An Empirical Analysis of Continuous Use Intention in Mobile Food Delivery App Considering the Herd Behavior

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Abstract

With the development and widespread of mobile networks, mobile food delivery has gradually become a very important part of people's lives through the transformation of people's consumption concepts. Based on TAM, D&M, and ECM, this paper introduces ten potential variables and supposes 17 paths to construct the theoretical framework. It discusses the factors affecting the continuous use intention of mobile food delivery app customers and the size of the influence between the influencing factors. According to the results of 1040 effective questionnaires, Warp-PLS was used to verify the model and its hypothesis. The results showed that 14 of the hypothesized paths were supported. The perceived risk negatively had an effect on continuous use intention, perceived ease of use, and perceived usefulness; The higher perceived ease of use, the higher perceived usefulness; perceived ease of use and perceived usefulness affected satisfaction positively; The system quality, information quality, service quality had a positive effect on satisfaction. And there was a positive correlation between system quality, information quality, and continuous use intention. The herd behavior negatively affected the relationship between satisfaction and continuous use intention. Finally, based on the data analysis results, this paper proposed some research conclusions. It is hoped it can give other mobile food delivery merchants the assistance of decision-making in formulating marketing strategies.

Keywords: Herd Behavior (HB), switching costs (SC), Continuous Use Intention (CUI), Warp-PLS, Mobile Food Delivery App

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Introduction

With the development and popularization of mobile networks and the acceleration of people's life, people need a faster way to meet their daily dining needs——mobile food delivery app. At present, there are three mainstream mobile food delivery platforms in China: Meituan, Are You Hungry, Baidu Mobile Food Delivery. There are also Ordering Secretaries, Word-of-mouth Mobile Food Delivery, Public Comment Mobile Food Delivery, Dajia Food Society, Takeaway Superman, Click Me, and so on.

In the past, the main business of mobile food delivery was catering to food. At present, the mobile food distribution business has been fully expanded. In addition to food and beverages, it also provides home delivery of fruits, vegetables, flowers, desserts, and medicines. There are even some housekeeping services like caring for the elderly, children, cleaning, repairing furniture and appliances, etc (Sun & Kong, 2016).

Trustdata (2020) revealed: In the first half of 2020, the growth rate of China's mobile food delivery industry slowed down, but it still maintained a relatively fast growth rate. The scale of China's mobile food delivery users throughout will be from about 397 million people in 2018 to about 417 million people in 2019. However, due to the impact of the COVID-19, as of March 2020, China Mobile's mobile food delivery users are about 397 million. The transaction amount for the whole year of 2019 increased from 461.3 billion RMB in 2018 to 603.6 billion RMB.

The development of the Internet and the popularization of smartphones have created a unique and excellent environment for mobile food delivery and other online service products. In the near future, emerging technologies like drone distribution and artificial intelligence will become a huge driving positive force for social development. Under such technical conditions, mobile food delivery has been strengthened in terms of "Hardware Tangibility". Not only has the interface been simplified in all aspects, but performance has also been optimized to give users a better experience. It also enhances customer satisfaction and loyalty.

Literature Reviews

Early researches on the continuous use intention mainly focused on "Initial Acceptance" and on the Technology Acceptance Model (TAM) containing perceived ease of use, Perceived Usefulness (J. C. Davis & Sampson, 1986); Information System Success Model (ISSM) containing system quality, information quality, and service quality, which was also called D&M model (DeLone & McLean, 1992) and Expectation Confirmation Model (ECM) containing satisfaction and continuous use intention (Bhattacherjee, 2001); Since then, the body of research on "Acceptance After Use" has been growing.

Continuous Use Intention

Scholars have defined, captured, and identified many variables to study information systems, but reinventing information systems is only the first step for businesses and consumers. It was more important for users to use the information system continuously for a long time (Bhattacherjee, 2001).

Many scholars have identified different concepts for continuous use intention. Kwon and Zmud (1987) gave a name as "Incorporation", Cooper and Zmud (1990) gave "Routinization", Rogers (1995) gave "Confirmation". However, there was general agreement on the assumption that it was a normal and continuous activity after institutionalization (Bhattacherjee, 2001).

Therefore, the purpose of continuous use is the users' decision to continue using the information system. This paper defines the continuous use intention of mobile food delivery app users as the customer's subjective intention to continue using the mobile food delivery app after the initial use.

Perceived Risk

The concept of perceived risk was proposed in the marketing field by Bauer (1960) at Harvard University. This was because consumers consider the results of product use that cannot be determined and some other situations that occur during the purchase process.

Cocosila and Archer (2010) stated that when consumers conducted transactions on mobile food delivery apps, they usually needed to establish an account. At the same time, in order to prove their identity, consumers needed to fill in personal information on it, which lead to the risk of consumer privacy being leaked. Consumers would have a perceived privacy risk for mobile food delivery and even the entire e-commerce consumption model due to fear of losing personal information. In an e-commerce environment, because consumers needed to fill in financial information for payment when paying online, such behavior also gave hypercritical an opportunity (Paspallis, Andreou, & Bullo, 2018). The safety issues of raw materials, food and beverage packaging whether it met environmental standards, the problem of untimely delivery, and the occurrence of crimes such as rape, forced touch, kidnapping, and murder committed by delivery personnel had caused psychological pressure on customers to use mobile food delivery food (Weeger, Gewald, & Vriesman, 2011).

Switching Costs

Porter (1997) first proposed the complete concept of switching costs, which referred to the one-time cost incurred when a supplier of a product or service used by a customer was switched to another supplier of product or service. Fornell (1992) found that the economic and psychological costs perceived by customers when changing service providers were switching costs. Jones, Mothersbaugh, and Beatty (2000) had a broader definition of switching costs. They pointed out that any factors that may cause consumers to change suppliers or bring higher costs should be called switching costs.

Herd Behavior

Herd behavior was first applied to the field of psychology. It presupposes that everyone is trying to make the same decisions as everyone else. Allen (1965), a social psychologist, believed that group behavior was a manifestation of individuals being influenced by other members of the group. Later, many scholars extended it to the study of consumer behavior in the social economy.

