Special Issue on Smart Services and Internet of Things

Customer Acceptance of Self-service Technologies in Retail: A Case of Convenience Stores in China

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A B S T R A C T

This paper investigates how firms increase customer acceptance of self-service technologies in retail, and the impact of self-efficacy on customer experience, satisfaction, and loyalty. We conducted our empirical research by administering 308 questionnaires to customers of self-service convenience stores in China. We employed a structural equation model to analyze the relationship between service quality, revisit intention, and word of mouth. The results indicate that perceived service quality significantly influences customer satisfaction, with the service quality of self-service retail and experience value being important factors in consumer acceptance of self-service retail stores. Additionally, we investigated the relationship between customer experience value, satisfaction, and loyalty, and found that self-service retail stores exert a significant impact on perceived self-efficacy. Informed by the research on customer acceptance of self-service technologies in retail, promoting further development of self-service retail technologies can effectively aid companies in generating profit while offering more convenience to customers.

Keywords: Self-service Retail, Experience Value, Perceived Service Quality, Self-efficacy, Customer Loyalty

Ⅰ. Introduction

In recent years, self-service technologies in the retail industry have developed rapidly. The self-service retail industry mainly consists of self-service convenience stores and supermarkets. With the main focus being on customer experience, various technologies such as big data, artificial intelligence, and mobile payment have been adopted, transforming the retail industry and improving consumption experience and cost efficiency. The main features of self-service retail stores are as follows. First, they adopt a variety of technologies such as the Quick response (QR) code, face recognition, radio frequency

identification (RFID), and other technologies. Second, they reduce the cost of labor, since they do not require sales personnel and can operate 24 hours a day. At present, self-service retail stores mostly use the traditional RFID technology for the checkout process, significantly improving customers' convenience by saving their time. However, some problems of self-service retail may lead to a lack of customer acceptance. For example, when customers need a refund after the checkout process, they must put all items back into their original location. Additionally, due to limitations of technology and space, self-service retail stores cannot sell all types of goods, and when the goods are sold out, they cannot provide them to customers on time. Moreover, since there are no sales personnel, sometimes it is more difficult for customers to find products. Furthermore, the self-checkout system relies on a stable network; thus, if there is a problem within the network, a payment delay or even failure may occur, worsening the customer experience. According to the China Business Research Institute, the number of self-service retail users was 50 million in 2017 and is expected to reach 240 million in 2022. With regarding to the scale of self-service retail transactions, these transactions amounted to 10 billion yuan in 2017, and are expected to reach 950 billion yuan in 2022. According to published data, the self-service retail industry is still in its infancy, as self-service retail stores are not very mature in terms of technology, resulting in incomplete market conditions. Therefore, both the user and transaction scales are at an early stage. With the continuous improvement in technology and the continuous promotion of self-service retail stores in the market, their numbers will increase. Furthermore, the scales of users and transactions will rapidly increase in the future.

The self-service retail industry depends on the consumer acceptance of the stores' service quality and technical presentation and the quality of consumer experience. Consumers are encouraged to accept the service quality and experience value of self-service technologies, since they are beneficial to retailers, providing a better understanding of consumer behavior in the emerging consumer-to-business (C2B) retail environment.

Providing a high-quality service is critical to win the competition among enterprises, since it leads to customer satisfaction, and thus a returning customer, which is the core element of enterprise survival. The self-service retail industry must have a different approach to compete with the traditional retail model, attract more consumers, and make more profit. High-quality service is one of the key elements to improve self-service retail (Simmers and Keith, 2015). Parasuraman et al. (1988) proposed the service quality assessment (SERVQUAL) model, which was mainly used to evaluate the service quality in this study. This model mainly evaluates the customer's expectations and experiences. In this model, the customer's perception of the service quality depends on the difference between the expected and the actual received service quality. The existing literature on the SERVQUAL model mostly studied the traditional retail industry. For example, Veloso et al. (2018) used the SERVQUAL model to evaluate traditional retail stores in Portugal, and Khan et al. (2014) employed it to assess superstores in Bangladesh. However, it has not been applied to new technologies in retail. Simultaneously, the existing literature on e-service quality mainly focused on the online retail industry (Al et al., 2017; Lee and Wong, 2015). In this study, self-service retail refers to offline retail, and the quality of e-services is applied to verify customer acceptance of self-service retail. We study the

service quality of self-service retail using both the SERVQUAL model and e-service quality. The goals are to assess whether the service quality is an important guarantee for customer satisfaction and loyalty and generating profits for enterprises.

The current level of maturity of face recognition, product identification, RFID code usage, mobile payment, and other relevant technologies, as well as the reduced costs of each technology and the popularity of applications, has laid the foundation for the widespread use of self-service retail terminals. Self-service retail has overtaken the traditional retail model, providing convenience for consumers while creating profits for enterprises. Furthermore, self-service retail is one of the new products of artificial intelligence technology, providing a new retail experience for consumers. However, previous studies have not addressed the experience value of self-service retail technology (Veloso et al., 2017). Traditionally, enterprises have paid more attention to product quality, which is the most important factor in attracting and maintaining customer interest. However, at present, they focus on both product quality and the consumer experience process. Considering consumers' rational attitude, including their inner desire for shopping, is important when evaluating consumers and promoting consumption, as captured by the consumer experience. This study demonstrates that customers not only use high-quality products, but also enjoy the convenience and capacity for more technical consumption offered by self-service retail stores.

