An Empirical Study on Takeout App Customers' Continuous Use Intention in China

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Abstract

The rapid advances of mobile internet technology and people's rising living standards have promoted the development of mobile takeout Apps. This paper aims to explore the factors that affect the continuous use intention of mobile takeout App customers in China, where the number of takeout Apps is fast growing. To determine the relationships among these factors and their level of influence, the paper used a nine-variable research model with herd behavior as a moderator variable and delivery service quality as a mediator variable. On the basis of the 509 valid questionnaires, the relationships among the variables and the influence on dependent variables were determined with Warp PLS7.0. Mplus 8.3 was used to test the mediated effects of the intermediary variables. The results indicate that information asymmetry directly affects customers' continuous use intention without the intervention of the intermediate variables and that perceived quality highly influences continuous use intention through the perceived value construct. Herd behavior, however, has no positive moderating effect on the relationship between satisfaction and continuous use intention. A number of suggestions were made to online takeout operators with the view to improving customer ordering experience and customer relationships.

Keywords: Information Asymmetry, Herd Behavior, Perceived Quality, Perceived Value, Continuous Use Intention.

1. Introduction

In recent years, the dramatic advances of smart phone and mobile network technology have greatly contributed to the promotion and development of mobile network Apps. As Jia et al. (2019) pointed out, more and more firms and individuals are becoming actively involved in the development and use of mobile Apps. The rapid growth of mobile applications has led to improvements in the ecosystem of many services, most notably food takeout services. Takeout Apps are online platforms for ordering food. Today, they basically cover every city in China. They also cover a wide and growing range of products. Ji and Zhang (2018) studied takeout Apps in China and found that they not only include original Chinese and Western fast food, but also Japanese and Korean cuisine and pastry and drinks and have even expanded their services to fruits and vegetables, medicine, seafood and so forth. Take out Apps bring great convenience to people's life and work, which is why they are so popular. Currently, the three

most commonly used takeout Apps in China are the following mainstream platforms: Meituan, Are You Hungry, and Baidu takeouts. There are many others, which basically operate as small secretariat for ordering food. They include among others Word-of-Mouth, Public Comment, Home Food Meeting, Superman, and Click me. More takeout Apps are emerging, with many of them available in virtually every city in China (Liu, 2019). As a matter of fact, takeout vendors are competing head-on in first and second tier cities. Given the cut-throat competition in those cities, third and fourth tier cities are rapidly becoming the new growth drivers. The amount of business they generate was expected to increase from 65.88 billion dollars in 2018 to 86.19 billion dollars in 2019. It is estimated that the transaction scale of China mobile internet catering takeout market will reach 105.43 billion dollars in 2020. The scale of the Chinese online takeout market is very considerable as is the potential for growth (Shi & Chu, 2019). This study focuses on the continuous use intention of Chinese who use mobile takeout Apps. Respondents are Chinese from various cities across China. The proposed conceptual theoretical model includes nine variables that are based on the theories of information asymmetry, the technology acceptance model, perceived quality and perceived value. This quantitative paper introduces delivery service quality as part of the perceived quality construct and herd behavior as moderator variable.

2. Literature Review

Early research on the continuous use intention of information systems mainly focused on "initial acceptance" and on the rational behavior theory (TRA), Information System Function (ISF), and the Technology Acceptance Model (TAM). This changed in 2001 when Bhattacherjee proposed a continuous use model for information systems (ECM-ISC). Since then, the body of research on "acceptance after use" has been growing and a number of operative concepts, which are based on the TRA，ISF, and TAM frameworks, have developed, notably those discussed below.

- Continuous Use Intention

Continuous use intention has also been referred to as 'incorporation' (Kwon & Zmud, 1987), 'routinization' (Cooper & Zmud, 1990), or 'confirmation' (Rogers, 1995; Bhattacherjee, 2001). Whatever this concept is named, there is a general agreement on the assumption that continuous use intention pertains to a normal and continuous activity (Lee & Kwon, 2011; Youn, Yoo, & Lee, 2020). Continuous use intention can thus be defined as a subjective intention generated continuing to access or to use, for example, an information system. Based on the studies from Youm (2017), Ju and Koh (2018), and Tsai & Hung (2019), this paper therefore defines the continuous use intention of mobile takeout Apps users as a customer's subjective intention of continuously using mobile takeout Apps.

- Information Asymmetry

Information asymmetry is a common economic phenomenon. Miller and Rock (1985) determined that information was distributed unevenly and asymmetrically among corresponding economic individuals. Various types of personnel have different understandings of relevant information. Those who have sufficient information are often in a better position, whereas those who lack more information are in a more disadvantaged position (Aboody & Lev, 2000). Customers' information asymmetry in mobile take outs can be problematic (Cui, Jo, & Na, 2018). Mobile takeout vendors sell goods information but the issue is whether it is

authenticity and reliability (Miller & Rock, 1985). Another issue is whether consumers can use certain channels to obtain the knowledge they want (Wang & Wang, 2013).

