# AN EMPIRICAL STUDY OF INFLUENCING FACTORS ON MOBILE FOOD DELIVERY APP CONSUMERS' CONTINUOUS USE INTENTION WITH THE PERSPECTIVE OF HERD BEHAVIOR--INTEGRATED MODEL BASED ON TAM, ISSM, AND ECM

Limin Ran

A Dissertation Submitted in Partial
Fulfillment of the Requirements for the Degree of
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National Institute of Development Administration
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# AN EMPIRICAL STUDY OF INFLUENCING FACTORS ON MOBILE FOOD DELIVERY APP CONSUMERS' CONTINUOUS USE INTENTION WITH THE PERSPECTIVE OF HERD BEHAVIOR--INTEGRATED MODEL BASED ON TAM, ISSM, AND ECM

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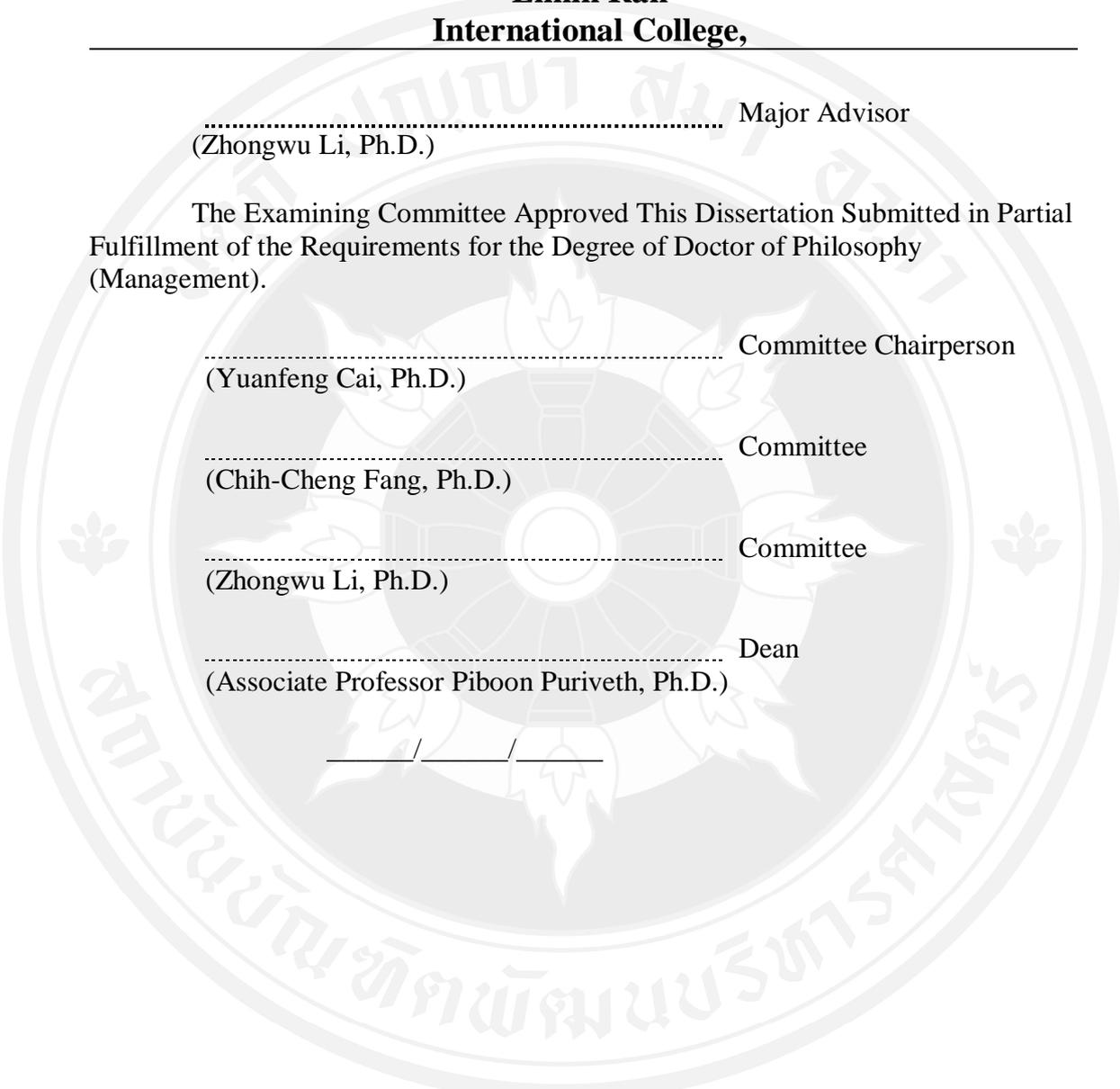(Zhongwu Li, Ph.D.)

The Examining Committee Approved This Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy (Management).

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# ABSTRACT

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| **Title of Dissertation** | AN EMPIRICAL STUDY OF INFLUENCING FACTORS ON MOBILE FOOD DELIVERY APP CONSUMERS' CONTINUOUS USE INTENTION WITH THE PERSPECTIVE OF HERD BEHAVIOR--INTEGRATED MODEL BASED ON TAM, ISSM, AND ECM |
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With the current development of mobile food delivery, based on the integrated model of TAM, ISSM, and ECM, this study introduced ten latent variables containing perceived risk, perceived ease of use, perceived usefulness, system quality, information quality, service quality, switching costs, satisfaction, herd behavior, continuous use intention and set up 17 hypothetical paths to construct the theoretical framework to discuss the factors that affect customers' continuous use intention of mobile food delivery apps and the magnitude of the influence between the factors. Based on the results of 1040 valid questionnaires in the formal investigation, this study used SPSS to conduct descriptive statistics and Warp-PLS to verify the framework and its hypothesis. Through empirical analysis, perceived risk negatively and significantly affected the continuous use intention, perceived ease of use and perceived usefulness; The same result between perceived ease of use and perceived usefulness, satisfaction; The higher the perceived usefulness, the higher the satisfaction; The same result between system quality and satisfaction; Information quality and service quality respectively had a positive and significant impact on satisfaction and continuous use intention; With the increase of satisfaction, customers' continuous use intention would increase; The herd behavior negatively and significantly affected the relationship between switching costs and continuous use intention. But the perceived ease of use did not have a significant positive effect on switching costs; The quality of the system did not significantly affect the continuous use intention as expected; The herd behavior had no significant effect on the relationship between satisfaction and continuous use intention. The study results also found that the six control variables introduced in this study did not significantly affect

the continuous use intention.

In addition, this study used Mplus to verify the mediating effect of the mediating variables.The result proved that all the intermediary variables which were perceived ease of use, perceived usefulness, satisfaction, and switching costs had no chain intermediary effects in the three effective paths from perceived risk to continuous use intention. The mediating variable satisfaction had a fully mediating effect in the path from system quality to continuous use intention. However, satisfaction had a partial intermediary effect between the quality of information and the continuous use intention, the same as in the relationship between service quality and continuous use intention.

At last, some targeted marketing strategies were proposed for mobile food delivery merchants and government supervision and supervision departments to reduce and avoid perceived risks and improve satisfaction. It is hoped that the study results can assist them in decision-making when formulating strategies and policies.

Keywords∶ perceived risk, switching costs, satisfaction, herd behavior, continuous use intention, warp-PLS, Mplus.

# ACKNOWLEDGEMENTS

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# CHAPTER 1

# INTRODUCTION

This chapter mainly introduces the six contents of the background of the study, Problem Statement, Research Questions, Research Objectives, Significance of the Study, and Scope of the Research.

## 1.1 Background of the Study

### 1.1.1 Realistic Background

With the rapid development of computer technology, mobile network technology, and communication technology, mobile internet has entered the lives of most people. Social and Hootsuite (2019) released the Global Digital 2019 reports. The reports showed that as of the end of January 2019, the global population was 7.676 billion people, of which 5.11 billion were mobile phone users, and 3.48 billion were active on mobile social media.

Since 2010, the Chinese mobile Internet has been on the verge of sparking the fire. China Internet Network Information Center gave the 45th "Statistical Report on Internet Development in China" which showed that as of March 2020, the population of Internet users in China had reached 904 million. The population of mobile internet users reached 897 million. The proportion of Chinese netizens using mobile phones to go online reaches 99.3% (China Internet Network Information Center (CNNIC), 2020). Mobile e-commerce has great market potential in China.

With the development of smartphone technology and mobile Internet technology, mobile applications have also developed rapidly. Especially the rapid development of 4G and 5G networks has promoted the blowout development of mobile apps. The development of mobile e-commerce promotes the development and popularization of mobile apps (Dai, 2018). Mobile app is an application software

installed on a smartphone. Its purpose is to provide users with personalized services while improving the system (L. J. Zhang, 2015). Nowadays, the areas covered by mobile apps mainly include games, videos, navigation, weather, travel, maps, life information, entertainment, food, group buying, shopping, payment, etc. It is foreseeable that mobile apps will further affect people's lives, studies, and work (T. H. Zhao, 2018).

The rapid development of mobile apps has improved the service methods of many service industries. The most obvious of these is the application of mobile food delivery in the catering industry. As the pace of people's lives accelerates, people need a faster way to meet their daily needs. China Mobile's food delivery industry has developed rapidly in recent years (M. K. Li, 2016). "Analysis Report on the Development of China's Food Delivery Industry in the First Half of 2020" which showed that the growth rate of China's food delivery industry slowed down in the first half of 2020, but still maintained a rapid growth rate (Trustdata, 2020).The population of mobile food delivery users in China for the entire year of 2019 had increased from approximately 397 million in 2018 to approximately 417 million. Since 2020 due to the impact of the COVID-19, as of March 2020, the number of Chinese mobile food delivery users is about 397 million (shown in figure 1.1).
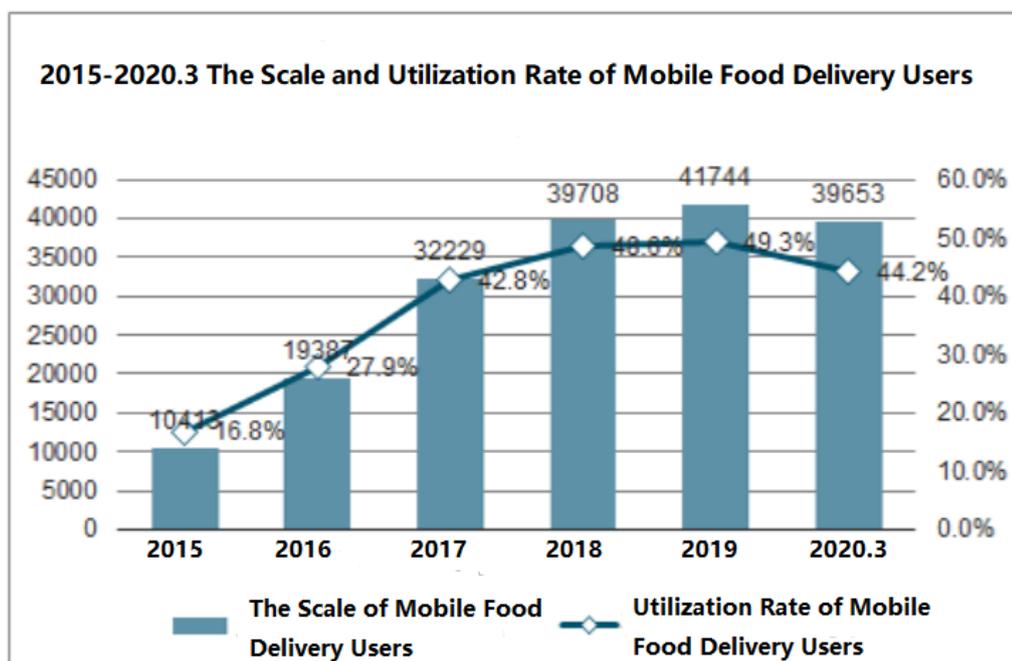
Figure 1.1  2015-2020.3 the Scale and Utilization Rate of China Mobile's Food
        Delivery Users

At present, there are three mainstream platforms for common food delivery apps in China: Meituan Waimai, Are You Hungry, and Baidu Waimai. There are other food delivery apps such as Little Secretary, Word of Mouth, Dianping Takeaway, Daojia Gourmet Club, Takeaway Superman, Order Me, etc. In the past, the main business of mobile food delivery platforms was food delivery. At present, mobile food delivery has been fully expanded in business. In addition to catering, it also provides door-to-door delivery services for supermarkets, fresh fruits, dessert drinks, flowers, cakes, medicines, etc.

It was reported that "Analysis Report on China's Food Delivery Industry Development in the First Half of 2019" which showed that the growth rate of China's food delivery industry slowed down in the first half of 2019, but it still maintained a rapid growth rate (Trustdata, 2019) . The transaction value for the whole year of 2019 increased from 461.3 billion RMB in 2018 to 603.6 billion yuan RMB. At the beginning of 2020, a sudden outbreak of COVID-19 has made the catering industry unexpected, and the entire industry has suffered an unprecedented blow. In order to

fight COVID-19, a large number of catering merchants actively or passively suspend business, and the number of people going out for dinner has plummeted. (Xinhuanet, March 8,2020) published "Research Report on the Impact of the COVID-19 on the Chinese Chain Restaurant Industry" shows that 91.6% of the sample companies began to develop takeaway products during the COVID-19, and 73.2% of the sample companies tried to expand their takeaway business; The sample companies have also explored to varying degrees the use of unmanned vehicle delivery, contactless delivery services, and take-away "safe card" methods in order to provide customers with more secure service. Therefore, the food delivery industry is still in operation when many industries are closed.
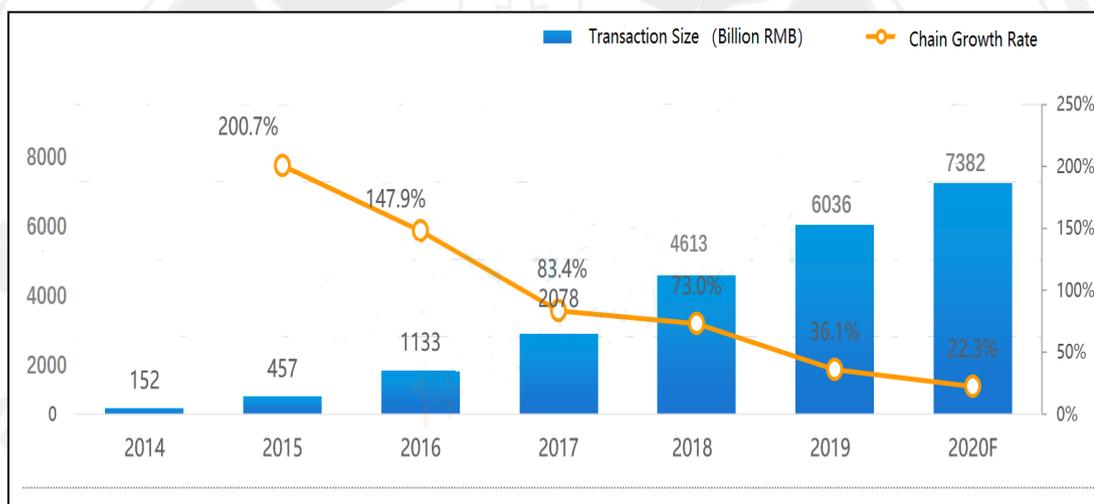


Figure 1.2 Forecast of Transaction Scale of China's Mobile Internet Food Delivery
Market

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 (B. L. Li, 2018). People are increasingly dependent on the internet and mobile phones, and they have even become an indispensable part of life. Emerging technologies such as big data, artificial intelligence, and drone delivery will become the driving force for the development of various businesses in the future. Under such technical conditions, mobile food delivery has been strengthened in the "hardware tangible" aspect, not only has been simplified in all aspects of the interface but has also been optimized in performance, to give users a better experience and enhance customer satisfaction and loyalty (R. Li, 2019).

However, with the rapid growth of the mobile food delivery industry. Some social issues related to mobile food delivery have gradually emerged. Such as mobile food delivery app platform problems, safety problems of food delivery, several service problems of pre-sales, in-sales, and after-sales in food delivery, delivery problems of food delivery, and device problems of delivery are also increasing. These problems make the experience of platform users continue to decline, and the user churn rate is also rising. Some core users are constantly leaving. How to keep the retention rate and activity of platform users stable has also become a real problem (H. Y. Li & Y., 2018).

### 1.1.2 Theoretical Background

The famous management master Drucker (1995) said: "The essence of business management was to acquire and retain customers." Customers are the foundation of an enterprise's existence. The only factor related to the long-term profitability rules and regulations of customers is often the continuous use of customers. Marketing theory also mentions that the cost of developing a new customer was equal to the cost of retaining five to eight old customers (North, 1990). The relationship maintenance function of old customers could achieve a multiplier effect with half the effort.

Hollenberg (2000) proposed that the information system was a human-machine integrated system composed of hardware, network and communication equipment, software, information resources, information users, and rules and regulations to process information flow. The mobile food delivery app includes these six basic elements of the information system. It can be seen that the mobile food delivery app is also a typical information system. Due to the wide variety of apps in the mobile food delivery industry. There are countless similar products, too. Many of the needs of consumers can be met by any mobile food delivery app. It is the goal pursued by all mobile food delivery businesses to adopt a mobile food delivery app and continue to use it. Therefore, several issues such as what characteristic value this mobile food delivery app brings to consumers so that customers can continue to use a certain mobile food delivery app have become particularly important.

It is the focus of mobile food delivery customer relationship management that they want to maintain the customers who have purchased, the repeated purchase of customers, and the spread of word of mouth will bring greater sales to mobile food delivery. As the growth of new users slowed down, the constant acquisition of new users would cost them more. It was urgent to consider how to retain existing users and to study the factors that influenced users' continued use of the applications (Zhan & Yan, 2014). From the audience's point of view, why this type of application represented by mobile food delivery is popular with them, and what factors make them choose to continue to use the application after the first use is the original basis for this study.