A self-service retail company provides customers with high-quality products and convenience, which facilitates their acceptance of self-service retail. Therefore, this paper discusses a range of key drivers that predict consumer acceptance of self-service retail stores. Research on consumer acceptance of self-service retail can promote the development of self-service

retail technology, and help enterprises reduce costs and create profits. Furthermore, self-service retail results in more convenience for consumers, thus furthering the case for its rapid development. Hence, the following research questions are addressed:

(1) How can a firm increase customer acceptance of self-service retail?

(2) Is there any relationship between perceived self-efficacy and customer satisfaction, loyalty, and experience value in the self-service retail industry?

The remainder of this paper is organized as follows. Section 2 reviews the existing literature on service quality, experience value, and perceived self-efficacy. Section 3 presents hypotheses about customer satisfaction and loyalty based on service quality, experience value, and perceived self-efficacy. Section 4 demonstrates the method used to test the research model, with section 5 presenting the results. Section 6 discusses the theoretical and practical implications of the findings. Section 7 summarizes the conclusions.

Ⅱ. Conceptual Background

2.1. Service Quality

In early studies on service quality (e.g., Gronroos, 1982), customer assessment of the service quality was related to the expectations provided by the service firm. Simultaneously, customer expectations of the service quality depended on the level of service quality provided by the service firm (Lewis and Booms, 1983). Parasuraman et al. (1985, 1988) studied the customer's expectation of service quality and his/her perception of the company's actual service quality. The early definition of service quality mainly focused on the customer's expectation, which determined the customer's evaluation of the enterprise and played

an important role in attracting consumers.

Parasuraman et al. (1988) developed the SERVQUAL model to assess service quality and defined the following five dimensions of service quality. (1) Tangibles: physical facilities and equipment. (2) Reliability: the ability to perform the promised service dependably and accurately. (3) Responsiveness: the willingness to help customers and provide prompt service. (4) Assurance: the ability to build trust with customers. (5) Empathy: the ability of the firm to provide its customers with caring and individualized attention. <Table 1> lists the most recent studies on the use of SERVQUAL to assess service quality.

The new technologies used in self-service retail stores are mainly aimed at the shopping process; therefore, this study does not consider the tangibles dimension. The responsiveness variable has been used in the case of sales personnel; however, there are no sales personnel in self-service retail stores. Therefore, this study does not consider this variable as well. Thus, we selected the remaining three dimensions of reliability, empathy, and responsiveness to evaluate the self-service retail industry.

In the existing literature, customer expectations were studied in the traditional retail, banking, medical, online payment, and hotel industries. However,

the use of the SERVQUAL model to assess the quality of service depends on the specific content of the item and its essential attributes. Sweeney et al. (1997) studied product quality, price perception, and service quality in the retail industry. Berkley and Gupta (1994) studied improving service quality in services, manufacturing, and banking by investments in information technology (IT). Their work included reliability, responsiveness, competence, access, communication, security, understanding, and knowledge of the customers. Past studies applied the SERVQUAL model to various industries to assess their service quality, depending on the nature of the specific study (Rayport and Sviokla, 1996). This study used reliability, responsiveness, and empathy to evaluate self-service retail. From the perspective of the aforementioned five dimensions, the SERVQUAL model does not consider service quality in the self-service retail industry, but instead adopts unique technologies such as big data, artificial intelligence, and mobile payment. Therefore, this study additionally uses e-service quality. Gummerus et al. (2004) defined e-service quality as the evaluation of the consumers' shopping process on a website and its outcomes. Consumers purchase efficiently and conveniently through the website shopping process (Parasuraman,

<Table 1> Studies on the Use of SERVQUAL to Assess Service Quality

Study	Industry	Research constructs	Methodology
Veloso et al. (2018)	Traditional Retail Stores	SERVQUAL	Survey, SPSS
Caruana (2002)	Postal Retail Banking	Service Quality, Customer Satisfaction, Loyalty	Survey, Structural Equation
Butt et al. (2010)	Private Health	SERVQUAL	Experiment, Confirmatory Factor Analysis
Rahman et al. (2017)	Online Bill Payment System	Service Quality, Customer Satisfaction, Loyalty	Face-to-face Interview, PLS
Nam et al. (2011)	Restaurants and Hotels	Service quality, Self-congruence, Desires congruence, Customer Satisfaction, Attitude, Intention to return	Survey, PLS