In terms of the influence of the user's herd behavior, Dian, Li, and Xu (2017) explained the main consideration factors affecting the changes in investors' investment behavior in the stock market under the network environment. Hong and Xu (2015) researched on the user behavior about mobile social apps shows

that imitating others had a significant impact on users' decision-making behavior and they did not fully believe that the information they had a positive impact on their continued use intentions; the credibility of the personal information affected the self-confidence of user information judgment, and the credibility of public information affected the attitude of users. The clearer the attitude of existing participants, the greater the influence of user behavior on the former, and the more likely herd behavior would occur. (Handarkho, 2020) researched on the continued use of social networks had shown that herd behavior had an effect on the perceived usefulness.

Conceptual Framework and Hypothesis

1. **Conceptual Framework**

Based on the theories above, this paper proposes a conceptual framework through the influencing factors of the food delivery app customers (shown in Figure 1).
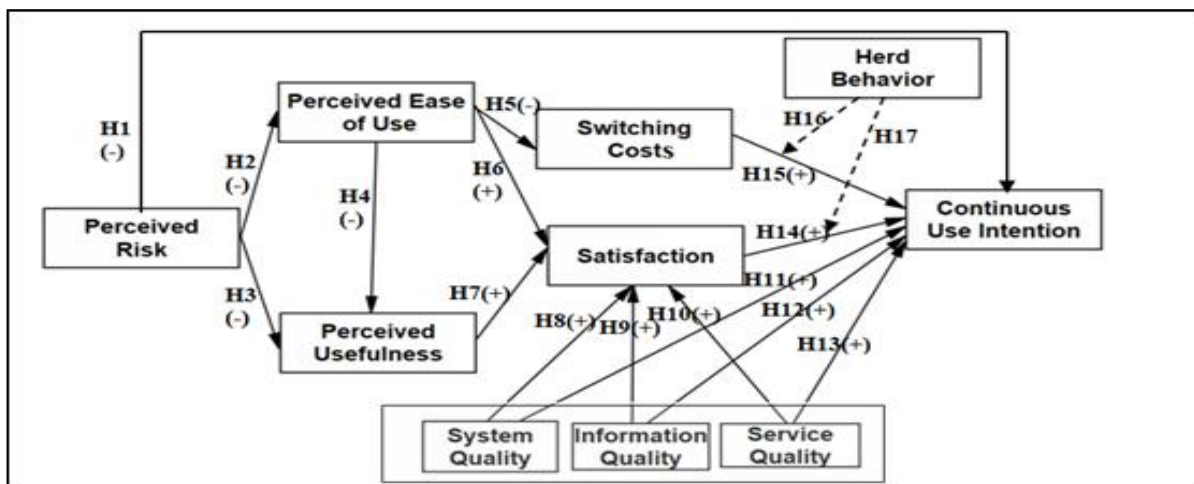

Figure 1: The Conceptual Framework

Source: (F. D. Davis, 1989); (Delone & Mclean,2003); (Bhattacherjee, 2001).

2. Hypothesis

2.1 Hypothesis between the perceived risk and other factors

Pavlou (2003) found that the higher the perceived risk, the lower the user's willingness to buy. In the mobile payment. Liu (2018) confirmed that the relationship between the perceived risks and the continuous use intention was the opposite. Through empirical study, Liu, Ke, and Liu (2019) found that if bike-sharing users had a higher perceived risk they would have lower their continuous use intention in the future.

Although mobile food delivery has greatly saved customers' time and energy and brought a lot of convenience for customers, its hidden safety problems could not be ignored (Cocosila, Archer, & Yuan, 2009). Customers are worried about property loss, privacy leakage, social opinion, time waiting, and physical

and mental health, which will reduce the perceived ease of use and usefulness of mobile food delivery app.

H1: The perceived risk has a negative (-) effect on the continuous use intention;

H2: The perceived risk has a negative (-) effect on the perceived ease of use;

H3: The perceived risk has a negative (-) effect on the perceived usefulness;

2.2 Hypothesis between the Perceived Ease of Use and other factors

Customer perceived ease of use is the degree to use certain information technology. In this paper, it refers specifically to how easily individual customers perceive the difficulty of using the mobile food delivery app to purchase food online.

In the TAM model, Davis and Warshaw (1989) found that perceived ease of use had been shown to have a positive impact on perceived usefulness, while it had a direct positive impact on personal attitudes. Then it affected behavioral willingness.

If the customer's perception of cognitive and proficient application software was relatively high, it would make their perception that the conversion cost from using one software to another software was relatively low (López-Nicolás, Molina-Castillo, & Bouwman, 2008). So the higher the customer's perceived ease of use, the lower the switching costs.

H4: The perceived ease of use has a positive (+) effect on the perceived usefulness;

H5: The perceived ease of use has a negative (-) effect on the switching costs;

H6: The perceived ease of use has a positive (+) effect on satisfaction.

2.3 Hypothesis between the Perceived Usefulness and other factors

In mobile food delivery apps, the perceived usefulness refers to the usefulness of the platform that customers perceive when they use the mobile food delivery app to save time, energy, and improve their quality of life. Perceived usefulness could not only affect customers' initial adoption of information systems (F. D. Davis, 1989), and it could also affect the important factors of customer satisfaction and continuous use intention (Bhattacherjee, 2001).

Teo & Yeong (2003) had studies whether the convenience of the online shopping process would affect consumer satisfaction. In many related types of research, on e-commerce scenarios. Yin, Yu, and Zhou (2017) confirmed that the users' continuous use intention was not only directly and positively affected by perceived usefulness, but also indirectly and positively affected through satisfaction.

H7: The perceived usefulness has a positive (+) effect on satisfaction.

2.4 Hypothesis between System Quality, Information Quality, Service Quality, and other factors

The revised D&M model showed that user perceived information system quality, service quality, and information quality were dependent variables of satisfaction, which had been confirmed in many aspects (Urbach, Smolnik, & Riempp, 2010). At the same time, users will be involved in a large amount of private information in the process of using mobile food delivery apps. Good pre-sales and after-sales service quality, including all kinds of service quality of offline mobile food delivery merchants, mobile food delivery

platforms, and mobile food delivery personnel, could help promote their perception of the app's usefulness and increase satisfaction, and further strengthen its continuous use intention (Qi, 2019).