At present, more and more scholars have begun to study the use of behavior of information system users. The user behavior of an information system can be divided into preadoption behavior and post-adoption behavior. The continuous use of information systems means that users will continue to use a certain information system for a long period of time in the future. If the initial adoption behavior of users is the first step towards success for an information system, the long-term survival of the information system and its ultimate success depend more on the continuous use of users. The sign of the success of an information system was the user's tendency and choice to continue to use it instead of just accepting it for the first time. The willingness to continue to use played a decisive role.

Generally speaking, the successful implementation of an information system was usually not determined by the initial acceptance behavior, but to a large extent mainly depends on the continued use behavior of the system users. Regardless of how high the initial acceptance of the information system by the users was, if the information system could not fully meet the needs of the system users in some aspects, the continuous use intention of the information system users would decline(J. Yang, Sarathy, & Lee, 2016). Therefore, scholars at home and abroad have turned to research on the continuous use of information systems.

While studying the continuous use of information systems, a large number of scholars have different views on the relationship between first adoption and continuous use. Some scholars believe that continuous use is only an extension of time for the first adoption. Therefore, this type of view adopts the same set of believes as the first adoption and uses longitudinal research methods to study continuous adoption behavior. The other view is to still use the original influencing factors as the research point, by improving or expanding the classic technology acceptance model, rational behavior theory, and other information system adoption models, so that it can explain the user's continuous use behavior after adopting the information system (Im, Kim, & Han, 2008).

Although the results of research on consumer behavior in information systems abroad are more than domestic, the amount of research on related topics is limited, and the research results are not completely applicable to China. According to the review of the previous literature, it can be seen that scholars have made some preliminary explorations on the behavior of mobile food delivery consumers. However, it can be seen from the literature review that there are still some differences in the research of scholars:

In the past, there were two main research methods on the behavior of mobile food delivery users: One is a quantitative empirical research method which asks survey subjects through the development of scales and questionnaires. The other is a qualitative research method. This is a comprehensive use of historical methods, observation methods, and other scientific methods as well as conversations, questionnaires, and other scientific methods to explore the motivations that affect consumers' continuous use intention.

In the research content, some scholars' empirical research focuses on the use of behavior or willingness of mobile food delivery users. And there is another part of scholars who have the same perspective as this study, paying attention to the continue to use intention of mobile food delivery users.

Besides, most of the existing theories are based on consumer behavior theory, but different scholars have different theoretical foundations. The main theories are involved. such as Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1975), Technology Acceptance Model (TAM) (J. C. Davis & Sampson, 1986), Information System Success Model (ISSM) (DeLone & McLean, 1992). Expectation Confirmation Model (ECM) (Spreng, MacKenzie, & Olshavsky, 1996), etc.

Technology Acceptance Theory (TAM) was based on the Theory of Rational Behavior (TRA), which was used to study the decisive factors of user acceptance of information systems (Ajzen & Fishbein, 1975). The two main constructs of TAM were perceived usefulness and perceived ease of use. Perceived ease of use was used to measure the individual's perception of the difficulty of operating the information system. Perceived usefulness was used to measure an individual's perception of the extent to which information systems help improve their performance (Ajzen & Fishbein, 1975). These two variables determine the individual's use behavior of the information system by influencing the delivery service provider's use attitude and use intention.

This study believes that technology acceptance theory (TAM) can explain user acceptance very well, but it cannot fully explain users' continued use behavior. Since the research object of this study is users who have used the mobile food delivery service. They have accepted the information system provided by the mobile food delivery service provider. There is no longer the problem of information system

adoption. So, the focus of the research should be on the individual's continuous use intention of mobile food delivery apps.

It is expected that the Expectation Confirmation Model (ECM) no longer pays attention to the variables before use, but only pays attention to the influencing factors after users use. The perceived usefulness in the Expectation Confirmation Model (ECM) not only considers the impact of ex-ante expectations on the user's intention to use but also considers the user's expectation of the continued use of the information system after the fact. It can well explain the user's intention and behavior of continuous use (Spreng et al., 1996) .

Since the development and application of information systems was a complex system engineering, the manifestation of its effects had intangible characteristics. The improved information system success model (ISSM) not only reflected the performance and function of the system, but also reflected the effect of the interaction between the information system and the users from the perspective of user behavior, and It also revealed users' perceptions of the importance and usefulness of information systems from the influence of individuals and organizations. So, it was a measure of the "overall success" of the information system.

With the popularization of mobile internet and the development of smartphone technology, any information system runs on an open network, therefore, any user had certain risks when using any information system. Perceived risk was a key determinant of attitudes towards the use of information systems (Weng, Zailani, Iranmanesh, & Hyun, 2017).

The risks perceived and the impact of the surrounding environment would also make users think that other information systems were better. Therefore, users might switch to other information systems due to the influence of the surrounding environment when their satisfaction was low (Oyeniyi & Abiodun, 2010). The user will naturally consider the switching cost at this time. In addition, more and more empirical evidence showed that the behavior of the surrounding public was an important factor in many consumers' willingness to use. This is the herd behavior introduced in this study. These documents have determined the importance of these influencing factors in explaining the continuous use intention. However, in the previous studies, the literature that considers these factors together is still blank.

Therefore, this study took a mobile food delivery app as the research object, and used the revised technology acceptance theory (TAM)) and the improved information system success model (ISSM) (also known as D&M model) and the expectation confirmation model (ECM) as the research foundation. And this study considered the impact of customer perception risks, switching costs, and herd behavior to study the continuous use intention of customers to use mobile food delivery apps. In turn, it provided countermeasures and suggestions for mobile food delivery app service providers to improve service quality.

## 1.2   Problem Statement

This study uses mobile food delivery and continuous use intention as keywords on the website "WEF OF SCIENCE". The results show that there are 375 papers (from 2001-2020). Among them, there are 9 review papers, 215 papers on its influencing factors, and 151 papers on its empirical research. At present, many scholars have conducted comprehensive and in-depth research on the factors affecting customers' continuous use intention, but there are still the following shortcomings:

### 1.2.1   Insufficient Attention to Continuous Use Intention

An important condition for the survival and long-term development of an enterprise is customers' continuous use intention. In recent years, the concept of "User-centered" and the vigorous development of information technology have promoted the research of user information behavior. However, the literature is more about the research on the purchase intention and purchase attitude of mobile food delivery. There is little research literature on the continuous use of intention after its initial acceptance. Both companies and academics don't pay enough attention to the continuous use intention. It is important to ensure that users can continue to use it after the initial acceptance. Only in this way can we cultivate sticky and loyal customers and succeed in the fierce competition (Amoroso & Lim, 2017). Therefore, according to the current development of China's mobile food delivery market, this study must conduct an empirical study of the factors affecting the continuous use intention of mobile food delivery apps.

### 1.2.2 There are Relatively Few Studies on the Continued Use of Mobile Food Delivery Apps

The current scholars' research topics on the continuous use of information systems are rich and diverse, Involving education and learning (Subject navigation tools, academic databases, mobile publishing systems, academic blogs, mobile libraries, online learning platforms, mobile reading software), social service (Information system related to medical, healthcare and community services), mobile service ( Mobile App, mobile browser, mobile search), Social (including new media, mobile social systems), entertainment (including short video websites), government (including government websites and other government service systems), business (including online banking, mobile business systems), etc. Research on users' continuous use has been widely distributed in various fields of information technology applications (Hossain & Quaddus, 2012). In terms of the distribution of research topics, research on the continued use of mobile social applications ranks first. The development of mobile internet technology has provided great convenience for people's social activities. It is a good way to help developers design and sell products for specific mobile applications through doing some research about mobile social users' continuous use intention thereby improving user satisfaction and user loyalty (Hsiao, Chang, & Tang, 2016). At present, the mobile social applications in the study of continuous use intention at home and abroad mainly include WeChat, Weibo, and Short videos.

Secondly, the frequency of research on topics such as virtual communities, mobile commerce, mobile reading, and mobile government affairs is comparable, ranking second. There is an important guiding significance for e-commerce companies to make their products and services better meet users' needs and expectations. The continuous use behavior of mobile reading and mobile government are also the current research topics that scholars prefer (Panigrahi, Srivastava, & Sharma, 2018).

However, scholars on some research topics were still relatively small, such as Internet applications, new media, subject navigation tools, academic databases, hospital information systems, mobile food delivery apps, mobile publishing systems, mobile browsers, etc., which need to be studied by scholars in the future (Nabavi, Taghavi-Fard, Hanafizadeh, & Taghva, 2016).

### 1.2.3 There is a Lack of In-depth Research on the Interaction Between the Influencing Factors of Customers' Continuous Use Intention

Previous studies have shown that the continuous use intention of information systems depended on perceived ease of use and perceived usefulness. But they did not necessarily promote the formation of continuous use intention of information systems (H. T. Kim, 2018). The core factors such as system quality, information quality, and service quality accumulated by enterprises would further promote the continuous use intention of the information system (Panigrahi et al., 2018). The existence of perceived risk made customers' perceived ease of use and perceived usefulness reduce continuous use intention of the information systems (Tandon, Kiran, & Sah, 2018). So, in some sense. System quality, information quality, and service quality might have a greater impact on customer satisfaction and promote customers' continuous use intention of the information systems (Y. S. Ahn, 2016). However, there is no literature that simultaneously studies variables of perceived risk, perceived ease of use, perceived usefulness, system quality, information quality, service quality, switching costs, satisfaction, herd behavior, continuous use intention. Therefore, it is necessary to in-depth study the interaction between the factors that influence the continued use intention of customers in the mobile food delivery field.

### 1.2.4 There is a Lack of Research on the Environmental Factors Surrounding Mobile Food Delivery Apps

Previous studies have shown that the most frequently used influence mechanism in the information system literature is the rational behavior model, the technology acceptance model, and the expectation confirmation model, and so on. The most frequently used keywords are perceived ease of use and perceived usefulness. The keywords with the middle frequency of use are system quality,

information quality, and service quality. Keywords that are used less frequently are perceived risk and conversion costs. No frequency of use is the herd behavior which is the surrounding environment that can affect customers' buying behavior and purchase intention. In the past, scholars often paid attention to the information system itself and the customer's experience, subjective norms, and perceptions to decide whether to adopt this information system and whether to continue to use it. Scholars seldom considered the influence of the surrounding environment on the purchase intention and behavior of customers (Handarkho, 2020).

## 1.3  Research Questions

This study is mainly to help mobile food delivery app service providers solve some urgent problems existing in mobile food delivery in order to retain existing users. That is, to understand the mechanism of the follow-up intention to continue using the mobile food app after the first use.

Therefore, the main research questions in this study are:

(1) What are the key factors that affect the continued use of mobile food delivery customers. What kind of relationship exists between these influencing factors. The size of their influence on the continuous use intention.

(2) The moderating variable herd behavior is how to influence the relationship between the switching costs and the continuous use intention, and the relationship between the satisfaction and the continuous use intention.

(3) What is the role of the key success factors system quality, information quality, and service quality which more comprehensively reflect the characteristics of mobile food delivery apps in the integration model constructed in this study;

(4) How to improve user experience and increase user stickiness to increase users' continuous use intention on mobile food delivery apps.

## 1.4   Research Objectives

Since its inception, the mobile food delivery app has developed rapidly and has received widespread attention from the business community and academia. There are certain differences between the mobile food delivery app and the traditional catering market. Customers have the identity of both consumers and information system users, so it is necessary to evaluate the mobile food delivery consumers comprehensively.

The author consulted a large amount of literature and referred to the research of domestic and foreign scholars on customers' continuous use intention. Based on this current situation, it is hoped to achieve the following goals through research:

(1) Based on the revised Technology Acceptance Model (TAM), Improved Information System Success Model (ISSM), and Expected Confirmation Model (ECM), this study constructed an integrated theoretical framework that was more in line with the actual situation about the factors affecting continuous use intention of mobile food delivery apps;

(2) Through empirical analysis, this study described and analyzed comprehensively the relationship between the switching costs and the continuous use intention, and the relationship between the satisfaction and the continuous use intention;

(3) This study introduced the key success factors system quality, information quality, and service quality, and further verified their roles in the integration framework constructed in this study;

(4) The research results of this study would put forward effective strategies to increase the willingness of mobile food delivery customers to continue using.

Mobile food delivery is a product of the combination of the traditional catering industry and mobile internet information technology. The mechanism of continuous use of mobile food delivery app users is different from previous studies that focused on enterprise information systems and e-commerce websites. Therefore, in this new research context of mobile food delivery app, this study adds new research variables to conduct extended research on the model universality of the continuous use of the theoretical framework of information systems. There is great significance both in theory and in practice for this study.

### 1.4.1    Theoretical Contribution

This study takes customers' continuous use intention of mobile food delivery apps as a scientific research question, based on the revised technology acceptance model (TAM), the improved information system success model (ISSM), and the expectation confirmation model (ECM). This article explores the relationship between customer satisfaction, customer switching costs, and users' continuous use intention in an environment where customers have perceived risks and the functions of information systems. This study also deeply analyzes the dynamic process of the influence of the willingness to continue using mobile food apps on the social group-herd behavior. From the perspective of consumers, this study has the following theoretical significance through theoretical argumentation, framework construction, and empirical analysis:

(1) This study attempts to combine the revised technology acceptance model (TAM) and the improved information system success model (ISSM), and the expectation confirmation model (ECM) on the basis of predecessors to construct a theoretical framework of the factors affecting the continuous use intention of mobile food delivery customers. It can explain more reasonably the factors that affect the continuous use intention of mobile food customers.

(2) This study introduces the group behavior-herding effect as a moderating variable. This article explores the moderating influence of the herd behavior on the relationship between switching costs and continuous use intention, the relationship between satisfaction and continuous use intention, considering the

perceived risk environment, under different customers' perceived ease of use, and perceived usefulness. It further expands these three theoretical frameworks.

(3) This study introduces the key factors (system quality, information quality, service quality) in the improved information system success model (ISSM). It uses satisfaction as a mediating variable to explore the impact on customers' continuous use intention and to further verify the mediating role of satisfaction.

### 1.4.2    Practical Contribution

In practice, with the vigorous development of the online food delivery industry, more and more investment institutions and social groups have focused their attention on the mobile food delivery industry. Therefore, the study has certain practical significance in terms of enterprise development or social impact. This study attempts to study the willingness of mobile food delivery users to continue to use behavior. And it tries to find out which key factors will affect users' continuous use of online food delivery and discusses their internal relationships. It is hoped to give certain reference significance to the platforms and catering companies in the network industry.

(1) It is more conducive to a deeper understanding of the user's perceived needs. If mobile food delivery companies want to develop and maintain users from the user experience, they must understand the user's perception needs more accurately. This requires mobile food delivery service providers to learn empathy. Only when you truly think from the user's perspective, can you understand the user's real needs. When companies understand this, they will naturally understand customer needs. In response to these needs, services suitable for customers can be made (Chulkov, 2017).

(2) There are some actionable strategic suggestions for mobile food delivery service providers to improve customer experience. It can assist mobile food delivery participants to identify important factors influencing the decision-making behavior of customers' continued use intentions. It helps to build communication bridges between mobile food delivery platforms, offline mobile food delivery businesses, and consumers. It helps them deepen their understanding of customer behavior motivation and mentality. In addition, by developing new functions of the

platform and formulating new marketing strategies, it can help the mobile food delivery platforms win a larger market space.

(3) It is conducive for the government and regulatory agencies to formulate and improve laws, regulations, and policies related to mobile food delivery. The study enables the government, and regulatory agencies to understand and grasp consumer behavior intentions and behavior characteristics, researching the consumer behavior of mobile food delivery. It can make them based on the needs of consumers, protect the rights and interests of consumers, and continue to formulate, improve and improve laws, regulations, and policies related to mobile food delivery to ensure the healthy development of mobile food delivery.

## 1.5 Scope of the Research

This study focuses on young and middle-aged customers in different Chinese cities over 18 and under 50 who frequently use mobile food delivery apps as the main survey objects. Through a questionnaire survey the usage of the currently popular mobile food delivery apps such as Meituan Waimai, Are You Hungry, Baidu Waimai, etc., This study uses a quantitative method to analyze the factors affecting customers' continued use intention. SPSS, Warp-PLS, and Mplus are used to get the results of the questionnaire data analysis. At last, some targeted marketing strategies are provided for mobile food delivery service providers based on the data results.

# CHAPTER 2

# LITERATURE REVIEW AND THEORETICAL FRAMEWORK

This chapter mainly elaborates on the theoretical basis and literature review of the research on the factors that influence the continuous use intention of mobile food delivery app customers. The theories and concepts involved in this study are: the revised technology acceptance model (TAM), the improved information system success model (ISSM) and the expectation confirmation model (ECM), perceived risk, switching costs, herd behavior. The structure of this chapter is as follows: 2.1 Overviews of the literature on continued use intentions; 2.2 Related theories and frameworks; 2.3 On the application forms of related theoretical frameworks; 2.4 Empirical research on continuous use intention; 2.5 The related concepts involved in this study; 2.6 The theoretical framework and relational hypotheses in this study; 2.7 Chapter summary.

## 2.1   Overview of Research on Continuous Use Intention

The term, continuous use intention, has its origins in psychology. Other names are given by many scholars. The name of Incorporation was given by T. H. Kwon and Zmud (1987).However, (Bhattacherjee, 2001) assumed that it was institutionalized and defined as Continuance Intention as a normal and continuous activity. Therefore, continuous use intention is the user's intentional decision after adopting an information system. It is the subjective intent generated by continuing to access or use the information system. With the development and popularization of the Internet in recent years, this concept has been widely used by scholars in the social and economic fields related to online media.