– *Herd Behavior*

Herd behavior originated in the field of social psychology. It assumed that individuals tended to make the same decisions as others in the group. The concept was subsequently extended to the field of consumer behavior (Allen, 1965). Sun (2013) stated that in terms of social behavior, herd behavior mainly refers to individual decision-making that is in line with the majority of behaviors. Individuals tend to observe and/or refer to others when making decisions and often change their behavior under group pressure. This is known as the "herding effect" (Hong & Xu, 2015). When people do not have the energy to gather enough relevant information for analysis, to avoid risk and get the best possible outcome, they let themselves be influenced by the behavior of others and imitate the decision-making behavior of others (Yin, 2019).

- *Perceived Quality*

The term 'perceived quality' was originally quoted by Olson and Jacoby in 1972. It refers to whether consumers perceive the quality of a product as high or low. It also pertains to services (Wheatley, Chiu, & Goldman, 1981). Zeithaml (1988) researched service quality and came to the conclusion that consumers' perceived value will positively affect their behavior intention. Bhattacherjee (2001) determined that the less information customers have on the goods they buy, the lower their perceived quality. A number of scholars have adopted this theoretical relationship in their studies of intention behavior towards the continuous use of information systems and confirmed that perceived quality had a positive effect on user satisfaction. For example, Kuo, Wu, and Deng (2009) explored the post-purchase willingness of users of mobile value-added services and concluded that perceived quality had a positive effect on customer satisfaction. In their study of the online relationship between customer satisfaction and continuous use intention, Anderson and Srinivasan (2003) pointed out that perceived quality could have a negative effect on perceived value. Liu (2019) studied the continuous use online banking and found that online banking users' perceived value had a significant positive impact on customer satisfaction.

In this framework, perceived quality includes four dimensions: platform system quality, platform service quality, merchant product and service quality, and delivery service quality. Platform system quality refers to the stability, reliability, system interface friendliness, ease of operation, payment security associated with mobile takeout Apps (Huang, 2019). DeLone and McLean (1992) proposed the Information System Success Model, known as the D & M model. They introduced the important variable of system quality into the model. Platform service quality can be defined as customers' subjective judgment on the timeliness, pertinence and responsiveness of takeout services provided by mobile takeout Apps (Hsu & Lin, 2015; Huang, 2019). De Lone & Mc Lean (2003) revised and improved the original model "D & M Model" and forme a new D & M model to which quality of service was added. Merchant product and service quality is a function of mobile takeout customers' subjective evaluation of the security, delicacy, timeliness of service and service recovery of the products or services provided by the mobile takeout Apps (Qi, 2019). Delivery service quality refers to customers 'subjective evaluation of the speed and quality of delivery of products or services provided by the mobile takeout Apps (Zhao & Wu, 2018). Since the quality of service variable fully takes into account

customers' service identification and feeling, improves customers' position in the information system, and makes the revised information system success model more comprehensive and accurate (Zhou, 2013), the four variables that it includes can be used in this research as accurate measurement of mobile takeout Apps.

– Perceived Value

Zeithaml (1988) has argued that it is vital for an enterprise to be customer-oriented and value-oriented. In the field of marketing, it is generally assumed that in making purchasing decisions, perceived value is a critical reference for consumers. The higher the customer perceived value, the more likely they are to make a purchase (Sheth, Newman, & Gross, 1991; Ji, 2013). User perceived value is viewed as an evaluation of the overall utility of a product or service and is based on the trade-off between the perceived gain and loss of the product or service (Kaufman, 1998). In analyzing the influence of perceived value on intention towards mobile takeout Apps, this paper therefore uses perceived value of mobile takeout Apps to measure the perceived benefits to users.

– Satisfaction

Cardozo (1965), who was the first to expand the concept of customer satisfaction into the field of marketing, concluded that in assessing customer satisfaction, there is a strong relation between customer input and his or her level of satisfaction. Customer satisfaction refers to a customer's perception of the extent to which his or her expectations or needs, which can be implied or expressed, have been met (Yang, 2016). It can be seen as a psychological experience that reflects a consumer's level of satisfaction with the goods or services that he or she consumes, which can be above or below satisfaction (Fang, 2018). In this paper, the degree of satisfaction relates to the feedback from and the evaluation by the customer to the takeout food and beverage's characteristics as well as the service level of the merchant.