H8: The system quality has a positive (+) effect on the satisfaction;

H9: The information quality has a positive (+) effect on the satisfaction;

H10: The service quality has a positive (+) effect on satisfaction;

H11: The system quality has a positive (+) effect on the continuous use intention;

H12: The information quality has a positive (+) effect on the continuous use intention;

H13: The service quality has a positive (+) effect on the continuous use intention.

2.5 Hypothesis between the Satisfaction and Continuous Use Intention

A lot of literature shows that consumer satisfaction will significantly affect the Intention and behavior to continue buying or using (Cronin Jr & Taylor, 1992) ; (Bhattacherjee, 2001); (Patterson & Spreng, 1997). Reichheld & Sasser (1990) pointed out that satisfaction would increase their loyalty, which means that consumers would increase their willingness, and satisfied consumers would increase their purchases and purchases. Barich & Kotler (1991) proposed that the more satisfied the customer was with the experience and experience of the mobile food delivery app, the stronger the intention of using the mobile food delivery app.

H14: The satisfaction has a positive (+) effect on the continuous use intention.

2.6 Hypothesis between the Switching Costs and Continuous Use Intention

Burnham, Frels, and Mahajan (2003); Yang and Peterson (2004) verified that the switching costs positively affected customer loyalty significantly.

Baloglu, Zhong, and Tanford (2017) tested a customer loyalty model in a casino scenario. They found the switching costs positively significantly affected customer satisfaction and customer loyalty. Through a survey of 590 online retailer shoppers in the UK Ghazali, Nguyen, Mutum, and Mohd-Any (2016) found that switching costs positively affected customer loyalty. Besides, Chinese scholars Zhu, Zhu, & Gao (2018) verified through empirical evidence that the switching costs had a positive and significant effect on the continuous use intention.

H15: The switching costs have a positive (+) effect on the continuous use intention.

2.7 Hypothesis about the Moderating Effect of the Herd Behavior

The herd behavior refers to the user imitating others under the influence of other users in using the mobile food delivery apps, ignoring their information, and adopting a consistent behavior towards the continuous use attitude (Hong & Xu, 2015). Combining the research results of scholars, this paper believes that the Herd Behavior of mobile food delivery apps negatively has a moderating effect on the relationship between the switching costs and the Continuous Use Intention. When the switching costs are low, the consumer will have a greater effect on Herd Behavior. When the switching costs are higher, the Herd Behavior will have a smaller effect. In the same way, when the satisfaction is low, the consumer will have a greater effect on the Herd Behavior, and when the satisfaction is higher, the effect of the Herd Behavior is smaller.

H16: The herd behavior has a moderating effect on the relationship between the switching costs and the continuous use intention;

H17: The herd behavior has a moderating effect on the relationship between satisfaction and continuous use intention.

Research Objectives and Methodology

According to the 45th statistical report on the development of the internet in china released by (Xinlangkeji,2020). Up to March 2020, the number of mobile phone food delivery customers in china had reached 398 million. With the development and popularization of the mobile Internet, these users were located in various cities in China. However, the users who used mobile food delivery apps frequently were mainly concentrated in the first, second and third tier cities in China, aged from 18 to 50, college students, and corporate staff with knowledge and consumption ability (Ran, 2020).

An analysis of factors influencing the continuous use intention of mobile food delivery app customers, according to the actual situation, this paper adopts a statistical analysis methodology: PLS-SEM. SEM: (Structural Equation Modeling), PLS: (Partial at Least Square Method). This was a statistical model and method with the aid of hypothesis testing and questionnaire surveys (Hair, Black, Anderson, & Tatham, 2010). Multivariate statistical methods such as factor analysis and path analysis are included. Compared with the previous regression analysis method, the structural equation model had obvious advantages. It could not only process multiple dependent variables but also estimated factor structure and factor path relationships at the same time (Hair, Black, Anderson, & Tatham, 2010). Their purpose is to establish, identify, estimate, and verify causality models and their relationships. The relationship between these influencing factors was not a simple linear relationship, but a complex curve relationship. In this paper, Warp-PLS was used to verify the model and its hypothesis (Kock & Gaskins, 2016).

Results and Discussions

1. Confirmatory Factor Analysis

The validity of the variables is currently the primary key factor of the measurement model. This paper uses Warp-PLS 7.0 when setting BOOSTRAPING 999 repeated sampling. The confirmatory factor analysis in this paper was greater than 0.700, and they all reached significant levels at P <0.001, (Chin, 1998).

2. Variable Reliability

The reliability and validity of the questionnaire were fully checked. The ten variables involved in this paper, the load-extraction average variance (AVE) of the relationship between any two variables were at a significant level of P <0.001 and they were all greater than 0.700 (Hair, Anderson, Babin, & Black, 2010). The reliability of the framework was tested by Cronbach's alpha, and a composite reliability factor was applied to ensure that the scale always received the same response. Hair, Black, Anderson, & Tatham (2010) pointed out that Cronbach's alpha should be greater than 0.70 and the composite reliability coefficient (CR) should be greater than 0.70. All variables of extracted average variance (AVE), composite reliability

coefficients and Cronbach's alpha can meet the requirements. Therefore, the model has high credibility, reliability, and convergence.

In addition to testing the reliability and validity of the variables, it is also necessary to measure the full variance expansion factor (VIF) of the variables to ensure that multicollinearity is not the main problem in the analysis. Multicollinearity will result in a high correlation or interrelationship between independent variables, which will lead to bias. The VIF value should be less than 5, and ideally should be less than 3.30 (Petter,2007). The VIF of all variables is less than the standard value of 3.30, which shows that there is no collinearity between them.

3. Discriminant Validity of Variables

This paper used discriminant validity to ensure that potential variables were distinguished from other variables (Paspallis, Andreou, & Bullo, 2018). The value on the diagonal was the square root of the AVE of each variable. This value should be greater than the Pearson correlation coefficient between this variable and another variable (Hair et al., 2010). The results of the discriminative validity of all the latent variables in this paper are satisfactory.