The interpretation of information systems in the past two to three decades has produced a large amount of literature. The field of information systems has always attached great importance to the study of user behavior rules. Its user behavior could be divided into two stages: pre-adoption behavior and post-adoption behavior. Both initial acceptance and continuous use were a sign of smooth implementation (Parthasarathy & Bhattacherjee, 1998).

Since the 1980s, the focus of research in this field has been on users' intentions and behaviors of initial acceptance of information systems. However, with the deepening of research, more and more scholars have gradually realized the importance of continuous use. For both enterprises and consumers, it was only the first step to adopt a new information system; the success of an information system required long-term continuous use (Bhattacherjee, 2001). The real value of an information system did not lie in the initial acceptance by users, but in its continued use after initial acceptance (Tam, Santos, & Oliveira, 2020). In addition, it is five to eight times the cost of maintaining an old user the cost of acquiring a new user in the marketing field. This shows that the continued use of users in the field of information systems is more important than initial acceptance. Therefore, recent information system user behavior research focuses on the continuous use intention and the actual behavior of users who have not terminated the use of an information system after the initial acceptance of an information system, that is, the analysis of the continuous use of the information system.

Focusing on users' continuous use intention, scholars have built models from multiple perspectives for research. Based on many theoretical models such as the planned behavior model, rational behavior model, technology acceptance model, information system success expectation confirmation model, and many other theoretical models as the basic analysis framework, scholars have defined, acquired, and identified many driving variables for people to accept new information systems and use it. Aiming at the willingness to continue using the mobile food delivery app, this article builds the theoretical framework of this study based on the revised technology acceptance model (TAM), the improved information system success model (ISSM), and the expectation confirmation model (ECM).

## 2.2    Related Theories and Frameworks

### 2.2.1    Technology Acceptance Theory and Its Frameworks

Technology acceptance theory is an important theory that studies the acceptance and use of information systems by users. It was first used to explain the reasons for the contradiction between high input and low output in information systems. Due to its simple structure and strong ability to explain user behavior, technology acceptance theory had been recognized by many scholars and had become a basic theoretical model for research on factors affecting the use of information systems (P. Zhang, 2017).

2.2.1.1  Original Technology Acceptance Framework

J. C. Davis and Sampson (1986) firstly proposed the technology acceptance model (TAM) which was derived from the theory of reasoned action (TRA) in his doctoral thesis. It was used to verify the influence of external variables on the use intention of personal information systems.

The acceptance of new technologies has always been the focus of research in the field of new technologies. Davis' technology acceptance model is considered to be one of the most widely used and highly predictive models. In the technology acceptance model, behavioral intention directly determines the actual behavior of consumers; The behavioral attitude and perceived usefulness together affect consumers' behavioral intentions; Perceived usefulness and perceived ease of use affect consumer behavior and attitude; The perceived ease of use affects the perceived usefulness (shown in figure 2.1). Subsequently, it was cited and modified by many scholars, forming the most widely used technology acceptance model.
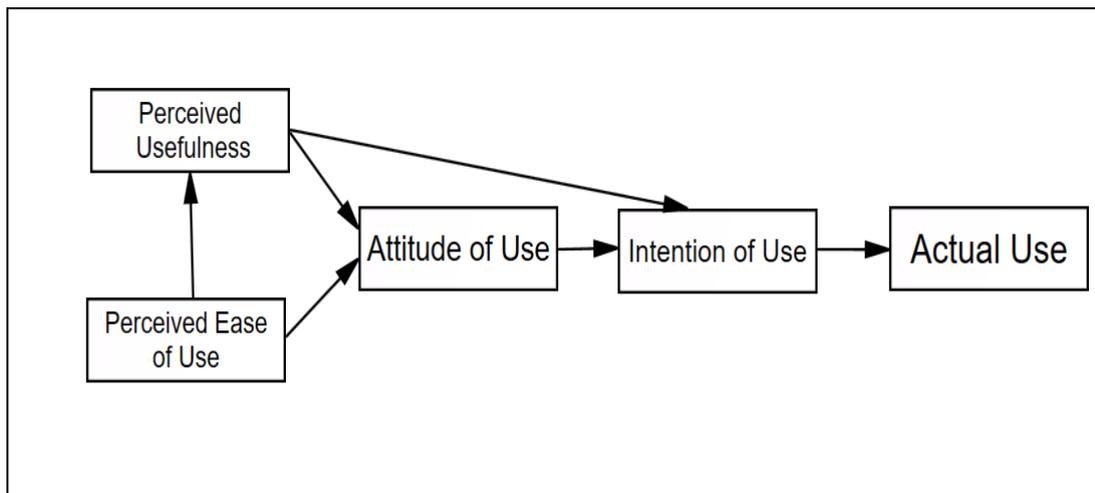
Figure 2.1  Original Technology Acceptance Model (TAM)
Source:  J. C. Davis and Sampson (1986)


2.2.1.2  Revised Technology Acceptance Model

After J. C. Davis and Sampson (1986) proposed the technology acceptance model (TAM) which has been applied to various fields due to its reliability and persuasive power, Davis and his colleagues had also been researching and demonstrating the model. F. D. Davis (1989) found that the behavior of users was largely affected by the external environment, such as the work environment or the social environment. J. H. Davis (1996) pointed out that although the influence of user beliefs on the intention of use in planning theoretical behavior was achieved through the mediating effect of user attitudes. However, the empirical research of TAM showed that user attitudes could only reflect personal preferences, and partially explain the impact of perceived usefulness on usage intentions. It could not well express the effect of perceived usefulness and perceived ease of use on an intention to use. Combined with the suggestions of other scholars on the original technology acceptance model, Davis et al. proposed a revised technology acceptance model. The new model deleted the variable of use attitude and added external variables to make the model more concise. The theoretical model diagram is shown in Figure 2.2.
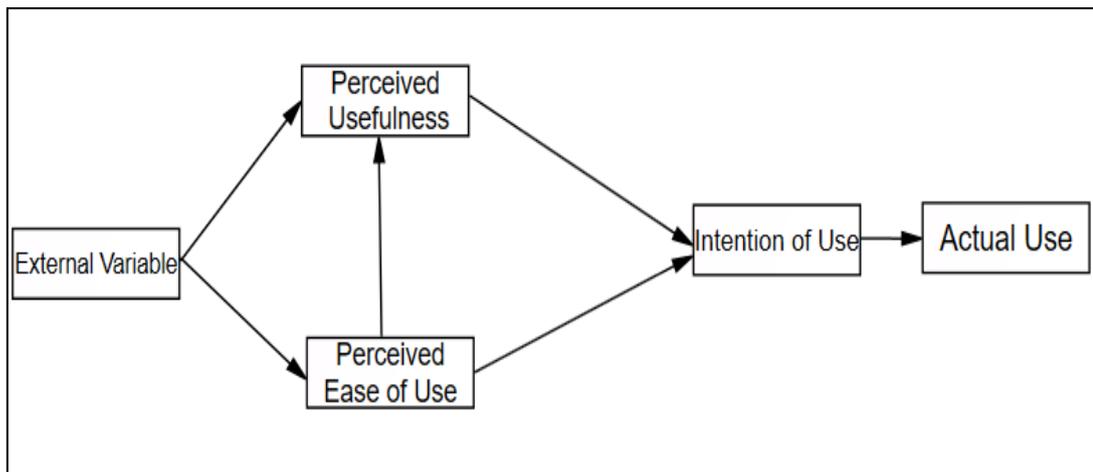
Figure 2.2  Revised Technology Acceptance Model (TAM)

Through the combing of the technology acceptance model, it is found that in the process of development and evolution of the TAM model, a more reasonable technology acceptance model is constructed by introducing relevant variables and forming new assumptions according to different application scenarios. Good scalability and realistic effectiveness are a powerful driving force for the continuous development of technology acceptance models. It also makes the TAM model have excellent explanatory power in the research of information technology acceptance. So, TAM becomes a commonly used theoretical model in technology acceptance research. As a mobile application software, the mobile food delivery app is an excellent representative of emerging information technology. It has all the characteristics of an information system. Therefore, it is a meaningful thing to adopt the revised technology acceptance model as the basic model to study and explain the influence of customers' continuous use intention of mobile food delivery apps.

### 2.2.2    Information System Success Theory (ISST) and Its Framework

2.2.2.1  Information System Success Theory (ISST)

Since the 1980s, with the emergence and popularization of information systems, the problem of measuring the effectiveness of information systems has become a hot and difficult research topic. A key factor in whether the information system could be accepted by users and used continuously was the quality of the

information system (M. J. Guo, Z., & Qin, 2015) . Based on the information communication theory Shannon and Weaver (1949) and the information impact theory Mason (1978), DeLone and McLean (1992) proposed Information System Success Theory (ISST). And based on this theory, they built Information System Success Model (ISSM), Also known as the D&M model (shown in figure 2.3). The ISSM model provides an overall framework for analyzing the constituent elements and internal mechanisms of the construction effect of information systems. It has become a landmark achievement in the information systems field.
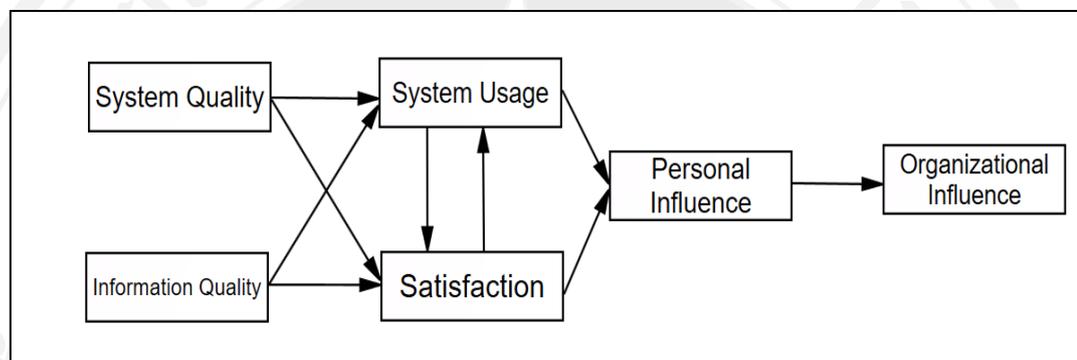


Figure 2.3  Information System Success Model (ISSM)

Source:  DeLone and McLean (1992)

Information System Success Model (ISSM) is based on Shannon and Weaver's hierarchical research on information exchange systems. Shannon and Weaver believed that information that could be measured or evaluated at three different levels was the output of the information system or the news in the communication system. Technical level, the accuracy, and efficiency of the production information system; Semantic level, the success of information conveying its original meaning; Effectiveness level, the impact of the information on the recipient. On the basis of the above theories, they put forward six elements for the success of information systems: system quality, information quality, system use, user satisfaction, personal influence, and organizational influence. And they analyzed the relationship between each element. Among them, system quality and information quality together and individually affect system use and user satisfaction; System use

and user satisfaction interact; System use and user satisfaction directly cause personal impact, and then affect organizational performance. Information System Success Model (ISSM) proposed by DeLone and McLean (1992) not only reflected the performance and functions of the system but also reflected the effect of the interaction between the information system and users from the perspective of user behavior. It also revealed users' perceptions of the importance and usefulness of information systems from the influence of individuals and organizations. Therefore, it is a measure of the "overall success" of an information system, with a certain time series and causal relationship.

Once the Information System Success Model (ISSM) was proposed, it was recognized by scholars. Some scholars integrated it with the technology acceptance model (TAM), which not only confirmed the effectiveness of the information system success model but also made up for the drawbacks of the technology acceptance model that could not measure the pros and cons of the information system.

2.2.2.2 Improved Information System Success Model

Information system research in many fields has confirmed the inferences of the "D&M model". But it has also been questioned by some scholars. Seddon (1997) revised the model from the level of model indicators and mechanism of action. They proposed that the Information System Success Model (ISSM) confused the process model and the causal model, so it was necessary to divide it into two and separate the system usage behavior model separately. At the same time, they also advocated replacing "system use" with "perceived validity". They believed that system quality and information quality directly affected perceived effectiveness rather than system use; The use of the system was the result of the effect of the system; The personal benefits, organizational benefits, and social benefits generated by using the system also had impacts on perceived effectiveness and user satisfaction; Perceived effectiveness was the determinant of user satisfaction.  revised and improved the original model after summarizing the literature on the use and evaluation of the "D&M model" in the past ten years, thus forming a brand new Information System Success Model (ISSM) (shown in 2.4).
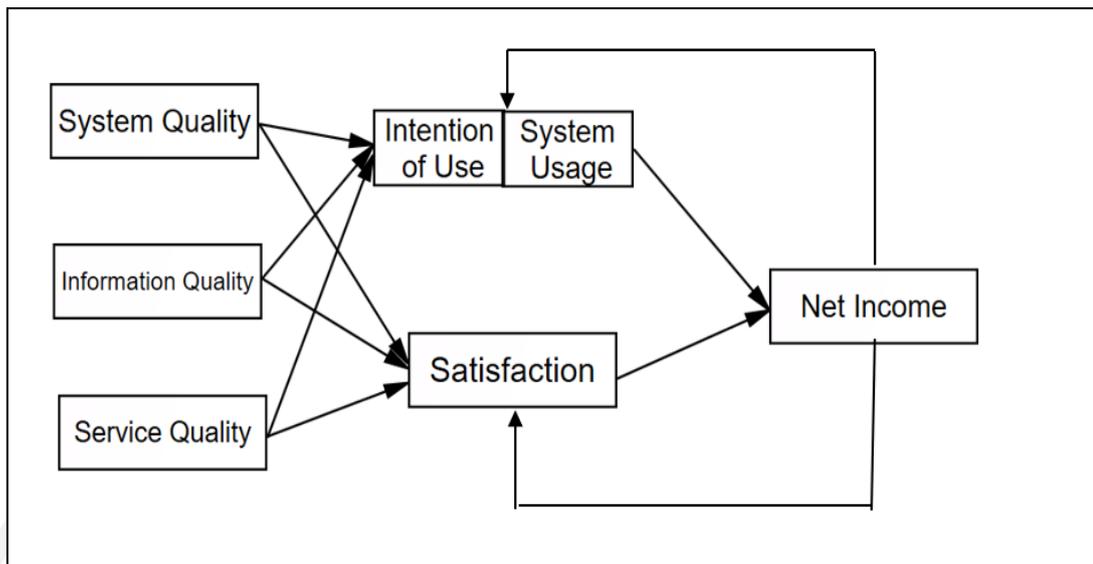
Figure 2.4  Improved Information System Success Model (ISSM)

Source:   Delone and McLean (2003)

Compared with the original model, the improved information system success model has been modified in three places: (1) Introduced the service quality variable. Service quality refers to the evaluation of all service support provided by the information system. (2) The system took the system used as the intension   to   use. The original model emphasized the behaviors used by the information system. The improved model paid more attention to the willingness to use information systems. (3) It reduced the combination of personal influence and organizational influence a net benefit. The personal impact and social impact of the information system may be positive or negative. It is more appropriate to use the net benefit for a comprehensive assessment. And it can include organizational team influence, internal influence, industry influence, and even many influences brought by consumers.

After the information system success model was revised, it was not difficult to find that the service quality as a variable fully considers the user's service identity and feelings, and improves the user's status in the information system; The proposal of net benefit took the team, industry, users, etc. into consideration for a unified evaluation, making the revised information system success model more comprehensive and accurate. Aiming at the exploration of factors affecting the continuous use intention of mobile food delivery apps, this study mainly refers to the

improved information system success model system quality, information quality, service quality, and satisfaction of these key variables to reflect the main embodiment of the information system function of mobile food delivery apps.

### 2.2.3 Expectation Confirmation Theory and Framework

Expectation confirmation theory (ECT) contained expectation disconfirmation theory (EDT) and expectation confirmation theory (Bhattacherjee, 2001).

2.2.3.1 Expectation Disconfirmation Theory (EDT)

Expectation disconfirmation theory (EDT) was first proposed by Oliver (1980) which was the basic theory for studying consumer satisfaction. The consumers had five stages of psychological changes before repeat purchases in this theory: In the first stage, consumers had certain psychological expectations for the goods they need to buy before making a purchase decision; In the second stage, the actual purchase experience was obtained after the purchase behavior was implemented, and cognitive performance was generated; In the third stage, the generated performance was compared with the psychological expectations generated before the purchase to obtain the degree of certainty of expectations; In the fourth stage, consumers felt satisfied or dissatisfied with the behavior according to the degree of expected confirmation and disconfirmation. The satisfaction level was relatively high when the expectation was confirmed, and the satisfaction level was relatively low when the expectation was not confirmed. Finally, in the fifth stage, consumers decided whether to buy the product again based on their satisfaction with this behavior, whether they would buy again. When the satisfaction was high, they would be willing to buy again, and when the satisfaction was too low, they would not buy again.
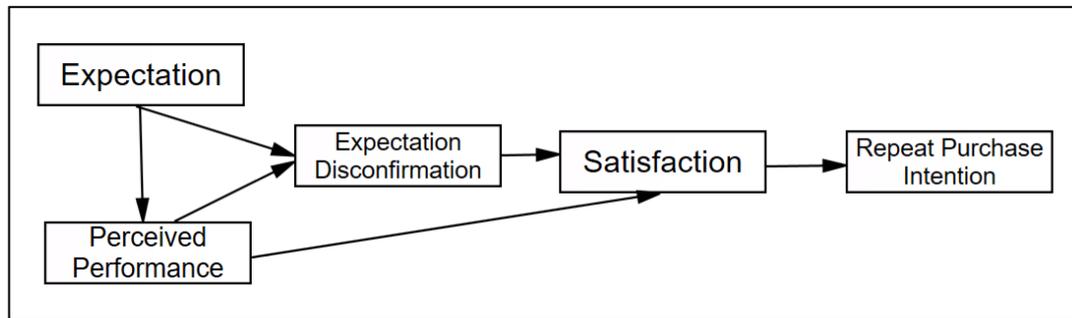
Figure 2.5  Expectation Disconfirmation Theory (EDT)
*Source:  Oliver (1980)*

      2.2.3.2  Expectation Confirmation Theory (ECT)

      Expectation confirmation theory (ECT) was originally developed from the expectation disconfirmation model proposed by Oliver (1980). Oliver studied customer expectations, perceived performance, degree of disconfirmation of expectations, and the relationship between customer satisfaction and repurchase intention. He believed that the degree of disconfirmation of consumers' expectations had an important impact on customer satisfaction.

