continue using, as seen in previous trials. Additionally, H3 and H5, which posit that perceived usefulness (PE) and perceived ease of use (PEU) are positively and directly influenced by personal innovativeness (PI), are also validated, with beta values of 0.186 and 0.243, respectively. This outcome aligns with the research conducted by Shankar & Datta (2018) and Kim et al. (2010).

Furthermore, a beta value of -0.157 supports H6, which suggests that perceived risk (PR) directly and negatively affects attitudes toward usage. Specifically, participants' shared perceptions of financial risk indicate that greater financial risk is associated with more unfavorable customer perceptions of usage. If users believe there is a possibility of fraud or that mobile money lacks security, they may be less inclined to utilize the service (Kelly & Palaniappan, 2023). Users may also exhibit reluctance to use the service and develop mistrust for the system if they believe there is a chance they may lose money.

With beta values of 0.162 and 0.327, respectively, the results also indicate that perceived utility (PE) and perceived ease of use (PEU) positively and directly impact attitude toward use (AU). Consequently, H8 and H9 are validated. This result corresponds to the study paradigm and fundamental ideas of Kelly & Palaniappan (2023), Peng & Yan (2022), and Li et al. (2019). These two observable characteristics significantly influence the attitude toward usage. Moreover, the intention to use the self-service payment system is directly and favorably influenced by perceived usefulness (PE), perceived ease of use (PEU), and attitude toward usage, with beta values of 0.113, 0.351, and 0.302, respectively, supporting H11, H12, and H13. The present findings are consistent with the research conducted by Kim et al. (2010), Peng & Yan (2022), and Li et al. (2019). These studies have demonstrated that perceived usefulness (PE) and perceived ease of use (PEU) impact attitudes and directly influence use intentions. The association between attitude, intention to use, perceived utility, and perceived ease of use is further clarified by Li et al. (2019). The attitude toward use directly and indirectly influences the intention to use. It also serves as a mediator between intention to use, and perceived ease of use and usefulness. As shown by beta coefficients of 0.049 and 0.099 for H10a and H10b, respectively, the research results also demonstrate that attitude plays an intermediate role in the two relationships between perceived usefulness and intention to use and between perceived ease of use and intention to use.

A beta coefficient of 0.167 supports H14b, revealing that trust positively and significantly moderates the relationship between the attitude toward use and the intention to use a self-service payment system and the relationship between the attitude toward use and the intention to use the ITU. This finding contradicts Ha et al. (2023)'s and Shankar & Datta (2018)'s research. According to the study's analysis of the relationship between attitudes toward use and intentions to use, higher levels of trust weaken the association between the attitude toward use and the intention to use a self-service payment system.

5. Conclusion and Managerial Implications

5.1 Conclusions

Using a combination of qualitative and quantitative research methods, the researcher developed a model and

scale to assess the connections between convenience, technological knowledge, personal innovativeness, social influence, perceived risk, perceived usefulness, perceived ease of use, attitude towards use, and the intention to use a self-service payment system. The study involved testing and measuring these relationships, considering the mediating role of perceived usefulness, perceived ease of use, attitude towards use, and the moderating role of trust.

The results of the study indicate that perceived ease of use has the most significant and positive impact on consumers' intention to use a self-service payment system ($\beta = 0.351$). Following that, the attitude towards use ($\beta = 0.302$) and perceived usefulness ($\beta = 0.111$) also exerted positive influences. The attitude towards use acts as a partial mediator in the relationships between perceived ease of use ($\beta = 0.099$), perceived usefulness ($\beta = 0.049$), and consumers' intention to use a self-service payment system. Moreover, trust moderates the relationship between the attitude towards use ($\beta = 0.167$) and consumers' intention to use a self-service payment system.

The study was conducted at a time when a self-service payment system was not a priority among payment methods in Vietnam City, and consumers still heavily relied on traditional payment methods with the assistance of cashiers. In practical terms, the study hopes to provide useful information to managers, aligning consumer needs with the current digital technology era. Therefore, managers can take appropriate measures to meet consumer demands. From an academic perspective, the study reaffirms the TAM and UATUA theoretical models in the current context. The research will serve as a reference for future studies on the intention to use a self-service payment system for consumers or the acceptance and intention to use new technologies.