2005). Many studies have measured e-service quality. Wolfinbarger and Gilly (2003) reported four main dimensions for measuring e-service quality, namely, website design, reliability, security, and customer service. Zeithaml et al. (2002) identified the dimensions of efficiency, reliability, fulfilment, privacy, responsiveness, compensation, and contact to assess e-service quality. Parasuraman et al. (2005) measured e-service quality according to four dimensions: efficiency (the ease and speed of access and the use of self-service retail systems), fulfilment (the degree to which the website fulfils its commitments to customers), system availability (appropriate technical capabilities of the system), and privacy (security of the system and protection of consumer information). Fulfilment is mainly an assessment of online service quality. Moreover, the self-service retail industry uses new technologies to realize self-service systems; therefore, we selected the two dimensions of efficiency and system availability to evaluate the self-service retail industry. Previous research focused on the SERVQUAL model or e-service quality. Jarrett et al. (2019) employed the SERVQUAL model to study the service quality aspects of retail stores and assessed customer satisfaction in Chittagong, Bangladesh. E-service quality and website satisfaction involving the purchase of tourism services were assessed by Sabiote et al. (2019) using the SERVQUAL model and e-service quality. This study used the SERVQUAL model and e-service quality to study the service quality of the self-service retail industry, with the results being of great significance for the self-service retail industry.

2.2. Experience Value

The self-service retail industry is centered on customer experience, with the shopping experience playing an important role in increasing revenues and attracting consumers (Yakhlef, 2015). Pine and Gilmore (1998) reported that consumers who are deeply impressed by the shopping process retain their memories of the experience for a long time. Particularly, customers gain experiential perceptions of the products and services provided by the company during the shopping process, so that they are more attracted to the products. Experiential value refers to the perceived value of the goods or services provided by the company during the shopping process (Mathwick et al., 2001). The experience value enables customers to obtain inner satisfaction, form a deep memory, and gain experience value. Holbrook (1994) divided the experience value into intrinsic and extrinsic values. Intrinsic value refers to the customers' inner feelings, which reflect their emotional experience, whereas the extrinsic value refers to the customers' utilitarian feelings during shopping. Mathwick et al. (2001) divided the value of intrinsic experience into playfulness and aesthetics. The value of extrinsic experience is further divided into the value of excellent service and customer return on investment (CROI). Of these four dimensions, this study focuses on playfulness and CROI. Aesthetic refers to both the visual and entertainment aspects of the experience process (Holbrook, 2000), as consumers are attracted to a certain design or performance. The playfulness value reflects the emotional value of positive feelings during the shopping process (Mathwick et al. 2001). In particular, consumers feel happy during the shopping process, and an attractive shopping process makes them forget everything else. This study focuses more on the emotional aspects of the shopping process; therefore, it uses the playfulness value. The value of service excellence indicates that the company provides customers with relevant expertise and reliable service (Holbrook, 2000). The CROI is defined as

buying high-quality products at reasonable prices, as consumers tend to purchase products that offer good value for money (Monroe and Krishnan, 1996; Thaler, 1985; Yadov and Monroe, 1993). When shopping in self-service retail stores, consumers rely on their perception of money, time, and psychology to evaluate the value of the return. Therefore, this study focuses on consumer attitudes and the consumption rationality during the shopping process using the CROI. Most of the studies on the relationship between service quality and experience value have not reached a unified conclusion. Additionally, most previous studies have investigated the relationship between service quality and customer perceived value. For example, Kuo et al. (2009) studied the relationship between service quality of mobile value-added services perceived value, customer satisfaction, and post-purchase intention. Therefore, this study uses the experience value to assess the relationship between service quality and experience value.

2.3. Perceived Self-efficacy

Bandura (1977) defined self-efficacy as the belief that an individual can perform an activity or task with the attitude of knowing, judging, and evaluating, independent of his/her ability to complete the task. Therefore, the perception and judgment of self-efficacy leads to the individual's evaluation of the performed task (i.e., the individual's expectation). The expected result of a person who performs a task depends on his/her cognition and judgment, which determines his/her degree of willingness to exert an effort. This paper mainly focuses on technological self-efficacy, which refers to the belief that individuals can use self-service technologies to complete shopping in self-service retail stores. Previous studies conducted considerable empirical research on techno-

logical self-efficacy (Bandura, 1994; Dabholkar and Bagozzi, 2002; Davis, 1986; Ellen et al., 1991; Hill et al., 1987; Kankanhalli et al., 2005; Kiseol Yang, 2012). In this study, the concept of self-efficacy is used in the context of the retail industry, which is important for the identification of consumer satisfaction and loyalty.

2.4. Satisfaction

Satisfaction refers to the individual's expectations and evaluation after consumption (Westbrook, 1980). To achieve consumer satisfaction, enterprises must realize the expectations of consumers before shopping, since satisfaction is a subjective attitude of the individual (Oh, 1999; Shankar and Erramilli, 2004; Yu et al., 2014). Maxham III (2001) conducted an experiment and a field study to investigate the impact of service recovery on consumer satisfaction and loyalty, with the results showing that the post-recovery satisfaction was greater than that before service failure. Miranda et al. (2017) conducted an online survey on Portuguese retail sales, with the results showing that perceived value and service quality exert a significant effect on customer satisfaction. In this study, customer expectations of service quality and experience value of self-service retail stores were evaluated to determine whether customer satisfaction plays an important role in the further development of self-service retail stores.