      Expectation confirmation theory was similar to expectation disconfirmation theory, its main concept was that consumers judge the degree of satisfaction with the comparison result of pre-purchase expectations and post-purchase performance about the product or service. Satisfaction was a reference for buying or using again next time. There were the same five parts of its specific process (Apollos Patricks Oghuma, Libaque-Saenz, Wong, & Chang, 2016). The expectation is a consumer's prediction of what will happen to a product or service. The Expectation confirmation is determined by perceived performance and expectations. The specific variables and relationship model are shown in Figure 2.6.
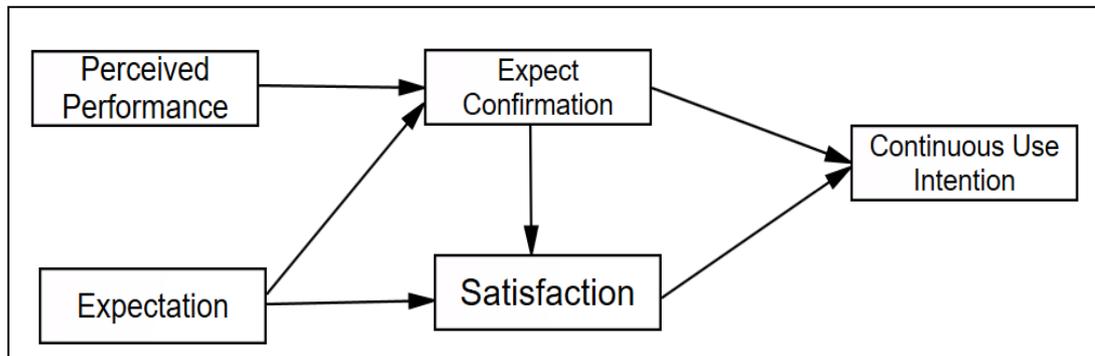
Figure 2.6  Expectation Confirmation Model

*Source:  Oliver (1980)*

Because the expectation confirmation theory cannot fully explain the continuous use behavior of consumers or users, and the scope of application is relatively narrow. On the basis of the expectation confirmation theory, combined with the user technology acceptance model, Bhattacharjee (2001) proposed the expectation confirmation model (shown in Figure 2.7)
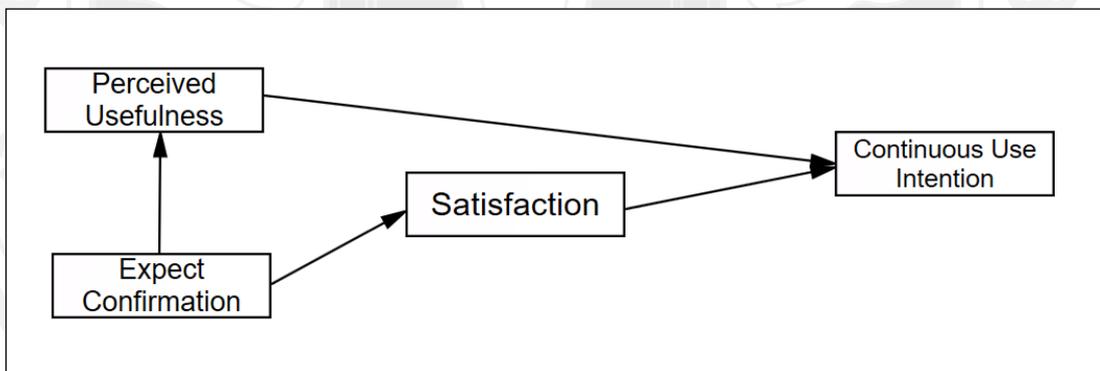


Figure 2.7  Expectation Confirmation Model (ECM)

*Source:  Bhattacherjee (2001)*

The expectation confirmation model enriches and extends the expectation confirmation theory. It is expected that the confirmation model pays less attention to the variables before user use but focuses on measuring related variables after user purchase and use, so as to obtain more accurate data on repeated purchase and use. At the same time, the expectation confirmation model introduces concepts such as Confirmation, Perceived Usefulness, Satisfaction, and Continuance Intention, making it more intuitive and accurate to measure user experience.

believed that the user's initial acceptance of the information system was not directly related to the user's continuous use intention of the information system. After conducting empirical research on the acquired data, he found that the degree of satisfaction that the individual felt after using the information system and the individual's perception of the usefulness of the information system significantly affected the individual's continuous use intention of the information system; The degree of confirmation of the individual's expectations could have an indirect impact on the user's continuous use intention through the mediation of satisfaction and perceived usefulness. Before using the system, the users of the information system had initial expectations of the utility. After using the information system, they would have a subjective perception of the actual use effect. The difference between the two was the expected degree of confirmation. This degree of confirmation would affect the user's satisfaction and ultimately affected the user's continuous use intention. In view of the continuous use intention of the mobile food delivery app, the key variables in the expected confirmation model, namely, perceived usefulness, satisfaction, and continuous use intention, are used to integrate the revised technology acceptance model (TAM) and improve The ISSM model of this study further achieves the ultimate goal of the continuous use intention of this study.

## 2.3    About the Application Forms of the Theories and Their Frameworks

At present, the application forms of theoretical frameworks are mainly as follows:

### 2.3.1    Apply the Original Theoretical Frameworks Directly to the Research

Many scholars directly apply the original theoretical frameworks to related research. Gefen, Straub, and Boudreau (2000) used TAM to study the intention of web users about using the website. They took a book-shopping website as an example and selected 217 MBA students as the research objects. Through simulation experiments and statistical analysis, they found that: when the website was mainly used to query information, the perceived usefulness and ease of use would affect the intention of the actors. When a user used a certain website to purchase a product, the perceived ease of use did not affect the use intention, the perceived usefulness affected the use intention, at the same time the perceived ease of use affected the perceived usefulness.

### 2.3.2    Add Variables to Propose an Expanded Original Theoretical Frameworks

Primitive theoretical frameworks are widely used to study the behavior of individuals receiving information. But there are still has certain limitations in every original theoretical framework. So, some scholars have solved the limitations of the original theoretical framework by adding variables to redesign the model. J. B. Lin, Lu, Y. B., & Lu, Y. F. (2011) added the variable of trust on the basis of the original technology acceptance model, using trust as an intermediary variable to study the user's willingness to use mobile securities (mobile stock trading app) which made an ordinary mobile phone a comprehensive processing terminal. Through empirical analysis, they found that consumers' perceived ease of use and perceived usefulness had a major impact on their willingness to use, and trust plays a mediating role in the influence of willingness to use.

### 2.3.3 Combine Multiple Theories to Propose New Research Frameworks

Rational behavior theory is the foundation of the technology acceptance model. Many scholars combine technology acceptance models, rational behavior theories, planned behavior models, etc. to study consumer behavior. At the same time, many scholars have also applied social cognitive theory, consumer psychology, perceived risk, trust, and innovation diffusion to the technology acceptance model by adding variables to study the behavior of users receiving information. Next, this study will briefly describe the research on continued use intention based on several theoretical models.

## 2.4 Empirical Research on Continuous Use Intention

During the 1950s and 1960s, computers were widely used in the field of information processing. As a result, many companies invested heavily in purchasing computers. They drew a lot of manpower, material resources, and financial resources to establish an information processing system to replace the daily manual information system. They used computers to solve the data processing, information analysis, and event management decision-making tasks that people wanted to do but could not do in manual situations, in order to bring huge economic benefits for the enterprises (Ives & Learmonth, 1984).

The mobile food delivery app is a human-machine system composed of smartphone hardware, mobile network, software, information resources, users, and rules and regulations to solve various information problems of users. At the same time, this man-machine system has five basic functions of input, storage, processing, output, and control of information. The mobile food delivery app complies with the basic components and basic functions that  explained about the information system. Therefore, the mobile food delivery app is obviously an information system. Around the theme of users' continuous use intention, many scholars have conducted research from multiple perspectives. Therefore, this study can research the continuous use intention to use mobile food delivery apps from the perspective of information systems.

**2.4.1    Empirical Research on the Continuous Use Intention in Information System**

The first generation of Windows 1.0 operating system in 1985 has been favored by consumers as soon as it went on the market. Karahanna, Straub, and Chervany (1999) took the users of the Windows 3.1 software package as the research object and studied the difference between the initial acceptance and continued use of these users. They put forward hypotheses based on TRA and ECM theories using factors such as attitudes and subjective norms that would affect users' continuous use intention. The research results showed that attitude had a significant positive impact on users' continuous use intention, and perceived willingness had a significant negative impact on it.

With the development of computer technology, in terms of specific applications of information systems, based on TAM, ECM, and innovation diffusion models, S. Liao, Shao, Wang, and Chen (1999)  studied the continuous use intention of using four virtual banking services that were different from traditional bank branch services: ATMs, telephone banking, home banking, and E-Banking. According to a survey of Hong Kong citizens' use intentions, ATM and telephone banking were currently the most widely used virtual banking services. Through empirical research, it was found that the continued use of virtual banks was basically affected by attitudes and behavioral wishes.

In the era of the experience economy, customers no longer only pay attention to the functional benefits such as the price and quality of goods or services but pursue the emotional benefits of self-efficacy in the consumption process. Chan, Scott, and Chan (2004) researched the willingness to continue using online banking. They took Hong Kong users as the survey object and introduced variables such as subjective norms, image, obvious effect, and perceived risk into TAM as variables that affect users' perceived usefulness. Research indicated that subjective norms and perceived usefulness significantly affected users' continuous use intention, Perceived ease of use would also have a certain impact on usefulness, but it would not affect the willingness to continue using it. Moreover, variables such as image and obvious effect would have a significant impact on perceived usefulness. Self-efficacy also had a significant impact on perceived ease of use. Later  Feng (2005) researched users' continuous use

intention of using the online banking system based on TAM and ECM. Through empirical research, he found that users' continuous use intention of using online banking (online information systems) was positively affected by their attitudes and perceived behavior control. But unlike the results of Chan, Scott & Chan's research, the research found that subjective norms had no significant effect on users' continuous use intention.

Based on TRA, TAM, and ECM, M.-H. Hsu and Chiu (2004) conducted an empirical study on users' continuous use intention of using an online tax filing system. Researchers believed that subjective norms included both social influence and interpersonal influence. Perceived behavior was replaced by users' Internet self-efficacy and perceived controllability. Attitudes were divided into three levels: perceived entertainment, perceived usefulness, and perceived risk. Naidoo and Leonard (2007) took users of the electronic service system as the survey object. They introduced two variables of service quality and loyalty stimulation into the integrated model of ISSM and ECM. They assumed that both these variables had a significant impact on users' continuous use intention. At the same time, perceived usefulness was a moderating variable between the quality of service and the user's continuous use intention. Naidoo and Leonard (2007) regarded perceived usefulness as a moderating variable. This was also a new idea of using ECM.

The virtual learning system is an information system that promotes online learning and is widely used to support face-to-face teaching and independent learning in the environment of online learning and education. In discussing the influencing factors of online learning, Roca, Chiu, and Martínez (2006) proposed a decomposition technology acceptance model about E-learning services based on TAM, ISSM, and ECM theories. The results showed that the user's continuous use intention was determined by satisfaction, which was determined by perceived ease of use, perceived usefulness, cognitive absorption, information quality, service quality, and system quality.

Ifinedo (2006) studied users of web-based learning tools as the survey object. He introduced the continuous use intention as a dependent variable in TAM. his innovation lied in the introduction of information system characteristics and user characteristics as exogenous variables. Through SEM analysis, it could be seen that the characteristics of information systems and user characteristics positively affected users' perceived ease of use and perceived usefulness. Perceived ease of use in turn affected the characteristics of the information system. The perceived usefulness and characteristics of the information system had a positive impact on users' continuous use intention. Jun Xu and Quaddus (2007) studied the continuous use intention on the knowledge management system based on ISSM and ECM. They put forward framework and hypotheses on the basis of summarizing the relevant literature of many scholars. The results proved that the quality of information, perceived benefits, and voluntariness had significant positive effects on continuous use intention.

Regarding the comprehensive application of these theoretical models, M. Lee (2010); T.-C. Lin and Chen (2012) integrated the Expectation Confirmation Model (ECM), Technology Acceptance Model (TAM), and Planned Behavior Theory (TPB) and proposed a theoretical framework to explain and predict users' continuous use intention about using E-learning. The results of the study showed that satisfaction had the most significant impact on users' continuous use intention. Secondly, perceived behavior control, attitude, perceived usefulness, and subjective norms were significant but weaker predictors. W.-S. Lin (2012) researched that students who use virtual learning systems can improve their learning level by obtaining information related to the course and having sufficient opportunities to interact with teachers and peers. Based on the theories of TRA, TAM, and ECM, the influence factors of technology acceptance on performance were included in a study for testing. After empirical research, they found that perceptual fit and satisfaction were important precedents for continuous learning motivation and personal performance. Their research has certain guiding significance for the design of network-assisted learning systems.

Ifinedo (2006) discussed the factors influencing college students' continuous use intention about the management information system course in using online learning, based on the theoretical frameworks of social cognitive theory, technology acceptance model (TAM), Expectation Confirmation Model (ECM), and motivation theory. Research results showed that self-efficacy, personal outcome expectations were related to students' initial acceptance of online learning. Enhancing social relationships and perceptual support had positive effects on students' continuous use intention.

This chapter mainly reviewed the research literature related to users' continuous use intention in the field of information systems and laid the literature research foundation for the construction of this theoretical framework. After reviewing the literature, it is found that in the research field of information system user behavior, scholars mostly analyzed the influencing factors of users' initial adoption and continuous use intention of information systems from the perspective of information systems and the construction of research frameworks. The research literature on the users' continuous intention about using information systems shows that people's lives, studies, and work are inseparable from the application of information systems. But at the same time, the influencing factors of information system users' continuous use intention will be different depending on the user and usage scenario. Therefore, in the past, whether the user's willingness to use the model and influencing factors of computer-based information systems are still applicable to mobile apps in mobile networks remains to be further explored.

### 2.4.2 Empirical Research on Users' Continuous Use Intention in Mobile Apps

With the popularization of information Internet technology and the further development of mobile terminals, mobile devices have greatly changed people's daily communication, study, work, and social mode. With the advancement of smartphone technology and mobile Internet technology, the continuous popularization of mobile network app, It was foreseeable that the mobile network app would further affect the production, life, study, and work methods of the general public (T. H. Zhao, 2018).

Based on TRA, TAM, and ECM, S. S. Kim and Malhotra (2005) studied the continuous use intention about the mobile phone app, with personalized portal users as the survey object. He proposed a two-stage framework to explain how users' perception of mobile phone app changes with the increased inexperience. The framework at each stage covers variables such as system use, perceived usefulness, perceived ease of use, and intention to use. The results of the study found that the perceived ease of use in the two stages before and after had significant impacts on the perceived usefulness and the user's continued use intention. The system usage and perceived ease of use in the first stage also significantly affected the perceived usefulness variables in the second stage of system usage, perceived ease of use, and perceived usefulness.

Gefen, Karahanna, and Straub (2003) studied the continued use intentions of users who had ever had B2C online shopping behaviors and introduced habit variables into the framework containing TAM and ECM. Through empirical research, it was concluded that habit had a significant impact on users' perceived usefulness, perceived ease of use, and continuous use intention. Moreover, perceived usefulness and perceived ease of use also had significant impacts on continued use intentions.

Based on the unique factors of the mobile network O2O (Online to Offline), with reference to the TAM, W. Y. Zhang (2013) constructed a theoretical framework that affected the acceptance behavior of mass consumers. The usefulness of O2O products or services would be affected by ease of use, cost, and social influence factors. The perceived ease of use was affected by whether the users had past experience.

In the popularization of mobile social network platform services, B. Kim (2011) analyzed the user's decision-making process to understand the continuous use intention of online social network services (SNS) had become very important. Kim established an integrated framework that incorporated subjective norms into the expectation confirmation model (ECM). He took social networks Cyworld as an example and integrated the subjective paradigm into the expectation confirmation model (ECM) to form a new user intention model for continuous use to verify the various factors that affect the continued use of social networking site users.

Considering the special hedonic, social, and utilitarian factors in the social environment of mobile networks, Y. Sun, Liu, Peng, Dong, and Barnes (2014) combined Batachegi's IS-continuance theory with mobility theory, social capital theory, and the unified theory of technology acceptance and use unified theory. They explored the continuous use intention in mobile network social apps.

Wang, Pan, Gao, and Cui (2018) studied the impact of perceived availability, perceived safety, perceived service quality, and confirmation on users' continuous intention to use social platforms. Gan and Li (2018) established a theoretical framework based on TAM, satisfaction theory, and ECM. The results showed that technical satisfaction (media appeals) had the greatest continuous impact on WeChat use intentions, followed by hedonic satisfaction (perceived enjoyment) and utilitarian satisfaction (information sharing).