3. Research Framework and Hypotheses

Based on the concepts and theories discussed above, this research paper proposes the following conceptual framework:
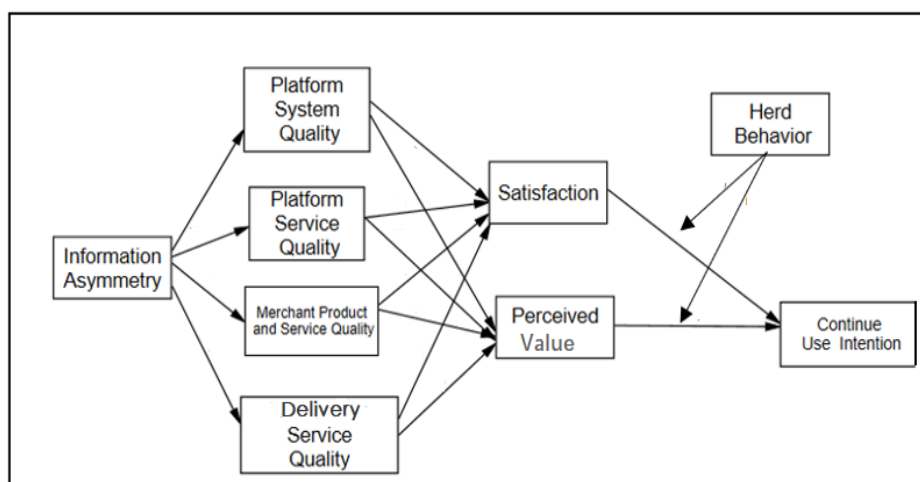

Figure 1: Conceptual Framework (Created by the Authors for this Study)

There are nine variables: one independent variable, *information asymmetry* (IA); one dependent variable, *continuous use intention* (CUI); four mediate variables: *platform system quality* (PSQ), *platform service quality* (PTSQ), *merchant product and service quality* (MPSQ), *delivery service quality* (DSQ), *perceived value* (PV), and *satisfaction* (SAT); and one moderate variable, *herd behavior* (HB).

This study developed the following research hypotheses:

H1：Information asymmetry has negative effects on perceived quality.
  H1a: Information asymmetry has a negative effect on platform system quality.
  H1b: Information asymmetry has a negative effect on platform service quality.
  H1c: Information asymmetry has a negative effect on merchant product and service quality.
  H1d: Information asymmetry has a negative effect on delivery service quality

H2: Perceived quality have positive effects on satisfaction.
  H2a: System quality has a positive effect on satisfaction;
  H2b: Service quality has a positive effect on satisfaction;
  H2c: Merchant product and service quality have a positive effect on satisfaction;
  H2d: Delivery service quality has a positive effect on satisfaction;

H3: Perceived quality has positive effects on perceived value.
  H3a: Platform system quality has a positive effect on perceived value.
  H3b: Platform service quality has a positive effect on perceived value.
  H3c: Merchant product and service quality have a positive effect on perceived value.
  H3d: Delivery service quality has a positive effect on perceived value.

H4: Satisfaction has a positive effect on continuous use intention.

H5: Perceived value has a positive effect on continuous use intention.

It has been confirmed that herd behavior has a positive effect on continuous use intention (Cao, Jiang, & Hu, 2015; Hong & Xu, 2015). Based on scholars' research, this paper proposes the following hypotheses:

H6: Herd behavior has a positive moderating effect on the relationship between influencing factors and continuous use intention.
  H6a：*Herd behavior has a positive moderating effect on the relationship between satisfaction and continuous use intention.*
  H6b：*Herd behavior has a positive moderating effect on the relationship between perceived value and continuous use intention.*

4. Methodology
- Data Collection
This research study is descriptive in nature and based on primary data obtained through a quantitative survey (Javed, Ahmed, & Anjum, 2019). The questionnaire is divided into three parts. The first part ensures the pertinence of the tested sample. The second part is the core scale test and uses a 7-point Likert scale for all items (Allen & Seaman, 2007). It includes 36 items in total. 4 items pertain to information asymmetry, 4 to platform system quality, 4 to platform service quality, 4 to merchant product and service quality, 4 to delivery service

quality, 3 to satisfaction, 5 to perceived value, 4 to herd behavior, and 4 to continuous use intention. The third part is about demographic characteristics of the respondents (gender, age, education level, occupation, level of the city and so). According to the 44th statistical Report on the Development of Internet in China released by CNNIC (2019), as of June 2019, the number of mobile phone takeout customers in China reached 421 million. In this study, the respondents, mobile takeout Apps users, are from Chinese cities at different tiers. It utilized the stratified sampling method. Based on Israel's (1992), 530 survey questionnaires were received and 509 found to be valid. The effective recovery rate was 96.04%.