4. Structural Framework

Scholars often use these indicators for estimation of PLS: the average path coefficient (APC), goodness-of-fit (GOF), average R^2 (ARS), average adjusted R-squared (AARS), R^2contribution ratio (RSCR), average full collinearity (AFVIF), nonlinear bivariate causality direction ratio (NLBCDR), statistical suppression rate (SSR) (Kock, 2010).

Kock (2017) described that the strength of the paths in Warp-PLS was the average path coefficient (APC). The global criterion of goodness-of-fit (GOF) was to be used as GOF. Its value was the geometric mean of the average communality multiplied the average R^2: $GOF = \sqrt{\overline{Communality} * \overline{R^2}}$. It was small, when the value of GOF was greater than 0.1; medium, when greater than 0.25; large, when greater than 0.36 (Tenenhaus, Amato, and Esposito Vinzi,2004).

(Furst, Connors, Bisogni, Sobal, & Falk, 1996) proposed R2 to judge explanatory power. If the R2 value was more than 10% the framework had strong explanatory power (Chin, 1998); (Ringle, 2004). The ARS was usually greater than the AARS for a given framework (Kock, 2015). And the P-value for the ARS, APC, and AARS should be less than 0.05 (Kock, 2011). The RSCR index was used to measure the degree that the framework is not influenced by negative R2. The acceptable value was greater than 0.90, which indicated that the sum of positive R2 influences in the framework was at least 90% of the sum of absolute R2 influences in the framework (Kock & Gaskins, 2016).

AFVIF was used to measure vertical, lateral collinearities, and multi-collinearity. The P-value was reasonable to be less than 3.3 (ideally) or equal to or less than 5 (acceptable) (Cassel, Hackl, & Westlund, 2000).

The SPV index was used to measure the degree of symptom-free paradox. When it was necessary to indicate that at least 70% of the pathways in the framework were asymptomatic, the acceptable value should be greater than 0.70 (Kock & Gaskins, 2016).

When scholars wanted to measure the proportion of the framework that was not affected by statistical suppression, the SSR indicator should be greater than 0. 70 and an ideal value of 1.0. (Kock & Gaskins, 2016).

The PLS analysis results of the above indicators can achieve satisfactory results (shown in Table 1).

Table1: Model Fitting Index

Statistical Test	A suitable Standard or Critical value	Test Data	The Judgment of Model Fitness
Average Path Coefficient (APC)	P<0.001(Significant) Acceptable if >=0	0.097	Suitability
A global Criterion of Goodness-of-fit (GOF)	Small >= 0.1, Medium >=0 .25, Large >= 0.36	0.306	Medium
Average R-square (ARS)	P<.001(Significant) Acceptable if >=0.1	0.107	Suitability
Average Adjusted R-squared (AARS)	P<.001(Significant) Acceptable if >=0.1 Acceptable if <=ARS	0.104	Suitability
R-square Contribution Ratio (RSCR)	Acceptable if >= 0.9, Ideally = 1	0.960	Suitability
Average Full Collinearity VIF (AFVIF)	Acceptable if <= 5, Ideally <= 3.3	1.410	Ideally
Nonlinear Bivariate Causality Direction Ratio (NLBCDR)	Acceptable if >= 0.7 Ideally = 1	0.913	Good
Statistical Suppression Ratio (SSR)	Acceptable if >=0 .7 Ideally = 1	0.913	Good

The results showed that the simulation indexes of the model matched well. Then it is to test whether the path coefficient of the constructed model is significant.

5. Hypothesis Testing-PLS

When setting **Bootstrap** 999 repeated sampling. the path coefficients (β) and P-value analysis results of the framework are shown in Table 2 and Figure 2.

Table 2: Test Results of Research Hypothesis

Hypothetical Path	Path Coefficient (β)	P -value	Whether supported
H1: CUI<--PR	-0.106	<.001	YES
H2: PEU<--PR	-0.138	<.001	YES
H3: PU<--PR	-0.155	<.001	YES
H4: PU<-- PEU	0.156	<.001	YES
H5: SC<-- PEU	-0.053	0.164	NO
H6: SAT<-- PEU	0.122	<.001	YES
H7: SAT<-- PU	0.187	<.001	YES
H8: SAT <-- SQ	0.225	<.001	YES
H9: SAT<-- IQ	0.143	<.001	YES
H10: SAT <-- SCQ	0.125	<.001	YES
H11: CUI <--SQ	-0.025	0.336	NO
H12: CUI <-- IQ	0.104	.001	YES
H13: CUI <-- SCQ	0.239	<.001	YES
H14: CUI<-- SAT	0.073	0.032	YES
H15: CUI<-- SC	0.095	0.033	YES
H16: CUI<-- HB* SC	0.060	0.175	NO
H17: CUI<--HB* SAT	-0.096	0.036	YES