Based on the theories of theory of reasoned action (TRA), technology acceptance model (TAM), and expectation confirmation model (ECM), X. J. Xu, Zhao, and Zhu (2016) studied the factors influencing the continuous use intention of knowledge Q & A apps by mobile social media platform Huang and Zhu (2016) users. researched the driving mechanism of continuous use intention of mobile social app customers. Based on TAM and ECM, they collected relevant data for specific objects through the mobile microblog. Through empirical comparison, it was concluded that satisfaction and trust directly affected customers' continuous use intention. Based on the expectation confirmation model (ECM), Xie (2016) analyzed the WeChat public platform of automobile 4S stores and discussed the willingness of the people who follow the WeChat public account of 4S stores to continue to pay attention to the platform.

Xiao (2016) took the users of the WeChat app as the research object, Based on TAM and ECM. The research results showed that users' expectation confirmation, perceived usefulness, perceived entertainment, content richness, and perceived service quality all significantly affected user satisfaction and continuous use intention. They put forward relevant suggestions and strategies to WeChat app operators based on the actual situation contributing to the future operation and development of WeChat apps. studied on the continuous use of government WeChat app based on TAM and ECM.

In addition, from the perspective of user perception P. H. Song, Lee, Toth, Singh, and Young (2019) chose Zhihu Community App as a case. He proposed a hypothetical framework based on TAM and ECM. Collecting data through questionnaire surveys, the analysis result showed that information quality, perceived usefulness, and perceived pleasure all had a significant positive correlation with Zhihu App users' satisfaction and continuous use intention. On the basis of interaction theory, TAM and ECM, T. Wang et al. (2018) comprehensively applied satisfaction theory, trust theory, user behavior theory, etc., and constructed a study framework of government microblog apps to study continued use intention from the interactive perspective. Based on the TAM model and the ECM, Cai (2019) analyzed the influencing factors of continuous use intention of mobile social network app-dominant users and browsing customers from the perspective of user behavior perception. Introducing relevant variables, He constructed a model of continuous use of mobile social network information services based on user behavior perception and proposed hypotheses.

With the combination of tourism and mobile networks, hotel booking apps have become popular in recent years. J. Kim, Lee, Seo, Woo, and Han (2019) analyzed the antecedent factors that affected the continued use of O2O online-to-offline hotel reservation app services. He used a comprehensive model constructed based on the value-based adoption model (VAM) and the expectation confirmation model (ECM) to test it empirically. He used 410 participants who had experience in booking rooms with accommodation apps as a sample. The results showed that privacy risk had the greatest impact on perceived value, followed by technicality and practicality.

Based on TAM, the extended unified theory (UTAUT2) and ECM Cheng, Sharma, Sharma, and Kulathunga (2020) used "Personalization" as the mediating variable to determine the key factors for the continuous use intention of mobile news apps. He established the key role of performance expectations, habits, hedonic motivation, and promotion conditions as the main factors that trigger users to continue using news apps. And he provided a complete framework to evaluate the moderating effect of personalization on technology acceptance.

In summary, in the field of research on mobile app user behavior, scholars mostly analyzed the influencing factors of users' initial adoption and continued use of mobile apps, such as social apps and online education apps. And users in different industries are different. Nowadays, the rapid development of the mobile Internet has changed our life, work, and way of thinking. All kinds of apps are gradually changing people's food, clothing, housing, entertainment, life, and work. Through the literature of scholars, it is found that the current world is integrating the power of computers, the Internet, and mobile communications, and making everything mobile and intelligent. Whether it was entertainment, work, or life, the changes brought about by the mobile Internet permeated every corner, breaking the information barrier, allowing people to obtain information at a lower cost, and to live a smarter and "smarter" life (Y. Lee & Kim, 2019).

As the saying goes, "food is heaven for the people", and the catering industry in which people live has become more and more efficient and convenient through technological innovation. With the accelerating pace of people's lives and the change in life concepts, mobile food delivery, as a new business format developed on the basis of "Internet + Catering", effectively solved the dining problems of "lazy people", home care for the elderly, and childcare during holidays. It was possible for everyone to eat better and live happier (Mota, Ruiz-Rube, Dodero, & Arnedillo-Sánchez, 2018).

With the decline in the performance of the catering industry, as well as the rapid development of the mobile network economy and e-commerce, merchants joined the mobile food delivery business. Its starting point and destination were to attract more consumers through the Internet to complete ordering and delivery services online. At the same time, it also enabled consumers and operators to obtain more convenient services through online transactions to achieve mutual satisfaction (Alalwan, 2020). Research on the application of smartphone applications in the field of food service and nutrition has provided practical enlightenment for restaurant owners and smartphone application developers.

In the research on the continuous purchase behavior of users of mobile food delivery apps, it was confirmed that the three-dimensional quality of the website had a significant positive effect on user satisfaction, and satisfaction had a positive effect on users' repeat purchase intention.

According to the theory of TRA and TAM, Okumus and Bilgihan (2014) proposed a theoretical framework to test the nature of smartphone users using mobile food delivery app when ordering meals in restaurants. With the increase of WeChat and Weibo users, businesses were slowly adding small programs to WeChat to complete online ordering, payment, and online reviews. F. Sun (2015) built a hotel WeChat customer willingness framework for continuous use based on TAM and Extended Information System Expectation Confirmation Theory (EECM-IT). On the basis of related theories and researches such as WeChat, the technology acceptance model (TAM), expectation confirmation theory (ECM), and continuous use intention, a measurement index system for the elements of hotel WeChat users' perception of expectations was constructed. Through the questionnaire survey and exploratory factor analysis, the factors of restaurant WeChat users' perception of expectations were determined.

With the rapid development of mobile Internet and e-commerce, the O2O (Offline to Online) came into being and was gradually accepted by the community. T.-J. Wu, Zhao, and Tzeng (2015) started with the psychological behaviors of college student consumer groups and the characteristics of the catering industry. Based on TAM and ECM they find out the factors affecting consumers' attitudes to consumers (mobile catering service platforms) through empirical analysis. According to the research conclusions, they proposed how businesses could use the O2O to grasp the attention of young consumer groups, improve their expectations of effort, performance expectations, and perception, and reduce perceived risks and perceived costs. Won, Kang, and Kim (2017) tried to use TAM and ECM to verify the convenience of O2O services and the influence of cyberspace characteristics. This study aimed to explore the impacts of the convenience of food O2O services and cyberspace on users' perception of ease of use and usefulness; And the impacts of perceived ease of use and perceived usefulness on O2O service purchase intentions.

In recent years, the continuous improvement of mobile Internet technology has enabled the rapid development of the mobile food delivery market and broad prospects. Based on the theoretical basis of TRA and ECM, through empirical research, M. R. Yang (2015) found the perceived quality, perceived price advantage, and subjective norms of mobile food delivery app users had no significant impact on their continuous use intention. However, perceived usefulness, perceived convenience, habits in contributing factors, and switching costs all had significant positive impacts on users' continuous use intention. User satisfaction also had a significant direct impact on users' continuous use intention, too.

The online ordering market and its scale are entering a period of stability. Based on TRA, combining the characteristics of the research object, TAM and ECM, Hao (2017) incorporated perceived performance, habits, brand image, and switching costs into the constructed framework. Through empirical research, the study found that the perceived ease of use, perceived ease of use, performance, habits, brand image, and switching costs of mobile food delivery app users had a significant and positive impact on users' continuous use intention. User satisfaction also had a significant and direct impact on users' continuous use intention. While expectation confirmation had a significant and positive impact on perceived performance and satisfaction.

Under the premises of consumer behavior, planned behavior theory, technology acceptance theory, etc., Y. Q. Liu (2017) constructed a 12-dimensional hypothetical research framework to study customers' continuous use intention. Based on a large number of questionnaire surveys and data collection and processing, he concluded that platform convenience, platform ease-of-use, platform-specific prices, platform entertainment, and platform personalized recommendations all had significant impacts on consumers' buying attitudes positively. Positive evaluation and consumer self-efficacy had significant positive impacts on perceived behavior control. The larger the negative evaluation the smaller the perceived behavior control. Consumer self-innovation had no significant impact on perceived behavior control. The attitude to buying and the perceived behavior control had the same growth direction with consumers' continuous use intention.

Based on the combination of expectation confirmation theory and planned behavior theory, J. Xu (2018) constructed a specific driving mechanism for the continuous use of mobile food app users. He conducted a questionnaire survey and collected data on 607 online and offline mobile food delivery users. The results of data analysis showed that: Perceived usefulness and expectation confirmation could significantly increase the satisfaction of mobile food delivery app users. There was a significant positive correlation between expected confirmation and perceived usefulness. At the same time, anytime and anywhere significantly positively affected the perceived usefulness. The satisfaction, anytime, anywhere and subjective norms significantly and positively affected the continuous use intention of using mobile food delivery apps.

With the popularization of the mobile Internet and the maturity of the consumer electronics industry, the mobile food delivery industry has entered various channels in china. Combining TRA, TAM model, innovation diffusion theory, and ECM, and F. Wu, Callisaya, Jones, and Winzenberg (2019) designed a framework about consumer behavior, and consumer psychology on mobile food delivery apps to study the factors that influence the behavioral intentions of online food delivery users and potential users in a certain region. Through empirical research, it analyzed the degree of influence of each influencing factor on usage attitude, usage behavior, and continuous use intention.

Based on the mobile food delivery apps, S. W. Lee, Sung, and Jeon (2019) researched and empirically analyzed an integrated model of an expanded technology acceptance model, a unified theoretical model used, and an expectation confirmation model that determined the determinants of continuous use intention. This research confirmed the importance of information quality, habits, performance expectations, and social influence as factors that induced users to continue to use food delivery apps.

In summary, in the field of research on the behavior of users of mobile food delivery apps, scholars are more based on the mobile food delivery app as the basis to analyze the influencing factors of the user's continuous use intention of the mobile food delivery app and the construction of research frameworks. Through the above review of classic theoretical frameworks and related literature research at home and abroad, it can be seen that the current research on the continuous use intention of

mobile food delivery apps by foreign scholars has a certain depth and breadth. The relevant empirical research mostly incorporates some influencing factors on the basis of the Expectation Confirmation Model (ECM). However, the research in mainland China has just started, with few research results. The mobile Internet, which has developed rapidly in recent years, has brought all kinds of mobile life apps into people's vision which gradually be recognized and used by users. Therefore, in the context of this era, the research on the factors affecting the continued use of the mobile food delivery apps, a lifestyle app that attracted the attention of many investors, has very strong time-sensitive value and significance.

## 2.5 Related Concepts

### 2.5.1 Perceived Risk

Consumers' traditional shopping habits deeply rooted is based on seeing is believing. The mobile food delivery apps only provided consumers with visual effects. In addition, due to the openness of mobile networks. As a new type of storeless marketing channel, mobile food delivery had significantly higher perceived risks than traditional shopping channels. It would make consumer transactions on the mobile network face various risks.

2.5.1.1 Overview of Perceived Risk

The definition of Risk in the Oxford dictionary is a chance of injury or loss. The definition of risk, Vlek and Stallen (1981) summarized in their research was as follows: Risk was the possibility of bad or bad consequences. It has been valued by scholars from various disciplines such as economics. Perceived risk has always been analyzed and explored under the scope of psychology. Until the 1960s, Professor Bauer (1960) at Harvard University used it to analyze consumer behavior. Since then, scholars had continued to increase their analysis and exploration of this variable. This variable has developed to the present and has been studied and discussed by a large number of domestic and foreign scholars. The exploration and analysis of perceived risk had developed quite maturely. The variable of perceived risk had become a part of consumer behavior analysis, and it was also playing an indispensable role and position (Dowling & Staelin, 1994).

At the 43rd Annual Meeting of the American Marketing Association in 1960, Bauer (1960) of Harvard University first introduced the concept of risk to the field of marketing. Perceived risk theory is used to explain consumers' buying behavior as a kind of risk-taking behavior because consumers cannot determine the result of the product, so consumers actually bear certain risks. This is the original meaning of perceived risk.

After Bauer, many scholars have studied perceived risk, and have continuously improved and supplemented the definition of perceived risk. Most scholars agree with the definition of Cunningham (1967). He divided the perceived risk into the following two factors: (1) Uncertainty consequence: Consumer's subjective probability of whether something would happen; (2) Consequence: If something happened later, the result was dangerous. If consumers paid more attention to the uncertainty or the higher the risk of consequences when making purchase decisions, the higher the risk perceived by consumers. Cunningham (1967) proposed the two components of perceived risk called the two-factor theory. Later it became the mainstream of perceived risk research and has been widely used in various researches.

Many scholars have conducted research on the impact of perceived risk on users' continuous use intention. This study introduced perceived risk into the framework considering the nature of current mobile Internet commerce and the actual situation. According to scholars' related research on perceived risk. This study gives a definition of perceived risk: in the process of using mobile food delivery apps, Customers cannot confirm whether the results are correct, and some results may make consumers dissatisfied or cause some losses. Therefore, the uncertainty of the result is implicit in the consumer's purchasing decision, and this uncertainty is the customer's perceived risk.

2.5.1.2  Empirical Research on Perceived Risk

The research focus of scholars is the study of the influencing factors of perceived risk and the dimension of perceived risk.

The influencing factors of perceived risk

According to many scholars' research on the factors affecting perceived risk, this article summarizes as follows:

(1)     Demographic variables. Differences in gender, age, occupation, etc., have an impact on people's shopping psychology and behavior. Spence, Engel and Blackwell (1970) discussed the role of factors such as academic qualifications and income. The results showed that both academic qualifications and income had a negative effect on perceived risk. Phillips and Sternthal (1977) research results showed that older people had various life experiences and had no fear or fear of possible uncertainties or risks, so the level of perceived risk was very low. Gao (2006); Wang, Pan, Gao, and Cui (2018) also affirmed that factors such as gender, age, education level, and income level had a significant effect on perceived risk.

(2)     Shopping experience. Gao (2006) believed that shopping experience was also a factor to consider that affected perceived risk. Consumers with online shopping experience tend to choose platforms for well-known brands that they believe are less risky, such as JD.com, NetEase, and Alibaba, etc. In addition, when consumers spend online, they are more likely to choose the companies they have contacted before. Consumers have more online shopping experience, relatively speaking, they will have more online shopping knowledge to support them to make real purchasing decisions. Therefore, the richer the experience, the more familiar with the entire process of online shopping. Thereby, the process from product selection to settlement and order placement could be completed more quickly (Suki, 2017). The more experienced, the more attention would be paid to the network settings of personal privacy, so as to better avoid the risk of endangering their privacy. After more experience, the products purchased by consumers would be more suitable for their expected effects than those purchased by ordinary users and achieve a state of value for money (Wai, Dastane, Johari, & Ismail, 2019).

(3) Product attributes. Zikmund and Scott (1974) found that products with different attributes had their own unique nature, which made the perceived risks different. Johne and Snelson (1988) took 89 different categories of products as research objects. After analyzing and studying the data of these products, the results showed that luxury goods and necessities acted in different ways with consumers' perceived risks. This was due to the virtuality and complexity of the Internet and Internet technology itself (Yeo, Goh, & Rezaei, 2017). In the physical shopping environment, consumers had the shopping habits of seeing, touching, hearing, nose, and mouth. When purchasing meals on mobile food delivery apps, if customers lacked the participation and coordination of multiple sensory perceptions of the body, they could not taste the real shopping environment, could not touch the texture of the food, and could not accurately judge and compare the quality, size, and taste of the food. These would affect the judgment of consumers and might make consumers make wrong choices. This led to increased product functional risks. J. Ahn (2019) Compared with physical shopping, the network environment was a virtual space. It would make consumers feel unreal, everything was imaginary, and its authenticity was difficult to grasp (Hussain, Ahmed, Jafar, Rabnawaz, & Jianzhou, 2017).

(4) Shopping environment. In different shopping environments, there are different consumption methods, different payment methods, and different delivery methods, and consumers will have different shopping experiences and feedback. Changes in the environment would cause consumers to have different perceived risks in some respects or change some of the originally perceived risks (Masoud, 2013). For example, transactions in the network environment are generally online payments. However, in the process of online payment by consumers, losses may occur due to network security issues such as viruses or hacker attacks. All these results in financial risks.

(5) Internet technology and design factors. The improvement of Internet technology and security prevention capabilities could help reduce perceived risks. A well-designed website also helped reduce perceived risks. The higher the reliability of mobile payment technology, the more consumers were willing to use the mobile payment for transactions (S. Lee, Lee, Kwon, Lee, & Lee,

2014). The more reliable the mobile payment technology was, the more likely it was for consumers to complete the payment successfully, and the less likely it was to cause economic losses, and the less financial risks consumers perceive. At the same time, the reliability of mobile payment technology also determined the possibility of consumer privacy leakage; The more reliable the technology of the terminal device, the less likely it was to be attacked by hackers and information stolen; The more reliable the near-field payment technology, the less likely that consumer privacy would be copied (K. H. Yang, Hwang, Lee, & Mun, 2019); In addition, the more reliable the mobile payment technology of the payment platform and terminal equipment was, the less likely it was to malfunction during the mobile payment process so that the functional risk perceived by consumers was less (Ariffin, Mohan, & Goh, 2018).

(6)     Social environmental factors. For example, through the mutual influence between individuals, the approval or disapproval within the group play a certain role in the perceived risk. Biucky and Harandi (2017) described the group's recognition of the e-commerce shopping model. Once this degree of recognition spread and influenced individuals, it was easy to reduce the perceived risk of consumers' online shopping. With the popularization of mobile food delivery apps, people have gradually accepted this time-saving consumption model. However, because the food delivery industry was mixed, different brands provide different levels of recognition. The higher the brand, the stronger the social responsibility of the mobile food delivery app, and the stricter control over the service of its catering assembly line, which would be more recognized by the society (Kang & Namkung, 2019).