2.5. Loyalty

Customer satisfaction is based on the premise of customer loyalty. Griffin (1995) confirmed two important factors of loyalty (i.e., emotional attachment of the customer and revisit intention). Customers' revisit intention is one of the most important elements

of loyalty (Uncles and Laurent, 1997), which indicates their loyalty in terms of their behavior (Tellis, 1988; Tucker, 1964). Emotional attachment indicates the customer's loyal attitude (Bennett and Rundle-Thiele, 2002). Customer loyalty leads to recommendations to relatives and friends (Zeithaml et al., 1996), and the provision of positive reviews (Zeithaml et al., 1996). Whether the customer's attitude and behavior can overcome his/her psychological inertia is crucial for achieving customer loyalty. Therefore, we divide loyalty into revisit intention and word of mouth.

Ⅲ. Research Model and Hypotheses

3.1. Impact of Service Quality on Customer Satisfaction

Service quality directly affects satisfaction; for example, a high-quality service exerts a positive impact on customer satisfaction, whereas a low-quality service exerts a negative impact. Previous research indicates a positive correlation between service quality and customer satisfaction (Cronin and Taylor, 1992; Veloso et al., 2017; Zaibaf et al., 2013; Zeithaml et al., 1996; Zeithaml et al., 2003; Zhang and Prybutok, 2005):

H1: The service quality of self-service retail has a positive effect on customer satisfaction.

3.2. The Impact of Service Quality on Experience Value

Most of the existing studies are based on the causality of customer perceived value, with many deficiencies affecting the current studies on experience value. Among them, a unified conclusion on the

relationship between service quality and the customer experience value has not been reached. Most of the previous studies focused on the relationship between service quality and customer perceived value, which includes the experience value (Parasuraman, 1997). When a customer purchases a product, the perceived value criteria differ between before, during, and after the purchase. Gardial et al. (1994) suggested that when purchasing products, consumers focus on the purchasing process. Additionally, since the shopping experience is part of the process of purchasing products, consumers form emotional and rational values during the shopping process. Therefore, the relationship between service quality and customer experience value is inferred from the relationship between previous customer service quality and perceived value. Previous studies have shown a positive correlation between service quality and perceived value. Thus:

H2: The service quality of self-service retail has a positive effect on experience value.

3.3. The Impact of Experience Value on Customer Satisfaction and Loyalty

During the shopping process, the customer exhibits either an emotional or rational shopping attitude, which plays an important role in both consumer satisfaction and loyalty. The experience value positively impacts customer satisfaction (Eroglu et al., 2003; Iglesias and Guillén, 2004) and purchase intention (revisiting and word of mouth) (Chang and Wildt, 1994; Nigam, 2012). Therefore:

H3: The experience value of self-service retail has a positive effect on customer satisfaction.
H4: The experience value of self-service retail has a positive effect on customer loyalty.

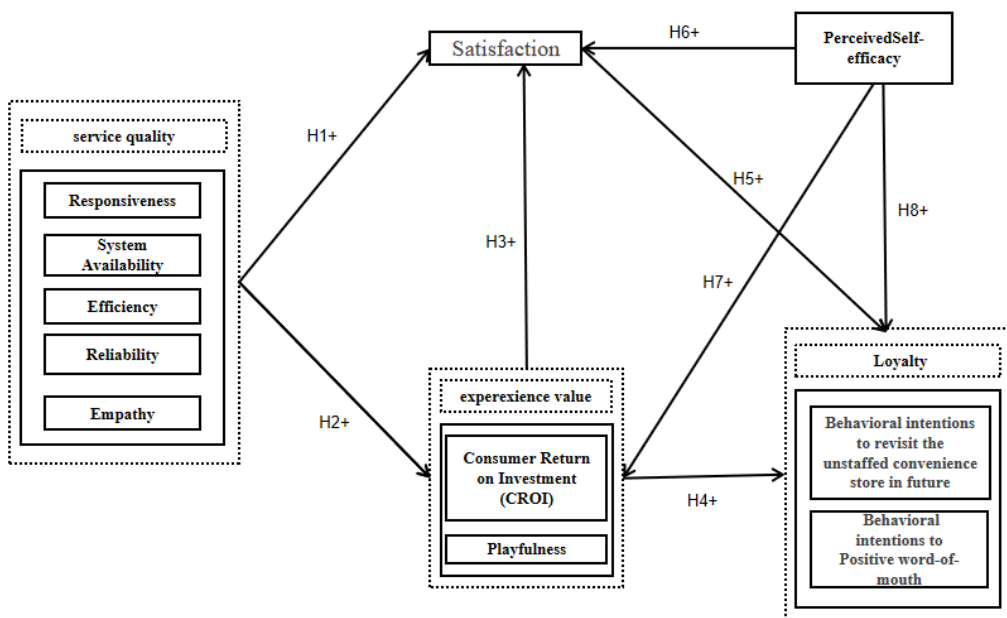## 3.4. Impact of Customer Satisfaction on Customer Loyalty

The relationship between satisfaction and loyalty has been studied extensively. To achieve continuous customers' loyalty, satisfaction is very important. If the customer satisfaction is high, he/she will be encouraged to revisit and recommend the experience to others (Zeithaml et al., 1996). Therefore, customer satisfaction is an important part of each company's profit improvement strategies. Previous studies confirmed that customer satisfaction exerts a positive impact on loyalty (Bloemer et al., 1999; Yu et al., 2014; Mittal et al., 1998; Zeithaml et al., 1996). Hence:

H5: *The customer satisfaction of self-service retail has a positive effect on customer loyalty.*

3.5. Impact of Self-efficacy on Experience Value, Customer Satisfaction, and Customer Loyalty

Previous studies have shown that during the shopping process, high-efficient customers are more aware of the experience value process than are low-efficient customers, thus achieving more satisfaction and loyalty. Therefore, high-efficient customers witness a positive impact on satisfaction and loyalty during the experience process (Yang, 2012). In this study, due to the use of various technologies in self-service retail stores, customers with high self-efficacy can use these technologies to complete the shopping, facilitating the use of self-service retail stores and achieving customer satisfaction and loyalty. Thus:

H6: *Consumers with a high level of self-efficacy are more satisfied than consumers with a low level of self-efficacy.*

<Figure 1> Research Model

H7: Consumers with a high level of self-efficacy have more experience value than consumers with a low level of self-efficacy.

H8: Consumers with a high level of self-efficacy are more loyal than consumers with a low level of self-efficacy.

Ⅳ. Research Methodology

This paper investigates how firms increase customer acceptance of self-service retail, and the impact of self-efficacy on the customer experience, satisfaction, and loyalty. We conducted online surveys on 308 Chinese users of self-service convenience stores to test the aforementioned hypotheses. The questionnaires were administered from July 28 to September 14, with 2018. 44 items being assessed using a 7-point Likert scale (1 "not agree at all" to 7 "absolutely agree"), and each item being constructed based on prior literature. The questions were reviewed and examined by experts and scholars in China and South Korea.

<Table 2> shows the demographic characteristics of the 308 users of self-service convenience stores. Among them, there are 160 males (51.95%) and 148 females (48.05%). Users aged 18-30 constitute the largest group, with 106 consumers (34.42%) aged 18-25, and 101 consumers (32.79%) aged 26-30. Regarding the educational level, users who are undergraduates or have master's or higher degrees are the largest group, with the number of undergraduates being 156 (50.65%), and the number of those with

<Table 2> Descriptive Statistics of Respondents

Demographics		Number of users	Percentage
Gender	Male	160	51.95%
	Female	148	48.05%
Age (years)	Below 18	11	3.57%
	18 – 25	106	34.42%
	26 – 30	101	32.79%
	31 – 35	34	11.04%
	36 – 40	14	4.55%
	41 – 45	12	3.90%
	46 – 50	20	6.49%
	Above 51	10	3.45%
Educational level	High school or below	20	6.49%
	College	39	12.66%
	Undergraduates	156	50.65%
	People who hold a master's or higher degrees	93	30.19%
How many times do you go to a self-service convenience store in a month?	1 time	125	40.58%
	2-3 times	107	34.74%
	4-6 times	40	12.99%
	7-10 times	15	4.97%
	11 or more times	21	6.82%

master's or higher degrees being 93 (30.19%). The number of users who go to self-service convenience stores once per month is 125 (40.58%), which is the majority. By contrast, the number of users who go 2-3 times per month is 107 (34.74%), and the number of those who go 11 or more times per month is 21 (6.82%), accounting for a small portion.

Ⅴ. Data Analysis and Results

We collected valid data on 308 users of self-service convenience stores. After excluding outliers, 229 users' data were used for testing our hypotheses. In the study, the exploratory factor analysis (EFA) confirmed that 11 variables of each factor are greater than 0.5, as shown in <Table 3>. In addition, the reliability scores of each factor are high, as shown in Table 3. After verifying the EFA results, convergent validity and discriminant validity were tested based on the confirmatory factor analysis (CFA). The average variance extracted (AVE) of each construct is greater than 0.5, with the construct reliability (CR) being greater than 0.7, as shown in <Table 3>.

Discriminant validity tests that each variable is distinguishable and does not affect other variables. When the square root of AVE is greater than the load of each corresponding variable, then the model has discriminant validity. In this study, the square root of AVEs of constructs is greater than the correlations of each construct, thus confirming discriminant validity as shown in <Table 4>.

Ⅵ. Results

As shown in <Table 5>, the results of the structural equation modeling showed that Responsiveness exerted a positive and significant effect on Satisfaction ($\beta = 0.239$, $p < 0.001$), Playfulness ($\beta = 0.478$, $p < 0.001$), but did not exert a significant effect on CROI ($\beta = 0.016$, $p > 0.05$), thus supporting H1-1 and H1-3, and not supporting H1-2. System Availability exerted a positive and significant effect on Satisfaction ($\beta = 0.284$, $p < 0.001$), Playfulness ($\beta = 0.213$, $p < 0.001$), while Responsiveness did not exert a significant effect on CROI ($\beta = 0.064$, $p > 0.05$), thus supporting H2-1 and H2-3, and