- *Empirical Analysis*

Becker, Klein, and Wetzels (2012) suggested that PLS-SEM analyses should be conducted to assess reflective and formative latent factors. PLS-SEM is primarily intended for causal-predictive analysis. It provides reliable and valid measures (Castro & Roldán, 2013). PLS-SEM is therefore an appropriate technique for this empirical study (Chin, 2010). PLS is particularly suitable to test complex theoretical frameworks (Hair Jr et al., 2016). As Kock (2016) argued, traditional PLS is preferable since this study uses second order frameworks and does not have a sufficiently large data set. Two other sources of inspiration for the framework design and reports on the role of moderator variables are Baron and Kenny (1986) and Efron and Tibshirani (1986) who first proposed the Bootstrap method, which is a repeated sampling method. It increases the sample size and makes the results more accurate. This paper therefore used Warp PLS 7.0 with bootstrapping set to 999 times. To evaluate the reliability of the scale, this research paper relied on Composite Reliability (CR), the Average Variance Extraction (AVE), and the Cronbach's Alpha (CA) coefficient Reliability refers to the consistency and stability of the sample measurement results.

Generally, the CR of the scale is ideal when its value is above .800 or .900 (Werts, 1974). This indicates high reliability (Hair et al., 1998). The AVE value reflects the degree of convergence of a potential variable. If the AVE value is above .500, this shows that the convergence ability of potential variables is ideal. The CA coefficient is used to reflect the consistency between potential variables and observation variables. If the CA coefficient is lower than .600, the reliability of potential variables is not up to standard. The CA coefficient is ideal when above .800 or .900. The reliability test results are shown in Table 1. The minimum AVE value is .707 and the minimum CR value .921. As to the CA, the minimum coefficient is .886. This shows that the overall reliability of the questionnaire is good.

Table 1: Variable Reliability Test

Codes	AVE	CR	Cronbach a
IA	.787	.937	.91
PSQ	.784	.935	.908
PTSQ	.746	.921	.886
MPSQ	.774	.932	.903
DSQ	.775	.932	.903
SAT	.832	.937	.899
PV	.753	.939	.918
HB	.757	.926	.893
CUI	.77	.93	.9

| **HB*SAT** | 1 | 1 | 1 |
| **HB*PV** | 1 | 1 | 1 |

Notes: IA= Information asymmetry; PSQ= Platform system quality; PTSQ= Platform service quality; MPSQ= Merchant product and service quality; DSQ= Delivery service quality; SAT= Satisfaction; PV= Perceived value; HB, Herd behavior; CUI= Continuous use intention; HB*SAT= Herd behavior affects between satisfaction and continuous use intention; HB*PV= Herd behavior affects between perceived value and continuous use intention.

Validity and reliability measurements are two critical aspects of an analysis. As shown in Table 2, in this study the size of the loading factors are all greater than .700 (Chin, 1998). They also all are at P < .001 significant level. Therefore, this framework has high convergence validity.

Table 2: Loading Factor Test of Variables

Codes	Scale items	Loading	P-value
IA1	The information revealed by takeout Apps merchants and platforms is true and reliable.	.886	<.001
IA 2	The information disclosed by the delivery persons is true and reliable.	.888	<.001
IA 3	I can easily use the network to get the information I need.	.884	<.001
IA 4	I can use the information I have to find takeout food that I want to get.	.891	<.001
PSQ1	The takeout App I am using has friendly interface, is easy to operate and use.	.887	<.001
PSQ2	The takeout App I am using is very stable, has fast response and high transmission speed.	.894	<.001
PSQ3	The takeout App I am using can better guarantee the privacy of user information and offer security.	.878	<.001
PSQ4	The takeout App I am using takes up less mobile phone memory and consumes less energy (saving power and traffic).	.882	<.001
PTSQ1	The takeout App I am using can provide timely, effective and active response to users' requirements.	.869	<.001
PTSQ2	The takeout App I am using can provide personalized recommendations and guidance to better meet the personalized needs of users.	.861	<.001
PTSQ3	The takeout staff has strong service orientations and professional skills.	.855	<.001
PTSQ4	The takeout App I am using can deal with transactions, refunds and complaints quickly.	.87	<.001
MPSQ 1	The products provided by the takeout App I am using can meet my personal needs.	.879	<.001
MPSQ 2	Merchants in the takeout App I am using can provide safe and hygienic food.	.88	<.001
MPSQ 3	The products provided by the takeout App I am using are high quality.	.879	<.001
MPSQ 4	The take-out package provided by the takeout App I am using can keep the freshness better.	.882	<.001
DSQ1	The delivery personnel in the takeout App I am using is polite, well dressed and trustworthy.	.874	<.001
DSQ2	The food provided by the takeout App I am using can be delivered within the promised schedule;	.874	<.001
DSQ3	Delivery staffs keep complete and clean food packaging during delivery.	.882	<.001