2.5.1.3  Dimensions of Perceived Risk

Perceived risk is a multi-dimensional concept, and the research on the dimension of perceived risk is an important direction of research on perceived risk.

Although Bauer (1960) gave a definition of perceived risk, he did not further classify perceived risk. Olson and Jacoby (1972) divided the perceived risk into 5 dimensions: Functional risk, financial risk, physical risk, social risk, and psychological risk. Their research found that 61.5% of the perceived risk was explained by these five risk dimensions.

When measuring these risk dimensions, most of the existing previous studies directly ask consumers about the risk perception of the dimensions, without involving the content of the dimensions. Stone and Grønhaug (1993) also noticed this problem. He believed that the existing studies had ignored the criterion dimension of the structure. So, on the basis of summarizing previous studies, they summarized the total perceived risk into functional risk, physical risk, financial risk, psychological risk, social risk, and time risk. At last, they proved that these 6 dimensions can explain nearly 88.8% of the total perceived risk. This multidimensional model of perceived risk has been universally recognized by scholars.

The shopping and transactions of the e-commerce model under the Internet are very different from the traditional shopping model in terms of payment methods. Even if there is no unified authoritative standard for the study of the dimensions of perceived risk, the research results of scholars still have important theoretical significance. It enables people to identify the types of risks, so as to better reduce and avoid these risks.

Crisp, Jarvenpaa, and Todd (1997) identified five types of online perceived risks in their research: Economic risk, social risk, functional risk, personal risk, and privacy risk. Privacy risk was first proposed as a dimension of perceived risk. Their research showed that economic risks and functional risks had the most significant impact on online consumers. Featherman and Pavlou (2003) predicted consumers' acceptance of electronic services from the perspective of perceived risk. They believed that economic risk, functional risk, psychological risk, social risk, privacy risk, and time risk were the six risk dimensions. Their research conclusions indicated that economic risks, functional risks, and privacy risks had the most significant impact on overall risks. However, social risks and psychological risks had no significant impact on consumers' acceptance of online shopping.

In the study of online marketing strategies for online fresh agricultural products, J. Cui, Jo, and Na (2018) divided the customer's perceived risk into product performance risk, physical risk, financial risk, psychological risk, time risk, and service risk. But in the analysis of the influence of online travel product purchase intention, H. L. Yan, F. Xu, H. Xiong, and Q. Wang (2018) divided the perceived risk into five dimensions: economic risk, time risk, information risk, service risk, and

functional risk. Fresh food e-commerce is developing rapidly, X. Y. Wang and Lee (2019) described the impact of perceived risk on online purchase intention of fresh agricultural products from five dimensions: economic risk, functional risk, physical risk, psychological risk, and time risk. When studying the perceived risks of online consumption, most of them discussed the dimensions of financial risk from product risk, time risk, security risk, privacy risk, social risk, and psychological risk (Han & Kim, 2017).

Existing research on the perceived risk of online shopping mostly focuses on the influencing factors and dimensions of perceived risk. Another part focuses on the impact of perceived risk on consumer purchasing decisions. Based on the existing research results and combined with the characteristics of mobile food delivery apps, mobile food delivery customers will predict the risks that will occur during their consumption process, so as to judge their consumption behavior and make corresponding corrective actions. This study considers the various factors influencing customers' continuous use intention of mobile food delivery apps, and divides the perceived risks into product risks, property risks, privacy risks, psychological risks, time risks, and social risks. This article considers the dimensions of perceived risk as external variables of the Technology Acceptance Model (TAM). In this way, there is a more sufficient reason to use the revised Technology Acceptance Model (TAM) for mobile food delivery app as an information system. Combining the literature and the actual situation, this study believes that the perceived risk of mobile food delivery customers has an inhibitory effect on the continuous use intention. However, because of the many perceived risks of using a mobile food delivery app, customers will have the idea of switching to other mobile food delivery apps. Therefore, switching costs has also become one of the factors that affect the willingness to continue using food delivery customers.

### 2.5.2   Switching Costs

Through the previous literature review of the factors affecting perceived risk, this study found that customer satisfaction is no longer the only factor driving customers' continuous use intention. Perceived risk is high, and satisfaction is low, some people may switch to other mobile food delivery apps due to the surrounding

factors. Some customers would insist on choosing products or services from the same mobile food delivery app (S. N. Zhang, Li, Liu, & Ruan, 2019) . Therefore, the research on switching costs has received more and more attention from practical and theoretical circles.

2.5.2.1 Overview of Switching Costs

The research on switching costs initially focused on the field of economics. Based on the viewpoint of transaction cost, Williamson (1981) studied the problem of minimizing transaction costs in the process of organizational exchange. Finally, it was discovered that the increased costs for customers to change suppliers caused export barriers.

The complete concept of switching costs was first proposed by Porter (1997). It referred to the one-time cost incurred when customers switched from one supplier of a product or service to another. Fornell (1992) found that switching costs can be broadly predicted as economic costs, psychological costs, and other costs perceived by customers when switching service providers. From this perspective, switching costs could be seen as an important obstacle to maintain customer relationships and had an important impact on customer loyalty. Jones, Mothersbaugh, and Beatty (2000) gave a broader definition of switching costs: any factor that might cause consumers to switch suppliers or bring higher costs should be called switching costs.

The cost incurred after switching suppliers mainly refers to the economic losses and relationship losses caused to customers by switching suppliers. It mainly includes the additional benefits provided by the previous supplier that are abandoned after the supplier is switched, as well as the loss of the relationship between the service personnel with the original supplier and the loss of the brand identity of the original supply. It also includes the loss of the relationship between the service personnel with the original supplier and the loss of the brand identity of the original supply.

Switching costs is a complex variable, including both objective and subjective aspects. It includes not only the concept of cost in the economic sense but also the concept of cost in the sense of psychology and sociology. Moreover, different types of switching costs do not work independently, but they have mutual substitution

and reinforcement. Every change in switching costs may lead to changes in the overall level of switching costs. Burnham, Frels, and Mahajan (2003) described that switching costs were the one-time costs associated with switching customers from one supplier to another. And this cost was not limited to occur at the moment, nor was it merely an economic expense.

The definition of switching costs is generally uniform in academia, and scholars in related studies agree that: switching costs occur to a one-time transaction cost when a customer adjusts a product or service supplier.

2.5.2.2 Empirical Research on Switching Costs

With the development of customer satisfaction theory and the deepening of people's understanding of the relationship between satisfaction and continuous use intention, the concept of switching costs has gradually entered the field of vision of management and marketing scholars. According to the definition of Dick and Basu (1994), switching costs were the costs incurred by consumers as a result of switching product/service providers, including time costs, monetary costs, and psychological costs.

With the development of the understanding of the relationship between satisfaction and continuous use intention, the concept of switching costs has gradually been introduced into the vision of management and marketing scholars. According to the definition of Dick and Basu (1994), switching cost is the cost incurred by consumers as a result of switching product/service providers, including time cost, monetary cost, and psychological cost.

Sengupta, Krapfel, and Pusateri (1997) stated that sellers' adaptation, users' investment, and users' incentives constituted the pre-factors of switching costs. The more active the seller was to adapt and encourage customers, the more investment the customer made, the higher the switching costs they faced.

In addition, Burnham et al. (2003) classified the switching costs in the existing literature. Through interviews with consumers and the use of factor analysis, they summarized the three dimensions of switching costs in terms of procedures, switching costs in finance, and switching costs in relational aspects. They put forward the three dimensions of switching costs and the scale constituent factors through the investigation of the US long-distance telephone market and the credit card market,

covering a wide range and strong practicability. After empirical research in different service industries, many comprehensive expansions of various types of impact factors. They comprehensively summarized the various types of impact factors of switching costs (Kaur & Soch, 2018).

To some extent, switching costs can be regarded as potential losses that customers incur when switching suppliers of products or services which include financial losses, performance-related losses, social losses, psychological losses, and safety-related losses. In essence, switching costs were a kind of "deterrence" for customers to change suppliers. Only when the relationship with the existing supplier ended, switching costs would turn into real "losses" and "risks." At other times, the switching costs were more like an "anticipation" or "guess" of the customer. Customers often turned to rely on existing suppliers because of the fear of "loss" and "risk" expectations.

The classification of switching costs has always been a hot topic for scholars. Although there is no recognized classification standard yet, Jones et al. (2000) for the first time subdivided the types of switching costs and proposed learning costs (the effort to learn new products), transaction costs (establishing with suppliers and ending the relationship) and man-made or contract costs (losses for not being able to enjoy the benefits provided by the original supplier). Some scholars have divided the types of switching costs from different perspectives such as psychology, management, marketing, and sociology. Burnham et al. (2003) further subdivided continuity cost into opportunity cost and risk cost. The organizational cost was divided into search and evaluation costs before switching, behavior, and cognitive cost after switching. The psychological constraint cost was defined as sunk costs. In this way, a total of six actual measurement dimensions were formed.

Some studies believed that in the Internet industry, conversion behaviors occur more frequently, and the competition between websites for users beforehand is more intense, and the low entry barriers beforehand have resulted in high conversion costs afterward. Xue, Ray, and Whinston (2006) believed that the strategy of Internet companies to increase customers' switching costs through continuous innovation to increase customer stickiness must be able to bring value to

customers, otherwise, it would discourage customers from innovation and lead to customer loss.

In addition, some Chinese scholars have studied the relationship between customer switching costs and customer loyalty in the network environment and proved that the positive impact of switching costs on customer loyalty exists. Through the study of online banking customer behavior, using the concept and scale of switching costs in Burnham et al. (2003) proposed the antecedent and outcome variables of switching costs. His research results also proved that switching costs had a significant positive impact on customer loyalty.

The cost incurred before switching suppliers is mainly the risk perceived by the customer. This type of cost is mainly due to the customer's anxiety or anxiety caused by the uncertainty of the products or services provided by the new supplier. This cost is more obvious in the conversion of trust and experience-based products. So, a stable business in the highly competitive and volatile business-to-business market was a strategic priority for many companies. It was a common strategy for companies to retain customers by setting conversion barriers (that is, by increasing switching costs) (Matzler, Strobl, Thurner, & Füller, 2015).

In summary, the previous literature has partially involved the definitions, types, and influencing factors of switching costs. However, the industries studied are mainly concentrated in the traditional market environment, such as banking, credit card, and communications. This Leads to the limitations of switching costs research. Moreover, users in different industries are different, and switching costs have different effects on their willingness to use. Therefore, this study will research the switching costs in the mobile food delivery industry under the new Internet environment from the perspective of different market environments, different industries, and users, which try to see how switching costs affect customers' continuous use intention.

It is difficult to retain customers for a long time because the software products of different companies have strong substitutes, the user groups are relatively concentrated, and the cost of software use is low, switching costs for mobile food delivery users is low. Therefore, it is extremely urgent to study the problem of the switching costs of mobile food delivery app customers and the customer's continuous use intention. Regarding the conversion cost of mobile food delivery in this study, people pay more attention to the switching costs in order to complete the conversion of mobile food delivery app, including various output such as finding suppliers, evaluating suppliers' products or services, and making decisions, which can be money, energy, and physical effort. At the same time, customers will take into account the loss of various points and other preferential activities that have been accumulated in the previous mobile food delivery app (Shah, Yan, Shah, & Ali, 2020). The higher the switching costs, the customer will naturally influence whether to switch to other mobile food delivery apps, which also encourages customers to continue to use the current mobile food delivery app. In many scenarios, consumers who switch from one mobile food delivery app to another are mostly influenced by the people around them. This requires a look at the role of herd behavior, the moderating variable introduced in this article.

### 2.5.3 Herd Behavior

The content above mentioned user behavior-related theories and models may include the user's own specifications, or the judgment of the product used, but do not include consideration of the user's environment (use scenario). For mobile food delivery customers, in the behavioral decision of whether to use mobile food delivery apps, the environment was not the traditional natural environment, but the user environment in which the surrounding relatives and friends and the majority of mobile netizens use which one mobile food delivery app (Shen, Zhang, & Zhao, 2016). At this time, the user's decision-making behavior is not completely controlled by personal willpower, nor can it be completely attracted by mobile delivery meals. At this time, the meaning of the herding effect and subjective norms will be somewhat close. Subjective norms were the social pressure that an individual feeling about whether to take a specific behavior. It was the influence given by an individual or

group that had an influence on an individual's behavioral decision whether an individual took a particular behavior (Cont & Bouchaud, 1997). It could be seen that subjective norms emphasized that individuals felt social pressure and were a moral standard and code of conduct that needed to be considered when individuals took actions. The herd effect in this study only refers to the environment in which users live. It will attract someone to use a certain mobile food delivery app used by relatives, friends, and the vast number of mobile netizens around. When users follow the crowd, there are no restrictions on ethical standards and codes of conduct. Therefore, herd behavior in this study and subjective norms are still different.

Research on herd behavior has been extended to Internet user behavior in recent years. When the popularity of the software exceeded a certain level, the installation behavior of the user who had installed a certain software would be observed and imitated by subsequent users (L. H. Kwon, Wats, & Rosendorff, 2017). For example, netizens collectively will spread a certain social hot spot on a large scale, users will tend to use the same information system as others, etc (X. Y. Liao, 2017). The mobile food delivery app is an information system, and the behavior of the first users (old users) will be used as a decision-making reference for the latecomers. The behavior of latecomers using the information system will also be observed and strengthened by the former. The mutual local influence (such as a local network formed by family and friends) gradually expanded to a larger range (such as between netizens) (P. Li, & Zeng Y., 2015). Based on this, this study believes that users' continued use behavior will still be affected by the closed-loop environment formed after the user's adoption behavior -- the herd effect, which caused user behaviors to affect each other.

2.5.3.1  Overview of Herd Behavior

Herd behavior originally originated in the field of social psychology. Later, scholars extended it to the study of consumer behavior in the social economy. The most primitive herd behavior refers to the behavior of animals in groups in search of food or migration. Group views were enough to shake any skeptical personal views, group power could obviously make rational judgments useless.

In the 1930s, Macroeconomist Keynes analyzed the investment decision-making behavior of investors with incomplete information symmetry and the

uncertain future environment from a psychological perspective and proposed the herd behavior theory. Social psychologist (Samar, Ghani, & Alnaser, 2017) believed that herd behavior was a manifestation of individuals being socially influenced by other members of the group. Banerjee (1992) proposed to define herd behavior as a phenomenon in which individuals blindly imitated the behavior of others and ignore their own information. Individuals often observe or refer to others when making decisions. When individuals change their behavior under group pressure, it is herd behavior. The herd behavior mentioned in their research was roughly the same as that of scholar P. Li and Zeng (2005). It was believed that the herd behavior referred to that when people make decisions, they could not collect enough relevant information for analysis due to limited energy. In order to avoid risks and obtain the most satisfactory results, they would be affected by the behavior of others and imitate the decision-making behavior of others. X. Y. Liao (2017) proposed that in terms of human social behavior, the herd behavior phenomenon mainly referred to the consistency of individual decision-making with most people's behavior. So far, the herd behavior has no precise definition in theory.

Few scholars have studied its influence on users' continuous use intention, this study introduces the herd behavior into the research framework to explore its impact on the continuous use intention of mobile food delivery app users. According to scholars' research on the herd behavior, the definition is given as: In the process of using mobile food delivery app, users ignore their own information and adopt consistent behaviors toward the continued use of a certain mobile food delivery app used by others.

2.5.3.2 Empirical Research on Herd Behavior

So far, empirical research on herd behavior has mainly focused on three aspects: existence test, behavior motivation, and empirical research model.

(1) Research on Existence Test of Herd Behavior

The early research on herd behavior mostly focused on the existence of herd behavior in the financial market. Later, with the development of information technology, it gradually extended to be applied to the Internet field. When Wermers (1999) studied the behavior of buying and selling stocks in the Hong Kong stock market, through empirical analysis, they found that selling stocks had a more

obvious herd behavior than buying stocks. J. and F. (2001) found that the comments of stock critics in the stock market had an important influence on the decision-making of individual investors, and the latter would show obvious herd behavior. Tan, Chiang, Mason, and Nelling (2008) studied the state of public sentiment in the Chinese stock market and found that the herd behavior existed in both bullish and bearish markets. The research of X. Zhang, Luo, and Li (2012) confirmed the effect of herd behavior in the microfinance market. There is also an effect of herd behavior in the Internet field. For example, in a virtual environment, people are more willing to listen to songs with a high download rate and eat meals with a high recommendation rate. And platform information, project information, and borrower information were the factors that influence this behavior. D. Zheng, Zhang, and Jiang (2018) studied consumer behavior in online shopping through behavioral experiments. It was found that consumers would adjust their judgments based on the selection behavior of others and the quality information of the products they needed, which proved that there was the effect of herd behavior in online shopping.

(2) Research on Behavior Motivation of Herd Behavior

In people's actions on information systems X. Li (2004) found that when rational individuals ignored their private information and imitated the behavior of previous decision-makers, it might lead to herd behavior. P. Li and Zeng (2005) pointed out that investment behaviors were more likely to be triggered when the information was uncertain, resulting in herd behavior. W. Cui (2009) also found that information asymmetry might lead to herd behavior. Wang and Greiner (2010) studied the investment behavior in the P2P lending market and found that some non-professional lenders would ignore certain existing information when the funds borrowed in the market reach a certain level. Thereby they would imitate the investment behavior of their predecessors which was herd behavior. F. Zheng, Zhao, and Zhang (2015) found that the mechanism of herd behavior included imitation behavior. Hanjaya, Kenny, and Gunawan (2019) found that under the condition of incomplete information, the decision of the first investor after being observed by the later investor would affect the decision of the latter, which resulted in herd behavior.