<Table 3> Convergent Validity for the Proposed Model

Constructs	Factor loadings	AVE	CR	Cronbach's a
Playfulness (PF)	0.79,0.78,0.79	0.88	0.93	0.93
Consumer Return on Investment (CROI)	0.90, 0.88	0.94	0.94	0.94
Revisit Intention (RV)	0.88, 0.90	0.90	0.94	0.91
Efficiency (EI)	0.92,0.93,0.91	0.91	0.95	0.95
Satisfaction (SF)	0.76, 0.78, 0.69	0.90	0.94	0.94
Responsiveness (RP)	0.72, 0.80, 0.74	0.92	0.96	0.96
Self-efficacy (SE)	0.76, 0.76, 0.73	0.90	0.95	0.94
System availability (SA)	0.77, 0.79, 0.80	0.94	0.95	0.97
word-of-mouth (WOM)	0.73, 0.73, 0.76	0.94	0.97	0.97
Reliability (RB)	0.91,0.91	0.84	0.82	0.81
Empathy (EP)	0.77,0.91	0.89	0.88	0.88

<Table 4> Descriptive Statistics and Correlations between Latent Variables

	CROI	EI	EP	SE	PF	RB	RP	SF	SA	WOM	RV
CROI	**0.971**										
EI	0.342	**0.956**									
EP	0.388	0.290	**0.945**								
SE	0.439	0.284	0.576	**0.949**							
PF	0.370	0.262	0.545	0.605	**0.936**						
RB	-0.095	-0.135	0.108	0.039	0.098	**0.919**					
RP	0.375	0.370	0.614	0.628	0.729	0.001	**0.958**				
SF	0.472	0.360	0.621	0.679	0.600	0.035	0.664	**0.947**			
SA	0.394	0.363	0.642	0.631	0.642	-0.013	0.672	0.682	**0.968**		
WOM	0.458	0.344	0.545	0.776	0.587	-0.076	0.620	0.691	0.625	**0.967**	
RV	0.392	0.329	0.354	0.491	0.421	0.047	0.420	0.464	0.421	0.532	**0.949**

Note: Leading diagonal shows the square root of AVE of each construct

<Table 5> Structural Model Testing Results

	Path		coefficient	*t*-value	Result
H1-1	Responsiveness	Satisfaction	0.239***	3.410	Supported
H1-2		CROI	0.016	0.200	Not supported
H1-3		Playfulness	0.478***	7.246	Supported
H2-1	System Availability	Satisfaction	0.284***	4.228	Supported
H2-2		CROI	0.064	0.831	Not supported
H2-3		Playfulness	0.213***	3.386	Supported
H3	Efficiency	CROI	0.202***	3.636	Supported
H4	Reliability	Playfulness	0.093*	2.330	Supported
H5-1	Empathy	CROI	0.132*	1.981	Supported
H5-2		Playfulness	0.014	0.240	Not supported
H6	CROI	Satisfaction	0.145***	3.484	Supported
H7-1		revisit	0.172*	2.574	Supported
H7-2		WOM	0.080*	1.981	Supported
H8-1	Playfulness	revisit	0.123*	2.126	Supported
H8-2		WOM	0.100*	2.222	Supported
H9-1	Satisfaction	revisit	0.144*	2.044	Supported
H9-2		WOM	0.243***	3.796	Supported
H10-1	Perceived Self-efficacy	Satisfaction	0.286***	4.805	Supported
H10-2		CROI	0.255***	3.365	Supported
H10-3		Playfulness	0.159*	2.452	Supported
H10-4		revisit	0.243**	3.252	Supported
H10-5		WOM	0.515***	9.095	Supported

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$)

not supporting H2-2. Efficiency exerted a positive and significant effect on CROI ($\beta = 0.202$, $p < 0.001$), thus supporting H3. Reliability exerted a positive and significant effect on Playfulness ($\beta = 0.093$, $p < 0.05$), supporting H4. Empathy exerted a positive and significant effect on CROI ($\beta = 0.132$, $p < 0.05$),

but did not exert a significant effect on Playfulness ($\beta = 0.014$, $p > 0.05$), thus supporting H5-1 and not supporting H5-2. CROI exerted a positive and significant effect on Satisfaction ($\beta = 0.145$, $p < 0.001$), revisit ($\beta = 0.172$, $p < 0.01$), and WOM ($\beta = 0.080$, $p < 0.05$), thus supporting H6, H7-1, and H7-2. Playfulness exerted a positive and significant effect on revisit ($\beta = 0.123$, $p < 0.05$) and WOM ($\beta = 0.100$, $p < 0.05$), thus supporting H8-1 and H8-2. Satisfaction exerted a positive and significant effect on revisit ($\beta = 0.144$, $p < 0.05$) and WOM ($\beta = 0.243$, $p < 0.001$), thus supporting H9-1 and H9-2. Perceived Self-efficacy exerted a positive and significant effect on Satisfaction ($\beta = 0.286$, $p < 0.001$), CROI ($\beta = 0.255$, $p < 0.001$), Playfulness ($\beta = 0.159$, $p < 0.05$), revisit ($\beta = 0.243$, $p < 0.01$), and WOM ($\beta = 0.515$, $p < 0.001$), thus supporting H10-1, H10-2, H10-3, and H10-4 and not supporting H10-5.