Notes: Perceived Risk=PR, Perceived Ease of Use=PEU, Perceived Usefulness=PU, Switching Costs=SC, Satisfaction=SAT, Information Quality=IQ, System Quality=SQ, Service Quality=SCQ, Herd Behavior=HB, Continuous Use Intention=CUI.
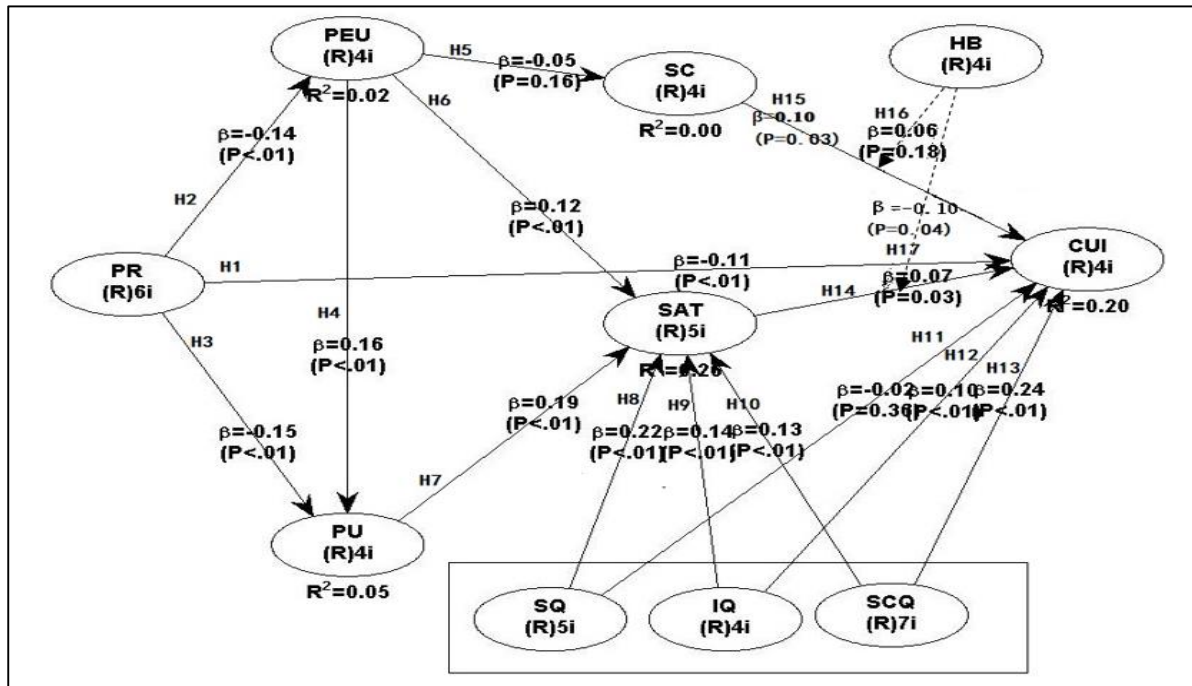
Figure 2: PLS Analysis Results (From Warp PLS7.0)

Notes: Perceived Risk=PR, Perceived Ease of Use=PEU, Perceived Usefulness=PU, Switching Costs=SC, Satisfaction=SAT, Information Quality=IQ, System Quality=SQ, Service Quality=SCQ, Herd Behavior=HB, Continuous Use Intention=CUI.

The results showed that 14 of the hypothesized paths were supported. The perceived risk had a negative effect on continuous use intention, perceived ease of use and perceived usefulness; The higher perceived ease of use, the higher perceived usefulness; perceived ease of use and perceived usefulness had a positive effect on satisfaction; The system quality, information quality, service quality had a positive effect on satisfaction and continuous use intention. And there was a positive correlation between them. The herd behavior negatively affected the relationship between switching costs and continuous use intention.

This paper assumes that there is a positive and significant effect between perceived ease of use and switching costs H5. But after verification, it was found that H5:(β=-0.053, P=0.164) was not supported. The main reasons may be as follows: Although the switching costs is high, the reason that customers switch to other mobile food delivery apps is that other mobile food delivery apps can bring them more authentic and reliable information, better food and better service. Therefore, even the mobile food delivery app currently in use is easier to use, it is possible that the information provided by the mobile food delivery app is not true and reliable, unpalatable food, or other services are not doing well, customers choose other mobile food delivery apps regardless of the time cost and other losses they have paid.

H11:(β=-0.025, P=0.336) was not supported. The system quality did not significantly affect customers' continuous use intention. The reasons may be as follows: Many reasons affect continuous use intention. The operation process of the platform is clear, it has beautiful interface design, quick response,

good stability and so on. However, such a system cannot guarantee that the catering of the mobile food delivery app can meet the tastes of customers and meet the requirements of customer information search. It is also possible that the customer service or the service of the delivery staff did not satisfy the customer, so the customer will stop using the mobile takeaway apps.

Next, this paper will discuss in detail the influence of the moderator variable ----- the herd behavior in the conceptual framework.

Moderating Effect of the Herd Behavior

(1) The herd behavior affects the relationship between switching costs and continuous use intention

From the results of the hypothesis test in Table 4: H15: (β= 0.095, P = 0.033), It showed that switching costs significantly and positively affected the continuous use intention. This also meant that switching costs with increasing each additional unit, continuous use will increase by 0.095 units. The herd behavior did not have significant effect on the relationship between switching costs and continuous use intention H16: (β=0.060, P =0.175). There may be the following reasons: customers continue to use this mobile food delivery app not because of the influence of people around, but because of other reasons. such as: customers are familiar with the software of this mobile food delivery app that they are using. They are very satisfied with the food it provides. Customers are always satisfied with the services provided by offline food delivery merchants, platform service.

(2) The herd behavior affects the relationship between satisfaction and continuous use intention

For the same reason, From the results of the hypothesis test in Table 2: H14: (β= 0.073, P =0.032). It showed that satisfaction had a significant effect positively on the continuous use intention. This also meant that satisfaction with increasing each additional unit, continuous use would increase by 0.073 units. H17: (β=-0.096, P =0.036) This showed that the herd behavior significantly and negatively affected the relationship between satisfaction and continuous use intention. It would reduce the relationship between them by 0.096 units when herd behavior increases one unit. So if satisfaction increases one unit, because of the negative and significant effect of the herd behavior, continuous use intention will reduce by (0.073-0.096) that is 0.023 units.

In order to express the relationships between them more clearly, this paper showed results in figure 3, figure4, and figure 5 respectively.

When the herd behavior is low and satisfaction is low, the willingness to continue using other mobile food delivery is low. At this time, the moderate effect of the herd behavior does not exist; With the improvement of satisfaction, when the herd behavior is low, customers do not have a herd mentality and choose to continue to use the original mobile food delivery app. The continuous use intention is high.