DSQ4	Delivery staff in the takeout App I am using can respond to customer inquiries in a timely and professional manner.	.891	<.001
SAT1	The products or services in the takeout App I am using are very satisfactory.	.916	<.001
SAT2	I am very satisfied using the takeout App I am using.	.906	<.001
SAT3	The takeout App I am using provides high-quality services or products and it gives me a better purchase experience.	.914	<.001
PV1	Using takeout App can buy high quality products that meet their value.	.838	<.001
PV2	Using takeout App, I feel that things are more cost-effective than other takeout Apps.	.884	<.001
PV3	Using the discounts and red envelopes provided by takeout Apps can give me more value.	.872	<.001
PV4	I use takeout App to get many people's approval.	.877	<.001
PV5	The food purchased through takeout Apps is suitable for my family or friends.	.868	
HB1	I use takeout App because people around me are using it.	.884	<.001
HB2	I use takeout App because it has become the top one in the takeout Apps.	.875	<.001
HB3	I will pay attention to the welfare of other takeout Apps.	.85	
HB4	I selected this mobile takeout App because it has become a popular discussion topic.	.87	<.001
CUI1	Let me choose one more time and I will continue to use the takeout App I am using.	.858	<.001
CUI2	I will use the takeout App that I am using regularly in the future.	.884	<.001
CUI3	I actively recommend the takeout App that I am using to my family and friends when I use it personally.	.889	<.001
CUI4	I will continue to use the takeout App that I am using now in the future.	.879	<.001

Table 3 shows the results of the Discrimination Validity Test. The arithmetic square root of the AVE of each observation variable is greater than the correlation coefficient between the observation variable and other variables. There is therefore good discriminant validity among the constituent concepts.

Table 3: Discrimination Validity of Scale Test

	IA	PSQ	PTSQ	MPSQ	DSQ	SAT	PV	HB	CUI	HB*SAT	HB *PV
IA	**.887**										
PSQ	.458	**.885**									
PTSQ	.634	.464	**.864**								
MPSQ	.531	.415	.568	**.88**							
DSQ	.541	.484	.62	.541	**.88**						
SAT	.395	.283	.403	.338	.367	**.912**					
PV	.55	.443	.606	.52	.531	.39	**.868**				
HB	.635	.452	.644	.612	.643	.4	.613	**.87**			
CUI	.506	.384	.519	.472	.493	.347	.486	.521	**.877**		

HB*SAT	-.362	-.243	-.414	-.384	-.361	-.336	-.352	-.491	-.249	**1**	
HB*PV	-.582	-.484	-.625	-.556	-.571	-.336	-.53	-.685	-.494	.511	**1**

- Structural Framework

Kock (2010) determined that the PLS estimation depended on: the average path coefficient (APC); the average R^2 (ARS); the average full collinearity (AFVIF); the goodness-of-fit (GOF); Simpson's paradox index (SPV); the R^2 contribution index (RSCR): and the statistical suppression index (SSR). In addition, Kock (2017) explained that the APC can be associated with the strength of the paths in the whole framework to estimate the Warp PLS. While the ARS has the power to explain the whole framework, whether a framework has explanatory power depends on the R^2 value of each concept. A framework had strong explanatory power if the R^2 value is more than 10% (Chin, 1998; Ringle, 2004). The p-value for the APC and the ARS should be equal to or less than .05. The AFVIF is used to measure vertical, lateral collinearities and multi-collinearity. The p-value is reasonable if it is equal to or less than 3.3 (ideally) or equal to or less than 5 (acceptable) (Cassel, Hackl, & Westlund, 2000; Diamantopoulos & Siguaw, 2006). A global criterion of goodness-of-fit (GOF) can be proposed as the geometric mean of the average communality and the average R^2:$GoF=\sqrt{Communality * \overline{R^2}}$. The value of GOF can be small greater than .1, medium greater than 0.25, or large greater than 0.36 (Tenenhaus, Amato, & Esposito Vinzi, 2004). As to the SPV index, it is used to measure the degree of symptom-free paradox in a framework. The acceptable value is equal to or greater than 0.70, which indicates that at least 70% of the paths in the framework are symptom-free (Kock & Gaskins, 2016). The RSCR index is used to measure the extent to which the framework is not influenced by negative R^2. An acceptable value is equal to or greater than 0.90, which means that the sum of positive R^2 influence in the framework is at least 90% of the sum of absolute R^2 influence in the framework (Kock & Gaskins, 2016). Finally, the SSR index is a measure of the degree to which a framework is not affected by statistical inhibition. An acceptable value is equal to or greater than .70 and an ideal value is 1.0 (MacKinnon et al., 2000). As Table 4 shows, the results of the PLS analysis for all the above indicators meet the required values discussed.