Ⅶ. Discussion

The results of this analysis indicate three main points. First, perceived service quality exerts a positive impact on the acceptance of self-service retail. We used responsiveness, system availability, efficiency, reliability, and empathy to investigate the impact of perceived service quality on satisfaction and experience value. Previous research has shown that service quality exerts a positive impact on satisfaction and experience value (Bandura, 1977; Davis, 1986; Gardial et al., 1994; Parasuraman, 1997). Our results show also that service quality exerts a positive impact on satisfaction. The main difference between self-service retail stores and the traditional convenience ones is their checkout system. self-service retail stores can ensure a more safe and convenient shopping environment for customers. A quick and convenient checkout

system is particularly important to improve consumer satisfaction. Responsiveness, system availability, and reliability positively impact playfulness. During the checkout process, it is very important for consumers to have a positive experience when using the QR code recognition and face recognition technologies. This type of inner emotional experience makes consumers enjoy their shopping experience, thus improving their satisfaction and loyalty to self-service retail. Efficiency and Empathy exert a positive impact on CROI. By providing customers with more convenient shopping conditions, going to self-service retail stores will become a more rational choice. In other words, the rational attitude of consumers during the shopping process is related to whether they choose a self-service retail store, and whether they have more convenient in-store shopping conditions. Therefore, whether the enterprise can provide customers with more convenient conditions is an important factor in attracting them. However, responsiveness and CROI, system availability and CROI, and empathy and playfulness did not pass the verification hypothesis. Responsiveness and CROI did not pass because consumers face very inconvenient situations when encountering problems in the checkout process, which make them feel stressed. System availability and CROI did not pass because consumers require sales personnel during the checkout process in traditional shopping, whereas self-service retail stores use an automatic checkout system, thus having different acceptance methods for checkout according to different consumer spending habits. Empathy and playfulness did not pass because of the difficulty of finding products during shopping in self-service retail stores. Compared to traditional shopping where sales personnel are present and able to help with finding products, the process of self-service retail induces an unpleasant feeling. However, self-service retail

stores can be open 24 hours a day, which provides considerable convenience for customers. The main difference between self-service retail and traditional retail stores is the presence of sales personnel. Since self-service retail customers buy their products without sales personnel, they need to manage the checkout process alone. However, the self-service retail technology is not mature, which causes various inconveniences during the purchasing process. Therefore, the technology should be improved to bring about more convenience to customers, so that they can accept self-service retail. Efficient service quality and better service experience can provide consumers with more satisfaction, which increases the customers' revisit intention. Word of mouth plays an important role in making consumers accept self-service retail stores.

Second, Previous research has focused on product quality. Veloso et al. (2017) reported that enterprises pay more attention to product quality, which is the most important factor in attracting and maintaining the customers. This study incorporates the experience value into the existing literature. Previous studies have shown that the experience value exerts a positive effect on customer satisfaction (Eroglu et al., 2003; Iglesias and Guillén, 2004) and loyalty (Chang and Wildt, 1994; Nigam, 2012). In addition, this study shows that CROI and playfulness exert a positive impact on customer satisfaction and loyalty. The core of the self-service retail industry is to bring a new shopping experience to customers using the face recognition and the QR code technologies in convenience stores. All products have a RFID label, which can be used for identification purposes at the checkout. Furthermore, the QR codes used at the checkout provide customers with a new technological experience, which can attract consumers to shopping, thus being of a great significance to improve corporate

profits.

Third, Previous studies showed that consumers with higher self-efficacy have higher experience value, satisfaction, and loyalty to the self-service retail industry (Yang, 2012) and have a positive effect on the perceived behavioral control of self-service retail stores, as shopping in self-service retail stores is easier for them than for consumers with low self-efficacy. This shows that when consumers have confidence in self-service retail stores, they will perceive convenience, which will enable them to explore more ways to use and enrich their experience of self-service retail stores. In other words, consumers with high self-efficacy are more likely to accept self-service retail stores. Self-service retail stores employ new technologies to provide a more convenient shopping environment for customers, thus offering a positive experience to consumers with high self-efficacy. However, it is inconvenient for consumers with low self-efficacy to use new technologies during the shopping process. Therefore, companies should provide consumers with simple and easy techniques that offer them a sense of convenience and a better experience, thus facilitating their acceptance of self-service retail stores, which is an important factor in attracting more consumers and improving corporate profits.

The results of this study have the following practical implications. From the perspective of a retailer, a high-quality service plays an important role in improving corporate profits. Creating a reliable and convenient self-service retail environment for customers improves the awareness of customers who actively go shopping in self-service retail stores. Effectiveness is very important for customers, since it stimulates their enthusiasm and initiative, and fully demonstrates the high-quality service of the enterprise, thus improving the purchasing power of customers and increasing the profit margins of

enterprises.

With regarding to employ new technologies, the experience value plays an important role, since, at present, consumers focus on both product quality and experience value. Additionally, since no salesperson is present during shopping in self-service retail stores, the experience process is more important. Currently, the face recognition, QR code, and RFID technologies, as well as a personal checkout system are used in self-service retail stores. To better meet the needs of consumers, while providing a convenient, fun, and simple experience, it is important for customers to accept self-service retail stores. Therefore, increasing the experience value will aid the development of self-service retail stores.