When the herd behavior is high and the satisfaction level is low, customers will have a herd mentality and choose to use other mobile food delivery apps. The continuous use intention is low. At this time, the herd effect adjustment effect is negativeH17: (β=-0.096, P =0.036). When satisfaction continues to improve, the continuous use intention will also increase; Although continuing to use it, satisfaction will continue to increase. Consumers may be affected by the high effect of herd behavior because of many

other reasons (such as curiosity). Customers will switch to other mobile food delivery apps, and their continuous use intention will decrease. Therefore, the growth result of continuous use intention, because the size of herd behavior is different (shown in Figure 3).
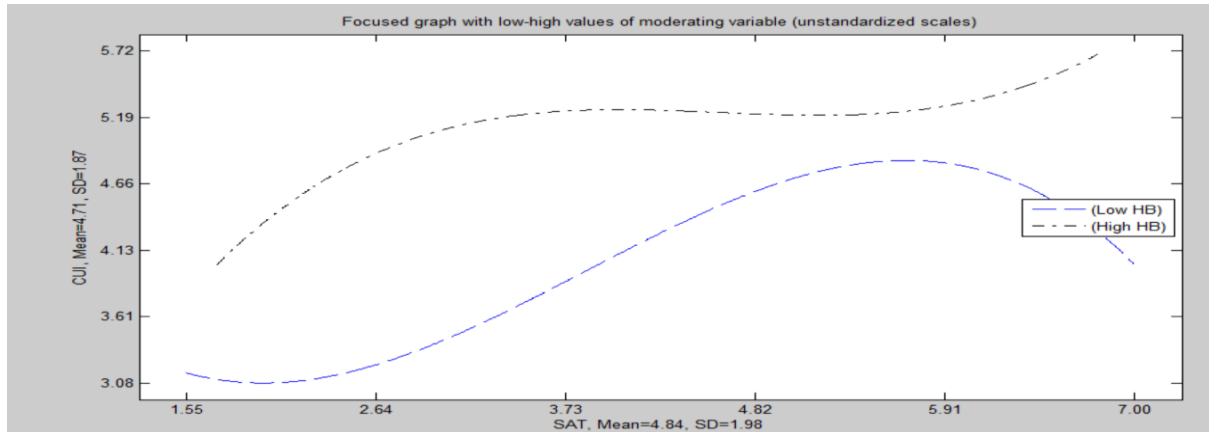

Figure 3: *One Graph with Low-high Value of Herd Behavior (From Warp PLS7.0)*

Notes: SAT =Satisfaction, HB= Herd Behavior, CUI=Continuous Use Intention, SD= Standard Deviation.

For the same reason, in the left figure, in the environment with the low herd behavior, when customers' satisfaction is low, customers' continuous use intention of using other mobile food delivery apps is low. At this time, the herd behavior has no moderate effect; With the satisfaction improving, continuous use intention of using the original mobile food delivery apps without herd mentality increases firstly in a positive proportion and then in a negative proportion. At this time, the moderate effect of the herd behavior does not also exist (shown in Figure 4);

In the right figure, In the environment of high herd behavior, when satisfaction is low, customers will choose to use other mobile food delivery apps because of herd behavior. Their continuous use intention is low. At this time, the herd behavior is negative H17: ($β$=-0.096, P =0.036). But when the satisfaction reaches a certain level, even if customers continue to use it, the satisfaction will continue to increase. Consumers may be affected by high herd behavior and switch to other mobile food delivery apps. At this time, the continuous use intention will decrease. Therefore, the relationship between satisfaction and continuous use intention is not a straight line but a warped result. It can also be seen that the growth rate of A is obviously slower in the right figure. (shown in Figure 4).
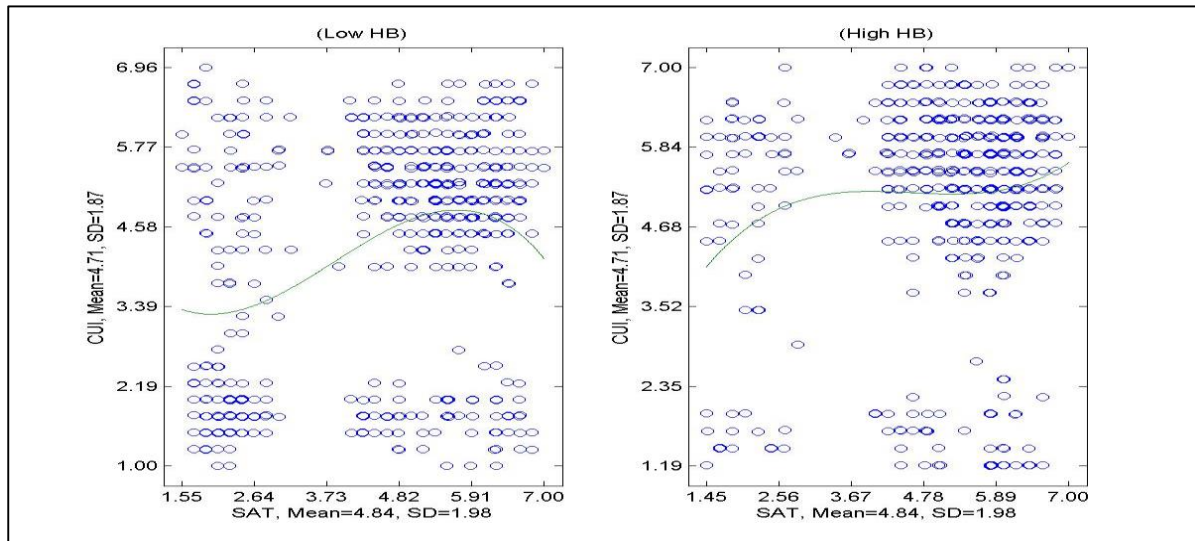
Figure 4: *Double Graph with Low-high Value of Herd Behavior (From Warp PLS7.0)*

Notes: SAT =Satisfaction, HB= Herd Behavior, CUI=Continuous Use Intention, SD= Standard Deviation.