Table 4: Framework Fit Indicators

Statistical Test	Suitable Standard or Critical value	Test Data	Judgment of Model Fitness
Average path coefficient (APC)	P<0.001(Significant)	0.269	YES
Average R-square (ARS)	P<0.001(Significant)	0.329	YES
Average adjusted R-squared (AARS)	P<0.001(Significant)	0.326	YES
Average full collinearity VIF(AFVIF)	Acceptable if <= 5, Ideally <= 3.3	2.004	YES
A global criterion of goodness-of-fit (GOF)	Small >= 0.1, Medium >= 0.25, Large >= 0.36	0.518	YES
Sympson's paradox ratio (SPR)	Acceptable if >= 0.7, Ideally = 1	0.938	YES
R-square contribution ratio (RSCR)	Acceptable if >= 0.9, Ideally = 1	0.991	YES

5. Results and Discussion

As can be seen in Table 5, takeout consumers were mostly young and middle-aged white-collar workers employed in government enterprises and institutions in second or third tier cities. Among them, university students appeared to gradually become a consumer group soon to become prominent. This indicates that the matching degree of the framework is very good.

Table 5: Summary of Demographic Information

Characteristics	Descriptive Statistics
Gender	Males: 239 (47%)
	Females: 270 (53%)
Age	Below 20: 50 (9.8%)
	21 and 40: 390 (76.6%)
	Above 41: 69 (13.6%)
Lever of education	Below junior college education: 32 (6.5%)
	Bachelor: 444 (87.2%)
	Above Master: 33 (6.5%)
Occupation	Students: 112(22%)
	Government enterprises and institutions: 292(57.4%) Others: 105(20.6%)
City tier	First tier cities: 43 (8.4%)
	Second tier cities: 250 (49.1%)
	Third tier cities: 143 (28.1%)
	Below fourth tier cities: 73 people (14.3%)

Next, whether the path coefficient of the constructed framework is significant was tested. The results are shown in Table 6. They indicate that out of all the hypotheses results shown in the table, two hypothetical paths were not supported; H2a (H2a: SAT ← PSQ，β = .052, P=.143, P>.05), and H6a (H6a: CUI ←HB*SAT,β =.042, P=.327, P>.05). The other fourteen hypothetical paths proposed in this paper were supported. It appears that H2a (*System quality has a positive effect on satisfaction)* was not supported for the following reasons. At present, the biggest problem in the operation of takeout App platforms is their homogeneity as their ordering service, platform interface and all other elements are similar. Since the level of imitation is very high, it is difficult for them to develop a unique competitive advantage. Since they cannot come up with their own distinctive service advantages, the quality of the system platform will not affect satisfaction.

Table 6: Test Results of Research Hypothesis

Hypothetical Relationship	Path Coefficient（β）	P Value	Supported or Not
H1a: PSQ <-- IA	.474	<.001	Yes
H1b: PTSQ <-- IA	.655	<.001	Yes
H1c: MPSQ <-- IA	.582	<.001	Yes
H1d: DSQ <-- IA	.579	<.001	Yes
H2a:SAT <-- PSQ	.052	.143	No

H2b:SAT <-- PTSQ	.202	<.001	Yes
H2c: SAT <--M PSQ	.123	.011	Yes
H2d:SAT <-- DSQ	.155	.002	Yes
H3a:PV <-- PSQ	.14	<.001	Yes
H3b:PV <-- PTSQ	.339	<.001	Yes
H3c: PV <-- MPSQ	.186	<.001	Yes
H3dh: PV <-- DSQ	.149	.003	Yes
H4: CUI <-- SAT	.136	.006	Yes
H5: CUI <-- PV	.124	.027	Yes
H6a:CUI <--HB*SAT	.042	.327	**No**
H6b:CUI <--HB*PV	-.362	<.001	Yes

As to H6a (*Herd behavior has a positive moderating effect on the relationship between satisfaction and continuous use intention),* it was not supported because customers themselves decide whether to continue using mobile takeout App based on their actual perception of the mobile takeout platform they use as well as others (Fang, 2018). If a customer sees that his/her friends are using a better one, he/she will switch to that mobile takeout App. As a result, he/she may give up points and possibly lots of promotional activities accumulated on the original the mobile takeout App. However, while there may be other mobile takeout Apps that appear to be better, switching often involves to re-downloading software, registering information, re-applying for a variety of members and so wasting a lot of time, energy, and money, all of which may end up increasing one's willingness to continue using the same mobile takeout App.