In the modeling and simulation of the influence of consumer opinion leaders in a social network environment based on system dynamics, Tang,

You, Jones, Tsao, and Tsang (2018) proposed that the herd behavior was mainly centered on information and the decision-making behavior of predecessors.

(3) Empirical Research on the Herd Behavior

Regarding the discussion of the conditions for herd behavior, scholars have gradually turned to rigorous model verification. Ying, Wu, and Deng (2009) proposed that when analyzing investor behaviors in different stock markets in different environments, they constructed a cellular automata evolution model and analyzed the imitation of stock market investment behaviors through this model.

The herd behavior is more commonly used in social media. Uzzi, Amaral, and Tsochas (2007) analyzed the adoption of new applications by users on Facebook and found that there was a clear threshold of adoption rate between popular software and ordinary software. When the software adoption rate reached the threshold, the user's willingness to adopt the software completely imitated the behavior of other users, showing an obvious herd behavior. Han and Kim (2017) pointed out that when users pursue a sense of identity caused by herd behavior, it would strengthen the influence of initial motivation on users' continued use. H. F. Qi (2010) researched on domestic consumers' herd behavior and found that, unlike the negative herd behavior in the West, Chinese herd behavior was mainly positive and self-adjusting. It was consumers who want to adopt strategies resulting from the purpose of group rapport to maintain or establish relationships with others.

H. Sun (2013) combed through the related literature of herd behavior and pointed out that herd behavior could describe the user's behavior on using new technology by the two variables of imitate others and not fully believing in their own information. discovered Both network externalities (the utility obtained by users using the network is proportional to the total number of users in the network) and herd behavior had a positive impact on users' continuous use intention of using social applications. Among them, incomplete variables of not fully believing in their own information were the main reason that the herd behavior enhanced users' continuous use intention. In the field of consumer behavior, scholars' research on herd behavior is mainly on the attitude or initial willingness to adopt the herd behavior to products or services. The evolution model of the herd behavior in the stock market was constructed based on the strategy of network proximity selection, and the

evolution characteristics of the herd effect were analyzed based on this (Bian, Li, & Xu, 2017).

Many scholars have found that the decision-making behavior of online network users is easy to follow the trend and refer to others, which has obvious herd behavior. First of all, because of the asymmetry of network information, users have less information, and are easy to get lost in decision-making; Secondly, users can easily obtain relevant information on the Internet and observe the choices of other users. In the research on the user's continuous use intention of mobile short video apps, the herd behavior was used as a moderating variable. She believed that herd behavior played a moderating role between the relationship the user perception (perceived usefulness, perceived ease of use, perceived interest) and satisfaction (Yin, 2019).

Therefore, in summary, from the understanding of the herd behavior theory to the verification of the existence of the herd behavior theory, And in the empirical research on the behavioral motivation and the effect on herd behavior, It showed that the herd behavior is easier to apply to the research of consumer behavior in the field of financial investment. The herd behavior had an important influence on the adoption of information systems, consumer online shopping behavior, investor decision-making behavior, and the development of online public opinion. It had become a key research issue in the field of consumer behavior (Bikhchandani & Sharma, 2000). With the development and popularization of the Internet today, this herd behavior will gradually affect consumers from all walks of life.

Considering that customers decided to choose this mobile food delivery app to buy food and beverages because many people chose this mobile food delivery app; Customers found that many people they knew buy food and beverages from this mobile food delivery app, so they were more willing to buy food and beverages in this mobile food delivery app; The more people bought meals from this mobile food delivery app, the more customers were willing to choose this mobile food delivery app; When buying meals from mobile food delivery, it was wise to choose a mobile food delivery app that everyone else was using (Handarkho, 2020).

## 2.6    The Theoretical Framework and Hypotheses

### 2.6.1    Theoretical Framework of Consumers' Continuous Use Intention of Mobile Food Delivery App

The use of mobile food delivery apps is a process of interaction between users and the system. The user's continuous use intention is not only directly affected by the user's perception, but also indirectly affected by the characteristics of the system. F. D. Davis (1989) proposed that the perceived ease of use and perceived usefulness of the system could affect the user's intention and intention to use. The information system success model (ISSM) proposed by Delone and McLean (2003) was to study the impact of system quality, information quality, and service quality on satisfaction and continuous use intention from a system perspective. They confirmed that information system quality could affect satisfaction, and then affect the user's continuous use intention.

At the same time, with the continuous advancement of information technology, the application field of information systems had gradually expanded from a closed system to an open system. The ability to explain simply using a certain model had declined (Alshurideh, Al Kurdi, & Salloum, 2019). Many scholars try to adjust and expand it by introducing new theories or adding new external variables and control variables. Therefore, this study introduced the influence of customers' perceived risk, switching costs, and herd behavior according to the actual situation.

With the construction and popularization of mobile networks, there is endless literature on consumer behavior researching mobile food delivery. In the literature on the continuous use intention by many scholars, there is no unified theoretical framework for analyzing the continuous use intention of information systems. Most scholars moderately adjusted research frameworks in other fields, and then conducted empirical research on a specific information system (T. H. Kwon & Zmud, 1987). In order to make up for the shortcomings of the technology acceptance model (TAM) that cannot measure the advantages and disadvantages of information systems. This study also introduces the information system success model (ISSM). Be more convincing in the explanation of consumers' continuous use behavior, this study introduces an expectation confirmation model (ECM). Therefore, in a risk-perceived

environment, based on the revised technology acceptance model (TAM), the improved information system success model (ISSM), and the expectation confirmation model (ECM), combined with the introduction of switching costs and herd behavior this study constructed a framework of the mobile food delivery apps about the influencing factors of customers' continuous use intention and the relationship between them (shown in figure 2.8).
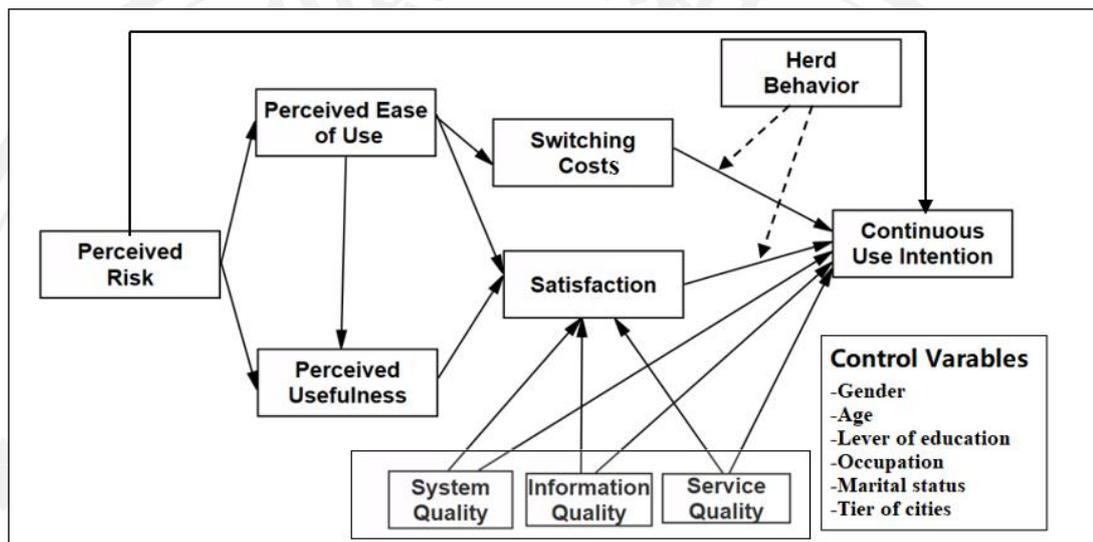


Figure 2.8  The Conceptual Framework

*Source: F. D. Davis (1989); Delone and McLean (2003);Bhattacherjee (2001)*

### 2.6.2    Research Hypothesis

2.6.2.1 Hypotheses about the Correlation Between Perceived Risk and Other Factors

Based on the previous review of relevant literature research, this study divides consumers' perceived risks in the mobile food delivery environment into privacy risks, property risks, payment risks, physical risks, time risks, and social risks.

When consumers conduct transactions on mobile food delivery apps, they usually need to establish an account on the platform. At the same time, in order to prove their identity, consumers need to fill in some of their personal information, which leads to the leakage of consumers' personal privacy risks. Cocosila and Archer (2010) found that consumers' privacy risks generally came from not only their personal privacy and security but also whether personal information remains intact.

Consumers would have perceived privacy risks because they were afraid of losing personal information, which might be leaked in mobile food delivery platforms and even the entire E-commerce transaction process (H. Li, Wu, Gao, & Shi, 2016). When consumers paid online, they needed to fill in financial information for payment. This behavior also gave cybercrimes opportunities (Miskin, 2018). The rapid development of the mobile Internet had successfully turned mobile food delivery into the most popular consumption model. However, security was also the responsibility of mobile food delivery (Chaudhry, Farash, Naqvi, & Sher, 2016). In addition, the safety of food and beverage materials for mobile food delivery, whether the packaging of the catering meets environmental protection standards, the problems of untimely delivery, and the occurrence of crimes such as rape, kidnapping, and murder caused by mobile food delivery personnel have caused psychological pressure for customers to use mobile food.

Pavlou (2003) found that perceived risk had a negative effect on users' purchase intentions. Cocosila and Archer (2010) verified the effect of perceived risk on satisfaction in the field of online banking and found that perceived risk would have a negative impact on user satisfaction, which in turn had a negative impact on users' intention to use online banking. A. Liu et al. (2018) took 340 valid questionnaire data from a large business district and nearby universities in Nanning as samples, through a field questionnaire survey, and verified that perceived risk had a significant negative impact on the continued use of mobile near-field payment users. Based on the technology acceptance model (TAM), the expectation confirmation theoretical model (ECM), and the perceived risk, F. Liu, Kanso, Zhang, and Olaru (2019) constructed and discussed the conceptual framework and influencing factors of shared bicycle users' continuous use intention. Through empirical research, they concluded that the

perceived risks had a significant negative direct impact on their continued use intentions.

As a key link in the realization of mobile food delivery, the mobile food delivery app platform gathers a large amount of offline food delivery business information, catering information, and user information. It is possible to make a point-to-point connection between supply and demand parties. Therefore, the reliability of the mobile food delivery platform will have an important effect on consumers. A higher risk of information sources would reduce users' perception of the ease of use and usefulness of mobile food delivery (Wai et al., 2019). In the process of information gathering for mobile food delivery and ensuring the quality, the platform will inevitably screen information resource providers and eliminate resources with potential safety hazards. This greatly reduces the search cost of consumers and contributes to consumers with a guarantee about the experience. The reliability of the platform has also become a direct factor in consumer perception. Once there was a problem with the platform, it would send consumers a signal that the platform was not safe. Consumers would feel that the consumption of mobile food delivery was not easy to use. At the same time, the information provided by the platform would lose its usefulness to consumers (Y. N. Lee et al., 2019). In this way, consumers no longer rely on platforms to obtain catering services and even gradually alienate mobile food delivery apps. Although mobile food delivery greatly saves customers' time and energy and brings a lot of convenience to customers, its potential safety hazards cannot be ignored. Therefore, this study proposes the following hypotheses:

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;

2.6.2.2 Hypotheses About the Correlation Between Perceived Ease of Use and Other Factors

Customer perceived ease of use was the subjective perception of how easy it is for customers to use a certain information system (J. C. Davis & Sampson,

1986). This study specifically referred to how difficult for individual customers to perceive the process of using mobile food delivery apps to buy catering online. F. D. Davis (1989) pointed out that perceived usefulness affected behavioral intentions through two paths: On the one hand, it had an indirect impact on behavioral intentions by influencing perceived usefulness. It was confirmed that perceived ease of use would increase as perceived usefulness increases. On the other hand, it will directly affect behavioral intentions. In the TAM, perceived ease of use had been shown to have a positive impact on perceived usefulness and had a direct positive effect on individual consumption and usage attitudes, thereby affecting behavioral willingness (Grover, Kar, Janssen, & Ilavarasan, 2019; Hanjaya et al., 2019). For those learners who think that the mobile food delivery app is easier to buy and catering online, it is more conducive to promote this type of user to use the mobile food delivery app as a live service tool. And because of the ease of use of the information system, a good attitude and a stronger continuous use intention of using mobile food delivery apps can be generated.

It takes a certain amount of time and energy to convert all personal registration information from one mobile food delivery app to another. If you switch to a new app, membership and point policies need to start from scratch. To adapt to new software and its new operating procedures, the long-standing relationship between users and the website needs to be re-established. These are the switching costs that users need to pay. However, if customers were more adaptable to cognitive and proficient application software, the less time and energy the customer would waste in using this information system and it would make their switching costs lower (Samar et al., 2017). Therefore, the higher the customer's perceived ease of use, the lower the switching costs. Therefore, this study proposes the following hypotheses:

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.

2.6.2.3  Hypotheses of the Correlation Between Perceived Usefulness
            and Satisfaction

The hypothesis of the correlation between perceived usefulness and satisfaction

In the context of mobile food delivery app, perceived usefulness refers to the usefulness of the mobile food delivery platform perceived by customers when using a mobile food delivery app to save time, energy, and improve quality of life. Perceived usefulness would not only affect customers' initial adoption of information systems but also affect customer satisfaction and continued use intention. Teo and Yeong (2003) have shown that whether the online shopping process is convenient will affect consumers' perceived value. Jarvenpaa and Todd (1996) showed that consumers' feeling of saving time and effort in online shopping would affect their purchase intention. A lot of relevant research on the context of e-commerce such as Chang G.L. (2017). Pan and Jones (2018) confirmed that perceived usefulness could not only directly affect users' continuous use intention, but also indirectly have a positive effect on users' continuous use intention through satisfaction.

On the contrary, if the quality of life of the customer cannot be improved after using the mobile food delivery platform, they will have a negative evaluation of the mobile food delivery platform. This will affect their overall evaluation and reduce their continuous use intention. Based on this, this study proposes the following hypotheses:

H7: The Perceived Usefulness Has a Positive (+) Effect on the Satisfaction;

2.6.2.4  Hypotheses about the Correlation Between System Quality,
            Information Quality, Service Quality, and Other Factors

The revised information system model shows that the information system quality, service quality, and information quality perceived by users are the antecedent variables of user satisfaction (Delone & McLean, 2003). In the field of mobile value-added services, Kuo, Wu, and Deng (2009) confirmed that perceived quality positively affected consumer satisfaction. Bou-Llusar, Camisón-Zornoza, and Escrig-Tena (2001) divided the perceived quality into two dimensions: perceived product quality and perceived service quality. The results showed that perceived

quality positively affected satisfaction, the two were used as intermediate variables to affect consumers' repeat purchase intention. On the use of employee portals Urbach, Smolnik, and Riempp (2010) proved that information quality was positively related to user satisfaction. Also based on the ISSM, X. Zhang et al. (2012) conducted a study on the continuous use intention on using mobile service users. The results showed that the quality of information and service quality would significantly and positively affect satisfaction and continuous use intention. Xie (2016) conducted research on the influencing factors of user labeling behavior in university libraries. It was found that service quality had a significant and positive effect on satisfaction, and satisfaction had a positive effect on users' willingness to label.

The mobile food delivery platform belongs to the information system. In this system, consumers complete multiple links such as browsing, ordering, and payment. The user's perception of the quality of the platform is direct and concrete. The stable and smooth performance of the mobile food delivery app platform during operation and other good system quality, as well as the interface settings that conform to the aesthetics and usage habits of the most of consumers, would be more convenient for more consumers to use. There were many phenomena such as it was not easily dropped during use, The system's non-jamming, simple and its easy-to-operate interface would enhance its perception of ease of use, it could improve customer satisfaction, and increase its continuous use intention (A. P. Oghuma, Chang, Libaque-Saenz, Park, & Rho, 2015).

Due to the particularity of mobile food delivery apps that are closely related to a healthy diet, the quality of the information content, and functions provided in the app have attracted special attention from consumers. If the mobile food delivery app provides a lot of false information or advertisements, or the function settings are obviously unprofessional and unreasonable, it will make customers doubt the professionalism and credibility of the app, and make them unwilling to continue using the health app. On the contrary, it will enhance the professionalism and credibility of the app. It means that customers will feel higher usefulness, obtain higher user satisfaction, and increase their continuous use intention.

At the same time, users will involve a lot of private information or paid services in the process of using mobile food delivery apps. For the new generation of

consumer groups with a strong awareness of rights protection, good quality of pre-sales and after-sales services, including various service qualities of offline mobile food delivery merchants, mobile food delivery platforms, and mobile food delivery personnel, would help promote their apps have a more useful perception of themselves, improving their satisfaction, and further enhances their continuous use intention (J. Qi, Du, Siniscalchi, & Lee, 2019). Therefore, this study proposes the following hypotheses:

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

H9：The information quality has a positive (+) effect on 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.

2.6.2.5 Hypotheses About the Correlation Between Satisfaction and Continuous Use Intention

A large amount of literature showed that consumer satisfaction would significantly affect the willingness and behavior to continue buying or using (Patterson & Spreng, 1997). Reichheld and Sasser (1990) pointed out that consumer satisfaction would increase their loyalty, which means that no matter how willing consumers were, satisfied consumers would increase their purchase frequency and purchase volume.