This paper chooses to set to draw Figure 5 seen from the top in Warp-PLS. When satisfaction and herd behavior are low, the willingness of customers to use other mobile food delivery apps is low, the moderating effect of the herd behavior does not exist; With the improvement of satisfaction, customers are still in an environment with low herd behavior. Customers choose to continue using the original mobile food delivery app. Their continuous use intention is high. Then, the moderating effect does not exist. With satisfaction improving, the herd behavior will continue to increase. The herd behavior is higher, customers will choose to use other mobile food delivery apps. Customers may be less willing to continue using them, which makes herd behavior plays a negative regulatory role H17: (β=-0.098, P =0.036). The result is uneven from the front angle (When HB and SAT are the minima). The result was a 3D gravel map with convex first and then concave (Kock, 2017).
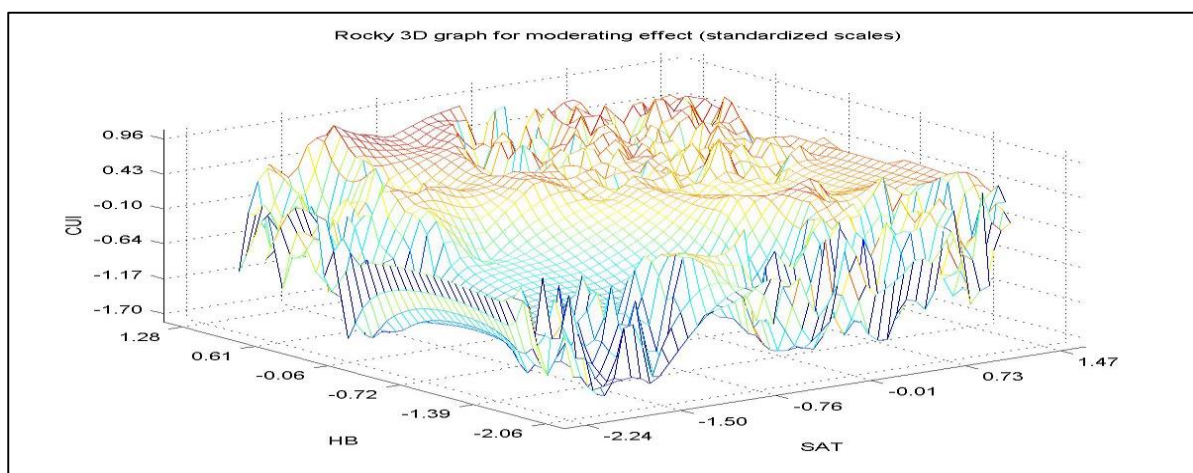

Figure 5: *3D Graph with Low-high Value of Herd Behavior (From Warp PLS7.0)*

Notes: SAT =Satisfaction, HB= Herd Behavior, CUI=Continuous Use Intention.

The herd behavior has a negative moderating effect on the relationship between satisfaction and continuous use intention. The main reasons are as follows: The relationship between satisfaction and continuous use intention is positive. The herd behavior worked when customer satisfaction was low. At this time, customers will follow the trend to use the mobile food delivery app used by people around them. They will use the mobile food delivery app that is at the top of the food delivery rankings. They will also pay attention to other people's discounts on mobile food delivery app. But when satisfaction is high, customers will not pay much attention to the mobile food delivery situation used by others. They only focus on the mobile food delivery app they are using (Yin, 2019). When the herd behavior is low, the continuous use intention will increase quickly as satisfaction increases. In contrast, because of high herd behavior, the continuous use intention will increase slowly even if satisfaction increases.

Conclusions

1. Perceived Risk is an Unavoidable Environment.

The empirical research found that the perceived risk negatively affected customers' continuous use intention, perceived ease of use, perceived usefulness, system quality, and service quality.

Firstly, the perceived risk affected the continuous use intention negatively. The higher the customer's perceived risk, the lower the customer's continuous use intention. The more customers worry about the leakage of personal privacy information and property information, it will affect customers to choose the right mobile food delivery app. It was difficult to maintain relationships with customers because of various concerns (Liu, et al., 2019).

Then, the perceived risk negatively affected the perceived ease of use and perceived usefulness. Customers are worried that personal privacy information and property information will be leaked, and they will deliberately not enter their actual and true situation when registering information, which will bring inconvenience to themselves (Meng, 2019). In addition, as a key link in the realization of mobile food delivery, the mobile food delivery platform will collect a large amount of information about food delivery merchants, catering and users, and the supply and demand parties will connect on the mobile food delivery APP platform. The reliability of the platform is a direct factor that affects consumers' purchasing intentions. Once there is a problem with the platform, the information consumers get from the platform is naturally unsafe. Consumers will feel that the consumption model of mobile food delivery is not easy to use. Naturally, such a shopping experience does not make consumers feel the usefulness of mobile food delivery.

2. Perceived Ease of Use and Perceived Usefulness is Important Links.

On one hand, the perceived ease of use affected the perceived usefulness positively. Multiple documents such as Davis & Sampson (1986); Muchran & Ahmar (2019) confirmed this. When they used easy to operate mobile food delivery apps, they would feel the benefits of using mobile food delivery apps, they would realize that they saved a lot of time and energy, and they would feel that mobile food delivery apps can bring a lot of conveniences, and made them feel that the quality of life and work efficiency had been significantly improved.

On the other hand, the perceived ease of use and perceived usefulness affected satisfaction positively. Customers feel that mobile food delivery apps can bring them a lot of conveniences and improve their work efficiency and quality of life. Naturally, their satisfaction will increase (Alshurideh, Al Kurdi, & Salloum, 2019; Shao, 2020).

3. switching costs Constitutes an Important Factor in Enterprise Competition Barriers.

The switching costs had a positive effect on the continuous use intention. If consumers spend more time and energy when switching from one mobile food delivery app to another app, the more the original discounts will be lost, and it is still uncertain that other mobile food delivery apps can bring them better products and services, the more consumers are reluctant to give up the mobile food delivery they are currently using (Baloglu, Zhong, & Tanford, 2017). Based on these concerns, they would continue to use the mobile delivery apps they are currently using.

4. System Quality, Information Quality, and Service Quality are the Core Competitive Factors of Enterprises.

System quality significantly affected satisfaction, information quality, and service quality significantly affected satisfaction and continuous use intention.

Consumers feel that when the operation process of the mobile food delivery app is clear, the interface design is beautiful, the response speed is fast, the search classification is clear, they can quickly find the food they need. The stability is good. They can log in at any time, all about the use of the mobile food delivery platform. All consumers' experience on mobile food delivery apps allows them to quickly and accurately find their favorite mobile food delivery food, which naturally improves consumer satisfaction (Zhang, 2018).

The information of the mobile food delivery apps was updated in a timely manner, the information provided was complete, and it could provide accurate retrieval results, the information was true and reliable, the customer service attitude was good, the effect of the problem remedial measures was good, and the customer service can satisfy customers, the additional requirements of the platform, the platform evaluation system was reasonable (Hanjaya, Kenny, & Gunawan, 2019). Consumers' all these buying experiences can make consumers feel happy. They can quickly and accurately buy their favorite food, which naturally increases consumer satisfaction and continuous use intention.