- Moderating Effect of Herd Behavior

According to Kock (2016), a moderating relationship involves three latent variables: a moderating variable and a pair of variables that are connected through a direct link. The moderating variable can impact results by strengthening or weakening a relationship which would exist at a different level if it were not for the moderator. The results of hypothesis testing shown in Table 6 indicate that satisfaction has a positive effect on continuous use intention (H4: CUI $\leftarrow$ SAT，β =.136, P=.006). Based on the findings, this means that continuous use intention will increase by .138 units if satisfaction increases by one unit. As H6a shows, herd behavior, however, has no positive moderating effect on the relationship between satisfaction and continuous use intention (H6a: CUI $\leftarrow$ HB*SAT, β =.042，P=.327，P>.05). Moreover, Table 6 hypothesis testing results reveal that perceived value has a significant positive effect on continuous use intention (H5: CUI $\leftarrow$PV，β =.124, P=.027, P<.0). Therefore continuous use intention will increase by .124 units if perceived value increases one unit. The result of H6b testing (H6b: CUI $\leftarrow$ HB*PV, β =-.362，P<.001) points to the fact that shew that herd behavior had a significant negative effect on the relationship between perceived value and continuous use intention.

It will thus reduce the relationship between them by .362 units. If perceived value increases by one unit, because of the significant negative herd behavior effect, continuous use intention will be reduced by (.124-.362); that is .138 units. In order to show the moderated effect more directly, the relationship between perceived value and continuous use intention in high herd behavior and low herd behavior situations was described in a graph (Chen, Tan, & Lu, 2015). As can be seen in Figure 3, when the herd behavior is higher, the positive effect of perceived

value on intention of continuous use decreases. The reasons are as follows. The greater the value consumers perceive when choosing takeout, the less likely the herd behavior effect. In choosing a dish from a takeout merchant or from a takeout platform, customers will not simply follow what other do (herd behavior) but will buy takeout based on how they feel. So it is important to make customers actually feel that the food they buy is worth it, and give them value. This is the fundamental premise on which takeout vendors and platforms should operate.
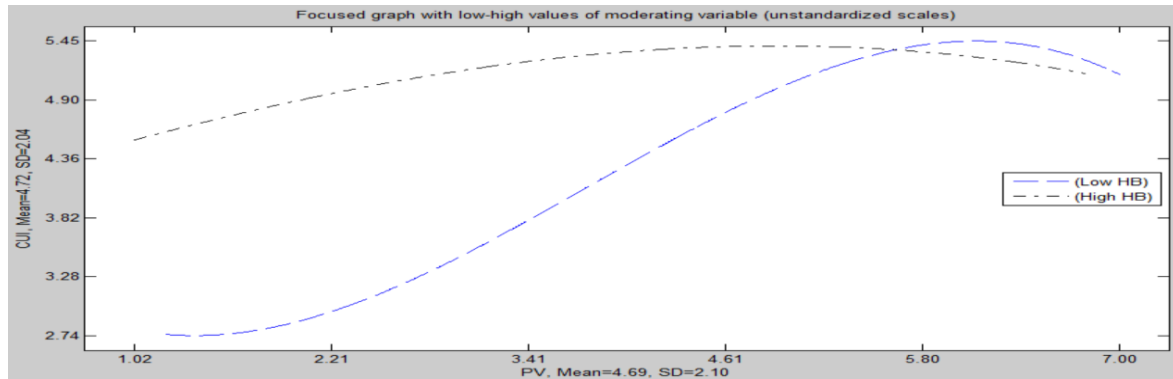

Figure 3: Graph of Low-High Value of Herd Behavior

- Mediating Effects of Intermediary Variables

Although several tests have been developed over time to test the mediating effects of variables (MacKinnon et al., 2002; Hayes, 2009), at present, the bootstrap confidence interval method appears to be the most accurate way to test mediation and other intervening effects (Biesanz, Falk, & Savalei, 2010). Its principle is that if confidence intervals do not contain several zeros, the original hypotheses will be rejected and the existence of mediating effects proved. This paper used Mplus 8.3 to test the mediating effect of the intermediary variables. When bootstrap was 1000, the values of the 95% confidence interval were below. If the path containing the hypothesis is not supported, the mediating effect of the mediator variable needs not be tested (Hayes, 2013). As can be seen from Table 8, the presence of total effects means that there are indirect effects. It also means that the mediating effects of these mediator variables partially exist. Therefore, it can be said that, one the one hand, information asymmetry (IA) directly affects customer continuous use intention and on the other, indirectly affects customer continuous use intention through perceived quality and perceived value.