5.2 Managerial Implications

Based on the research findings mentioned above, the author proposes some managerial implications that can help businesses in the retail and consumer goods industries better support consumer needs and enhance the customer experience.

Firstly, a self-service payment system has been implemented in some supermarkets in Vietnam but is not widely known or used by consumers. Therefore, businesses that have adopted this payment method need to provide more information to consumers. Particularly in the current era of social media development, it can be an effective tool to promote this payment method to younger consumers. At locations with automatic payment systems, prominent banners, and posters should be displayed to attract consumer attention and encourage more usage of the system. Having support staff available at self-service payment counters can assist customers in case they encounter any issues and provide them with a sense of assurance when experiencing something new.

Secondly, there should be an adequate number of payment systems at various points of sale. To reduce congestion at cashier counters and encourage consumer usage, sufficient availability of a self-service payment system is necessary. If only a few locations implement this payment method, it will not effectively address the issues.

Thirdly, the usage process should be clear. Each payment point should have instructions on how to carry out the payment process and resolve any issues, helping customers understand the payment procedure and build trust in using it.

According to the obtained results, perceived risk is a concern for many consumers when using a self-service payment system, including financial risks and the possibility of system malfunctions during payment without compensation from the provider. Therefore, businesses should build customer trust by promptly addressing customer issues and implementing clear policies that protect customer interests.

5.3 Practical Implications

Based on the above research findings, the authors also propose practical implications that can help society. Firstly, with a crowded and long lineup of consumers who wait for the cashiers, applying a self-service payment system can help consumers save lots of time and feel more comfortable, improving their quality of life. Then, the self-service payment system can accelerate the digital transformation of the Vietnamese government by integrating this system with many digital payment methods, such as Momo, the banking system, etc. The process of digital transformation is one of the most important targets that the Vietnamese government aims to achieve soon.

5.4 Research Limitations

Although the research has achieved certain results, some specific limitations remain. Firstly, the results are only applicable within the geographical scope of the study in Vietnam, and future studies can also expand the research to other Asian countries to see the necessity of applying this research.

Secondly, this study only focuses on factors that encourage consumer usage of a self-service payment system but does not extensively explore the practical experiences of consumers. Future studies could examine factors influencing consumer satisfaction to develop solutions that further enhance consumer intentions to use the system.

Thirdly, during the survey sampling process, there may be difficulties in reaching consumers who have never or rarely used a self-service payment system, making it challenging to gather insights on their perspectives towards a new technology. Additionally, a self-service payment system has yet to be widely adopted in the Vietnamese market. Future studies can also conduct longitudinal research to see if any other factors, such as subjective norms and social influence, can be added to the model to explore the intention to use self-service payment.

Lastly, this study only focuses on consumers and does not consider companies' perspectives, which may include financial resources or businesses' infrastructure. Future studies can consider adding these factors to expand the research model.

Author Contributions

If your research article has several authors (i.e., those who have contributed substantially to the work), you are recommended, but not required, to list the contributions of each author in the following statement: "Conceptualization, Nguyen Le and Ngoc Thi Bich Mai; methodology, Nhan Trong Ngo and Hien Thu Thi Dang; software, Nguyen Le; validation, Nguyen Le and Ngoc Thi Bich Mai; formal analysis, Nhan Trong Ngo and Hien Thu Thi Dang; investigation, Nhan Trong Ngo and Hien Thu Thi Dang; resources, Ngoc Thi Bich Mai; data curation, Nguyen Le; writing—original draft preparation, Nhan Trong Ngo and Hien Thu Thi Dang; writing—review and editing, Nguyen Le; visualization, Nguyen Le; supervision, Nguyen Le; project administration, Nguyen Le; funding acquisition, Ngoc Thi Bich Mai. All authors have read and agreed to the published version of the manuscript". The relevant terms are explained at the CRediT taxonomy.

Data Availability

The data used to support the research findings are available from the corresponding author upon request.

Acknowledgements

The authors would like to sincerely thank the Industrial University of Ho Chi Minh City. Their assistance has been a great motivation in completing the study on time.

Conflicts of Interest

The authors declare no conflict of interest.

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