5. Customer Satisfaction is an Important Way to Achieve Continuous Use Intention.

The satisfaction had a positive effect on the continuous use intention. In the mobile food delivery app ordering link; offline meal delivery link; changing back-order processing link; etc. The satisfaction level of the consumption experience is relatively high. Compared with other consumption methods, the consumption method of using mobile food delivery was relatively high (Liu, 2017). So the consumers would continue to use mobile food delivery apps.

6. Herd Behavior is a Common Market Behavior Phenomenon.

Through combing the literature, it is found that most scholars treat users as rational people in the study of continuous use intention. They only consider the user's individual perception and ignore the

external environment and the influence of others on it. The actual situation was that any user was in a very complex environment, and the usage behavior of the people around would more or less affect the individual user (Chulkov, 2017). Through empirical results, it is found that herd behavior negatively significantly affected the relationship between satisfaction and continuous use intention. When satisfaction was low, customers would follow the trend and follow the crowd to use the mobile food delivery app used by people around them. They would use the mobile food delivery app that was at the top of the food delivery rankings, and would also pay attention to the discounts of other people's use of mobile food delivery apps. At this time the herd behavior would work (Handarkho, 2020).

Research Limitations and Prospects

First of all, this paper only surveys customers of mobile food delivery apps in China. Future research can collect more samples by expanding to other mobile applications and even in other countries.

Secondly, from the research object, this paper mainly takes college students and office workers as samples. This paper should expand the sample scope in future research. The age of the research subjects further expanded from 12 to 60 years old.

Finally, this paper mainly analyzes the influence of consumers' continuous use intention from the perspective of mobile food delivery platforms and food delivery consumers themselves. As can be seen from Figure 2, this empirical study can only explain 20% of customers' continuous use intention but there are still 80% reasons for this. Therefore, future research may be from other aspects such as the market trends of the catering industry, related policies, and market conditions in other fields of local life services, and so on. Therefore, the following research can conduct a more comprehensive analysis and discussion on the continuous use of mobile food delivery consumers from multiple perspectives.

Appendix

Constructs	Items of Scale	Source
Perceived Risk (PR)	I am worried that using mobile food delivery app to place an order online may result in the disclosure of bank card and other payment account information;	(Han & Kim,2017)
	I am worried that the personal registration information on the mobile food delivery app will be stolen by others;	
	I am worried that the mobile food delivery purchased with the mobile food delivery app does not match the description on the platform;	
	I am worried that mobile food delivery food purchased using the mobile food delivery app will cause potential harm to the body;	
	I am worried that the time from purchase to delivery using the mobile food delivery app is beyond the tolerable range;	
	I am worried that ordering food using the mobile food delivery app will cause people around me to have a bad evaluation of me.	

Constructs	Items of Scale	Source
Perceived Ease of Use (PEU)	Using the mobile food delivery app, I can easily search for the mobile food delivery information I need;	(Yudiarti & Puspaningrum, 2018)
	It is easy for me to learn to use the mobile food delivery app to buy food;	
	The operation process of using the mobile food delivery app shopping process is simple and easy to understand;	
	I can easily use the various functions of the mobile food delivery app.	
Perceived Usefulness (PU)	I can find a lot of useful information on this mobile food delivery app I currently use;	(Chen & klikokou, 2020)
	Using the mobile food delivery app can save me time and improve my work efficiency;	
	Using the mobile food delivery app can improve my quality of life;	
	Using the mobile food delivery app has brought a lot of convenience to my life.	
System Quality (SQ)	The operation process of the mobile food delivery app is clear and clear;	(Zhang, 2018)
	The mobile food delivery app is beautifully designed;	
	The mobile food delivery app has a fast response speed;	
	The search classification of the mobile food delivery app is clear, and you can quickly find the catering you need;	
	The mobile food delivery app has good stability, you can log in at any time.	
Information Quality (IQ)	The mobile food delivery app information is updated on time;	(Hanjaya, Kenny, & Gunawan, 2019)
	The mobile food delivery app provides relatively complete information;	
	The mobile food delivery app can provide accurate search results;	
	The information on this mobile food delivery app is reliable.	
Service Quality (SQ)	The service attitude of the mobile food delivery app customer service is very good;	(Liu, 2017)
	The mobile food delivery app dealt with the problem promptly;	
	The portable food delivery app has a very good effect on the remedy of the problem;	
	The customer service of the mobile food delivery app can meet the additional needs of customers;	
	The customer appraisal system of the mobile food delivery app is very good;	
	The delivery of the mobile food delivery app is timely;	
	The mobile food delivery and delivery staff have a good service attitude.	

Constructs	Items of Scale	Source
Switching Costs (SC)	I need to spend some time to find other mobile food delivery app to replace the ones I am using;	(Yan, She & Xiong, 2020)
	I need to lose a certain discount and choose another mobile food delivery app to replace the one I am using;	
	If I uninstall the mobile takeaway app, I need to spend some time to register and become familiar with other mobile food delivery apps;	
	I am not sure that other mobile food delivery apps can bring me better products and services.	
Satisfaction (SAT)	I am satisfied with the online ordering process of mobile food delivery;	(Alalwan, 2020)
	I am satisfied with the offline food delivery of mobile food delivery;	
	I am satisfied with the processing of mobile food delivery change orders;	
	I am satisfied with the consumer experience of mobile food delivery;	
	Compared with other consumption methods, I am satisfied with mobile consumption.	
Continuous Use Intention (CUI)	If I want to order a meal in the future, I will continue to consider using the mobile food delivery app I currently use;	(Lee, Sung, & Jeon, 2019)
	Even if there are other ways to order food, I will still prefer the mobile food delivery app I currently use;	
	In the future, I will use the mobile food delivery app I currently use often;	
	I will recommend this mobile food delivery app I currently use to my family and friends to use.	
Herd Behavior (HB)	I use this mobile food delivery app for everyone around;	(Handarkho, 2020)
	I chose this mobile food delivery app because it has become a popular discussion topic;	
	The mobile food delivery app I chose is at the top of the ranking;	
	I will pay attention to the discounts of others using mobile food delivery apps.	

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