Table 8: Test Results of Mediating Effect

Paths	Bootstrapping 95% Confidence Interval		Whether Mediating or No Mediating Effect
	Lower	Upper	
	Total	**Effects**	
IA ->CUI	0.548	0.742	**YES**
	Indirect Effects		
IA->PSQ ->CUI	-0.032	0.089	NO

IA->PTSQ ->CUI	-0.001	0.284	NO
IA->MPSQ ->CUI	0.016	0.194	**YES**
IA->DSQ ->CUI	0.009	0.206	**YES**
IA->PSQ->SAT->CUI	-0.001	0.012	NO
IA->PTSQ->SAT->CUI	-0.001	0.044	NO
IA->MPSQ->SAT->CUI	0.000	0.022	NO
IA->DSQ->SAT->CUI	-0.001	0.026	NO
IA->PSQ->PV->CUI	0.001	0.024	**YES**
IA->PTSQ->PV->CUI	0.007	0.100	**YES**
IA->MPSQ->PV->CUI	0.002	0.042	**YES**
IA->DSQ->PV->CUI	0.001	0.043	**YES**
	Direct	**Effects**	
IA ->CUI	0.017	0.474	**YES**

6. Conclusion and Recommendations

Using logical relationships among expectation recognition, perceived quality, perceived value, user satisfaction, and continuous use intention, this paper constructed a theoretical framework of continuous use intention and introduced 'herd behavior' as the moderator. The population tested was young Chinese people using takeout Apps in China. The results show that information asymmetry directly affects customers' continuous use intention without the intervention of intermediate variables. H1 (*Information asymmetry has negative effects on perceived quality*) is supported. Since information asymmetry negatively affects perceived quality, a few strategies can be proposed here to improve customers' continuous use intention. To mitigate or avoid the negative impact of information asymmetry, the following recommendations can be made:

- Product information posted by takeout merchants on the web should be authentic and credible. They should not release false information or sell counterfeits and inferior products
- Takeout platform service providers should strictly monitor the accuracy and timeliness of store information, product information, and rules of use provided by all service providers.
- Takeout merchants, takeout platform service providers, and takeout delivery persons should focus on improving communication with customers and on delivering information to them in a timely manner. By promptly responding to their various inquiries, they would meet their needs, influence their purchase behavior, and achieve "Double Win" with them.

Two other areas which this study shows to be in need of attention are perceived quality and perceived value. As explained earlier, H2 (*Perceived quality have positive effects on satisfaction*), H3 (*Perceived quality has positive effects on perceived value*), H4 (*Satisfaction has a positive effect on continuous use intention*), and H5 (*Perceived value has a positive effect on continuous use intention)* are supported. Since perceived quality highly influences continuous use intention through the perceived value construct, this paper suggests that takeout

App firms implement the following steps:

- *Exercise strong regulatory control over merchants* – Takeout platform service providers should establish stricter admission and exit systems to try their best to prevent unscrupulous merchants from cheating on consumers in the takeout transaction market.
- *Simplify system functions* – Make takeout platform system function user-friendly and through big data analysis provide consumers with different specific functions and services. In short, make takeout Apps simpler and more convenient.
- *Add online customer service functions* – Before- or after-purchase functions should be added so that consumers can easily contact the service provider and the seller for product information, rules of use, etc, before buying the goods.

  Hire reliable delivery staff – Takeout platforms should choose honest and reliable takeout delivery staff who is willing to cooperate. When hiring delivery personnel, they should pay closer attention to their ethics, character, and any other relevant aspects of their personalities. They should also develop strict rules and regulations to limit the bad behavior of delivery persons and ensure their strict enforcement.

- *Significance of this Study*

In this study, nine factors influencing continuous use intention of takeout Apps were discussed as well as the relationships among them and their level of influence. In terms of theoretical significance, the pertinence of the findings further evidence the feasibility of the framework used and add to the research lore in this field. In terms of practical significance, with the popularization of mobile networks, mobile takeout markets are fast expanding and ever more competitive. With takeout Apps being keys to the existence of enterprises and becoming a critical tool for improving customers' continuous use intention, this paper will help provide decision-making references for online takeout operators, improve customer relationships, and promote customers' continuous use intention.

- *Research Limitations and Future Studies*

This research study has several shortcomings. Firstly, the study sample was limited to China's cities at all tiers; this, even though the penetration rate of mobile network in rural areas in China is fast rising. So, future studies should extend research to Chinese rural areas. Secondly, the sample was limited to college students and office workers who are familiar with internet and takeout Apps. Although the sample reflects the behavioral intentions of mainstream takeout buyers and captures the consumption characteristics of the takeout group, obviously, it does not include of the characteristics of all takeout consumers. Future papers should therefore expand the scope of their investigation and test a broader spectrum of hypotheses and, given the growing popularity of mobile Internet, the age of the study subjects be extended to 60 years old. Thirdly, the overall framework only explains 30% of continuous use intention, which means that 70% of the factors of customer loyalty need to be further researched and verified in the future.

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