Ⅷ. Conclusion

This paper investigates how a firm can increase the customer acceptance of self-service retail stores. By adjusting various factors of service quality, experience value, and self-efficacy in the collected data, this paper confirms the relationship between service quality and the customer intention to revisit a self-service retail store in the future and give a positive feedback via word-of-mouth. The results show that improving the service quality is a very important factor in the customer acceptance of self-service retail stores. Additionally, this study can help self-service retail stores improve service quality, while increasing both corporate profitability and customer convenience. The shopping experience is very important for today's customers, as they not only pursue quality value, but also pay attention to the shopping experience. Moreover, this study can help companies employ new technologies and enhance the provided experi-

ence to further attract customers to self-service retail stores, which is an important factor in the customers' acceptance of self-service retail stores and increasing corporate profits.

Contribution and academic impact: (1) Usage of e-service quality for evaluating the service quality of offline self-service retail stores. (2) Usage of e-service quality and the SERVQUAL model to assess the service quality of self-service retail stores. (3) Verification of the relationship between service quality and experience value.

The various factors that have been used to evaluate service quality in this paper are important for verifying customer satisfaction and increasing the loyalty of self-service retail customers. However, many factors may affect the service quality of self-service retail. Therefore, exploring more factors will be of great significance for improving customer satisfaction and loyalty when using self-service retail stores. We tested the research model based on the data collected from Chinese customers of self-service convenience stores. In this paper, the self-service retail industry includes self-service convenience stores and supermarkets. Such survey results may show subtle differences in conclusions, but self-service convenience stores in China are currently developing more rapidly and becoming more targeted than other self-service sectors. Future studies should investigate other sectors of the self-service retail industry (e.g., self-service supermarkets) and the situation in other countries and conduct comparative research to improve the results.

Acknowledgements

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<Appendix> Measurement Items

Constructs	Items	Questions	References
Responsiveness	RP1	When the self-service convenience store has problem, the intelligent customer service hotline can respond in time.	Kau (2007)
	RP2	The company can quickly apologize and make up for the inconvenience caused to customers.	
	RP3	In case of emergency, enterprise personnel can dispatch quickly.	
System availability	SA1	The self-service convenience store identification of RFID code, identification of QR code, face recognition, etc.	Ataburo et al. (2017)
	SA2	The checkout system of the self-service convenience store does not crash.	
	SA3	Enter and exit the self-service convenience store can be activated immediately.	
Efficiency	EI1	The checkout system can complete the transaction quickly.	Ataburo et al. (2017)
	EI2	Easy to use technologies such as QR code recognition, face recognition, and checkout system.	
	EI3	RFID code, QR code, face recognition, etc. can be quickly identified.	
Reliability	RB1	The self-service convenience store provides customers with 24-hour service.	Kau (2007)
	RB2	When the self-service convenience store has problem, the intelligent customer service hotline is unblocked.	
	RB3	The self-service convenience store can complete the transaction without errors.	
Empathy	EP1	The products displayed make it easy to find for customers.	Kau (2007)
	EP2	Enterprises can provide products for customers in time. There is no shortage of goods or shelf display of products very messy phenomenon.	
	EP3	Provide customers with convenient and intimate services (such as microwave oven, mobile phone free charging, etc.)	
	BRE4	Regularly offer discounts to customers.	
CROI	CROI1	Shopping at self-service convenience store, I feel relaxed, no pressure.	Kim (2011) Maghnati and Ling (2013)
	CROI2	Shopping at self-service convenience store is a very efficient way to manage my time.	
	CROI3	Shopping at self-service convenience store fits with my schedule.	
Playfulness	PF1	I shop at self-service convenience store for the pure enjoyment of it.	Kim (2011)
	PF2	Shopping at the self-service convenience store brings me extra happiness.	
	PF3	I get so involved when I shop at self-service convenience store that I forget everything.	
	PF4	Shopping from self-service convenience store makes me feel like I am in another world.	
Satisfaction	SF1	I am very happy to shop at self-service convenience store.	Lam et al. (2014)
	SF2	Overall, I am satisfied with my shopping experience at this self-service convenience store.	
	SF3	Overall, the shopping experience of self-service convenience store comes up to my expectations.	

\<Appendix\> Measurement Items (Cont.)

Constructs	Items	Questions	References
revisit	RV1	I would like to come back to this self-service convenience store in the future.	Turel et al. (2010)
	RV2	I would consider revisiting this self-service convenience store in the future.	
	RV3	It is very likely that in the next few years, even if there are other convenience stores, I will continue to shop in self-service convenience store.	
word-of-mouth	WOM1	I say positive things about the self-service convenience store to other people.	Ha and Im (2012) Roman and Cuestas (2008)
	WOM2	I would recommend this self-service convenience store to other people.	
	WOM3	I would recommend this self-service convenience store to my friend.	
Self-efficacy	SE1	If I go to the self-service convenience store for the first time, I can go shopping smoothly.	Rada (2011)
	SE2	If I have problems with shopping at the self-service convenience store, I usually find several solutions.	
	SE3	If I have problems with shopping at the self-service convenience store, I can calmly face it because I trust my ability to handle problems.	

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