Barich and Kotler (1991) believed that after the consumer's purchase behavior occurs, there would be feelings of satisfaction or dissatisfaction. If they were satisfied, consumers would have a higher tendency to repeat purchase; if they were not satisfied, there would be no repurchase behavior. These relationships were more obvious in the network environment. Through an empirical study of online game players, Otsuka (2018) found that the higher the player's satisfaction with online games, the higher their willingness to continue using the game. Kuo et al. (2009)

studied the direct impact of satisfaction on the continuous use intention in the field of mobile reading. The research results showed that users' satisfaction with mobile reading services was directly proportional to their attitudes towards mobile reading services. The more satisfied customers are with the experience and experience evaluation of the mobile food delivery app they use, the stronger their intention to continue to use the mobile food delivery app. Therefore, this study proposes the following hypotheses:

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

### 2.6.2.6 Hypotheses About the Correlation Between Switching Costs and Continuous Use Intention

It is an important marketing strategy for online retailers to increase switching costs to retain customers. However, research on the role of switching costs barriers in e-retailing is still limited. Z. Yang and Peterson (2004) put forward in an empirical study on the influencing factors of customer loyalty in an e-commerce environment: Customer loyalty mainly depended on customer satisfaction and perceived value. The switching costs significantly affected customer loyalty. Through empirical research on e-commerce, Burnham et al. (2003) gave research conclusions: Factors such as switching costs and customer satisfaction worked together to affect customer loyalty. Switching costs and customer satisfaction were the main drivers of customer loyalty. K. Lee et al. (2009) explored the relationship between customer interface quality, customer satisfaction, switching costs, and other driving factors and e-loyalty. Through the built electronic loyalty driving model, they found that the switching costs had a positive effect on customer electronic loyalty. L. Kwon, Lee, Hwang, Radermacher, and Kim (2014) used online retail stores as the research object and demonstrated that switching costs had a direct positive effect on customer loyalty.

In literature research, scholars often use it to study its influence on dependent variables. Users often consider switching to another information system for various reasons after the initial acceptance and use of the information system, so as to influence the situation of the dependent variable. Therefore, this study considers switching costs as an intermediate variable. In a perceivable risk environment, the

switching costs are used to consider the influence of customers' continuous use intention of using the mobile food delivery app with different perceived ease of use.

El-Manstrly, Kandampully, and Duddy (2016) showed that switching costs affected the relationship between customer loyalty, trust, and perceived value in different ways. In addition, the intensity of the effect of switching costs varied with the type of service of switching costs. Baloglu, Zhong, and Tanford (2017) developed and tested a customer loyalty model in a casino situation. They found that switching costs significantly affected customer satisfaction and customer loyalty. Ghazali, Nguyen, Mutum, and Mohd-Any (2016) researched data collected from a survey of 590 online retailer shoppers in the UK and found that switching costs had a significant positive impact on customer loyalty. J. Cui et al. (2018) empirically verified that switching costs had a positive and significant impact on customers' continuous use intention. Therefore, this article proposes the following hypotheses:

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

2.6.2.7  Moderating Effect of the Herd Behavior

The herd behavior refers to users who are influenced by other users and imitate others. They ignore their own information and take actions consistent with others while using mobile food delivery apps. Hong and Xu (2015) found that under the effect of the herd effect, in order to integrate into the group, users use the application to achieve their own goals. It would also affect the user's rational perception of satisfaction with the application, thereby further affecting the continuous use intention.

In terms of the influence of herd behavior, imitation behavior was one of the producing mechanisms of herding behavior. The uncertainty of information could easily induce users to produce the phenomenon of herd behavior (P. Li & Zeng, 2005). Herd behavior was the key elements affecting the investment behavior of stock market investors from the network perspective (Bian et al., 2017).

Hong and Xu (2015) researched user behavior of mobile social applications shows that the user's decision-making behavior was significantly affected by imitating others. Their information that did not fully believe in positively affects their continuous use intention. X. J. Xu et al. (2016) found that herd behavior

had a positive impact on users' continuous use intention on using social applications. Based on the related theories of herd behavior and information waterfall, L. Zhao, & Zhang, J. (2013) researched on the influencing factors of Weibo users' herd behavior showed that: The credibility of the personal information affected the confidence of users' information judgment; The credibility of public information affected users' attitudes; The more clear the attitude of the existing participants, the more the user behavior was affected by the former, and the more likely herd behavior would occur. Cao, Capozzi, Kjellerup, and Davis (2019); Yin (2019) researched the continuous use intention of social networks show that herd behavior played a moderating role in the effect of perceived usefulness on the continuous use of dependent variables.

The continuous use behavior studied in this study is the re-adoption behavior after the user adopts the behavior. This study combined existing research results to speculate: Imitating others will cause users to have corresponding behaviors. The more users use behavior, the more the platform knows about users, and the more personalized services provided to users through big data analysis can meet users' expectations. Therefore, user satisfaction can be gradually cultivated, thereby strengthening the user's continuous use intention. Based on the research results of scholars, it has real meaning to take the herd behavior as a moderating variable and consider the moderating effects of the relationship between satisfaction and continuous use intention, and the relationship between switching costs and continuous use intention.

This study assumes that the mobile food delivery apps used by surrounding users are different from the mobile food delivery apps used by the sample. This study believed that herd behavior in the theoretical framework of the mobile food delivery app constructed in this study may have the following conditions:

For high switching costs or high satisfaction, if the herd behavior is high, customers will have a herd mentality and choose to use other mobile food delivery app. The continuous use intention is low. As a result, the herd behavior plays a negative moderating role. if 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. At this time, the moderating effect of herd behavior does not exist.

For low switching costs or high satisfaction, if the herd behavior is high, customers will have a herd mentality and choose to use other mobile food delivery app. The continuous use intention is low. As a result, the herd behavior plays a negative moderating role. In the case of low switching costs, when the herd behavior is low, the willingness to continue using other mobile food delivery app is low, and the herd behavior has no moderating effect. In the case of low satisfaction, when the herd behavior is low, the willingness to continue using other mobile food delivery app is low, and the moderating effect of the herd effect still does not exist.

Therefore, this study proposes the following hypotheses:

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 the continuous use intention.

In summary, the 17 hypothetical relationships among the ten variables in this article are as follows (shown in Figure 2.9).
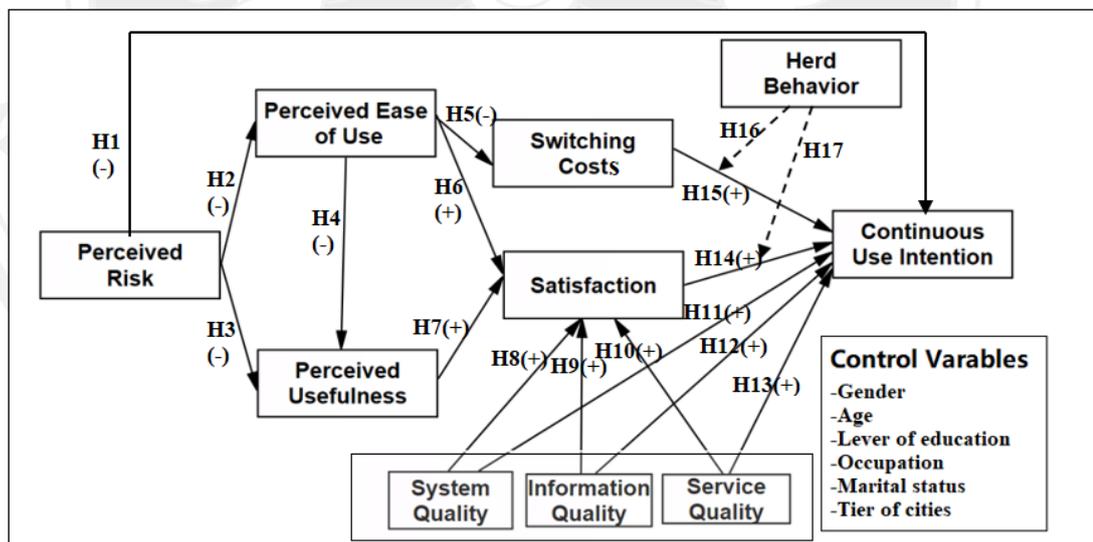


Figure 2.9  Hypothetical Relationships of the Theoretical Framework

## 2.7 Chapter Summary

Through the above review of classical theoretical models and related literature research, it can be seen that many well-known scholars have already had a certain depth and breadth in the study of continued use intention. The theoretical framework of this study is developed from common user behavior models. Its application is more universal.

Since the mobile food delivery app has gradually developed in recent years, its starting point in practice and research is relatively late. So, there are not many related research results. However, many international scholars have explored apps in many aspects, using qualitative and quantitative methods to explore. Among them, the content analysis method and structural equation method are mainly used to conduct research mainly from the evaluation indicators of apps, service content and market development, user satisfaction, and continuous use. The food delivery app is a subdivision of mobile services. the revised TAM and the improved ISSM model and ECM are used to combine the research to study, which obviously has good applicability.

In an environment of perceived risk. This study is inspired by the development path of TAM and ISSM then to switching costs. It is believed that when mobile food delivery apps first appeared, there are other types of apps in the mobile app market, such as apps or entertainment apps. After initial adoption, users would judge their willingness to continue using them based on the evaluation after use. And many users will be influenced by other users to produce herd behavior. Nowadays, this type of app has attracted a lot of users. How to improve user satisfaction and switching costs to retain these users has become a key consideration for its operators.

In the above, this study summarized the influencing factors of the various types of customers' continuous use intention. Considering antecedent variables, it is found that the existing influencing factors are not completely suitable for the object of this study. based on existing research results, in an environment of perceived risk, this study introduced ten variables: perceived risk, perceived ease of use, perceived usefulness, system quality, information quality, service quality, switching costs, satisfaction, herd behavior, continuous use intention. This article combines the

characteristics of mobile food delivery app users and considers the influence of the surrounding environment. This article summarizes the factors that may have a significant impact on the continuous use intention of mobile food delivery apps. It is formed that the Conceptual Framework and hypothetical path are used in mobile food delivery apps.

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# CHAPTER 3

# RESEARCH METHODOLOGY

The research method used in this study is quantitative. There are ten sections in this chapter: 3.1 The quantitative research methods; 3.2 Specific explanations of the variables; 3.3 The questionnaire design of this article; 3.4 The situation of the research objects; 3.5The sampling method; 3.6 The sample situation; 3.7 Data collection tools; 3.8 Data analysis tools; 3.9 The adjustment of the pre-investigation and the adjustment of question items; 3.10 The preliminary data verification in the pre-investigation.

## 3.1 Quantitative Research Method

When analyzing the influencing factors of consumers' continuous use intention on using mobile food delivery apps, according to the specific situation, this study adopts a quantitative research statistical analysis method that is currently popular in the research fields of behavior and sociology: PLS-SEM (Variance analysis method based on partial least squares). SEM: (Stuctural Equation Modeling), PLS: (Partial at Least Square Method). This is a statistical model and method for multivariate analysis through hypothesis testing. PLS-SEM combines multiple statistical methods such as factor analysis and path analysis which can establish, identify, estimate, and verify causal relationship models. Compared with the previous regression analysis method, the structural equation model has obvious advantages. It

can not only process multiple dependent variables but also estimate factor structure and factor path relationships at the same time.

The PLS-SEM model requires researchers to construct a hypothetical theoretical model based on theory or empirical rules. The latent variables in the model are measured by the measurement scale to obtain data for empirical analysis. And then the structural equation model can be used not only to test the measurement model but also to measure the structural model.

This article first selects SPSS to test the pre-test samples. The sample size of the pre-test can be five times the questionnaire item (Wolda, 1981). The total questionnaire in this study is 60 items, so more than 300 items can be selected for the prediction sample. Firstly, this study conducts a descriptive statistical analysis of the pre-test sample information to get a preliminary understanding of the distribution of the sample; Secondly, this study uses the reliability analysis method to test the reliability of the pre-test sample mainly choosing Cronbach's α coefficient for internal consistency test. Thirdly, combining the two indicators of "CITC total correlation of correction items" and "Cronbach's α coefficient with items deleted", this study judges whether the questionnaire needs further adjustment and correction. Fourthly, this study tests whether the data can be subjected to factor analysis whose indicators are KMO and Bartlett sphericity test. The preliminary test is used to whether the scale meets the research needs, the reliability, and validity of the data.

After the data collected in the pre-test passed the requirements, this study uses Warp-PLS to test the reliability and validity of the large sample measurement model of the formal survey; Then this study will perform model suitability test and structural model path analysis and determine whether the theoretical model fits the actual data based on the model parameters (If "not suitable", the model may need to be revised according to the actual situation). On these foundations, this study will make a significant judgment on the theoretical path relationship hypothesis to test whether the

proposed theoretical hypothesis is supported. Last this study will explain and discuss the empirical results.

## 3.2 Variable Explanation

In view of basic concepts and basic theoretical literature, this study introduces ten variables: perceived risk, perceived ease of use, perceived usefulness, system quality, information quality, service quality, switching costs, satisfaction, herd behavior, continuous use intention. The summary of related variables is shown in Table 3.1.

Table 3.1  Summary Table of Related Variables

| Model Composition | Variables |
|---|---|
| **Independent variables** | perceived risk, system quality, information quality, service quality; |
| **Mediating variables** | perceived ease of use, perceived usefulness, switching costs, satisfaction |
| **Moderating variable** | herd behavior; |
| **Dependent variable** | continuous use intention. |

### 3.2.1  Dependent Variable

The dependent variable in this study is the continuous use intention. The earliest research about continuous use intention started by Oliver (1980). When Oliver studied customer satisfaction with products and after-sales service, he found that users' perception of products and services affect their willingness to buy products again. S. W. Lee et al. (2019) believed that customers would predict the benefits they would bring before buying products. And after the purchase and use, they made a

personal judgment and compared the prediction before the purchase. If they are satisfied with the expected goal, you will choose to renew the purchase.

After that, the continuous use intention has been studied many times. In the research on information systems. Bhattacherjee (2001) believed that after the user uses the information system for the first time and had the willingness to use the system again, it was the continuous use intention. Bhattacherjee is the first scholar to propose this concept in the field of networking. Based on previous studies, this study defined the customer's continuous use intention as shown in Table 3.2.

Table 3.2  Definition of Customers' Continuous Use Intention

| Variable | Concept Meaning | Theoretical Source |
|----------|-----------------|--------------------|
| *Continuous Use Intention (CUI)* | *Customer's subjective willingness to continue to access or use the original mobile food delivery app after initially accepting a certain mobile food delivery app.* | *(Bhattacherjee, 2001; S. W. Lee et al., 2019).* |

### 3.2.2  Independent Variables

There are four independent variables involved in this study: perceived risk, system quality, information quality, service quality.

3.2.2.1  Perceived Risk

Perceived risk in this study refers to consumers' subjective expectations of the uncertainty and consequences of purchase results when considering mobile food delivery app. It can also be further explained that in the consumer's purchasing decision process for mobile food delivery, the uncertainty of the external and internal environment and wrong purchasing decisions will cause

consumers to be negatively affected to varying degrees. Therefore, consumers will be aware of risks during the shopping process.

Stone and Grønhaug (1993) defined risk perception as "the subjective expectation of loss". Consumers' expectations of loss are inversely proportional to their perceived risks. Grewal, Gotlieb, and Marmorstein (1994) believed that perceived risk was "the possibility of loss." Mitchell and Boustani (1994) proposed a shopping decision theory based on consumers' perceived risk. He believed that at all stages of the purchase process, consumers were taking a certain degree of risk. In the purchase process, every consumer is trying to avoid or reduce the perceived risk. Due to the impact of perceived risk, consumers will change, postpone, or cancel their purchase decision. Based on the traditional definition of risk, Lim (2003) defined the perceived risk of online shopping as the degree of loss that consumers may suffer if they purchased products or services through the Internet. Perceived risks were the psychological feelings and subjective perceptions of objective risks encountered by online consumers in the process of purchasing products. Objective risks here included product performance risk, physical risk, financial risk, privacy risk, psychological risk, time risk, and service risk (Han & Kim, 2017). These risks are the uncertainty that consumers perceive during online shopping. It includes the uncertainty of purchase results and the severity of wrong purchase decisions

Combining the above definitions, this study defines perceived risk as Consumers' subjective expectations of the uncertainty and adverse consequences of this shopping method when they consider using a mobile food delivery app to buy meals (shown in Table 3.3).

Table 3.3  Definition of Perceived Risk

| Variable | Concept Meaning | Theoretical Source |
|---|---|---|
| *Perceived Risk* | *In the consumer's purchasing decision-making process of mobile food delivery app, the uncertainty of the internal and external environment and the negative impact of erroneous purchasing decisions on consumers have led to varying degrees of negative impact.* | *(Han & Kim, 2017)* |

### 3.2.2.2  System Quality

DeLone and McLean (1992) stated that ISSM was a model for the smooth application of information systems which was also the theoretical and practical basis for system quality to become a basic variable. Some scholars refer to this mode as the detection and control of the information system itself. On the basis of previous studies, Wixom and Todd (2005) put forward the two most critical measurement dimensions of system quality which were availability and reliability.

Based on the research results of scholars and combined with the performance of mobile food delivery apps, this paper incorporates availability and reliability into the measurement dimensions of system quality in mobile food delivery apps. Among them, accessibility refers to the response speed of using mobile food delivery apps when the network is good. Reliability refers to whether the mobile food delivery app runs smoothly and stably during the reuse process (M. Y. Zhang, 2018). In addition, as a platform for users to obtain information, book meals, and exchange private information in the mobile Internet era, mobile food delivery apps are also an important dimension to measure the quality of their system (Gui, 2017).

Therefore, this study defines the system quality as the interface friendliness, easy availability, stability, reliability, friendliness, and payment security of the mobile food delivery apps.

Based on previous studies, this study defines the system quality as follows (shown in Table 3.4).

Table 3.4  Definition of System Quality

| Variable | Concept Meaning | Theoretical Source |
|---|---|---|
| System Quality | The interface friendliness, easy availability, stability, reliability, friendliness, and payment security of mobile food delivery apps. | (DeLone & McLean, 1992; Gui, 2017; M. Y. Zhang, 2018) |

3.2.2.3  Information Quality

The original source of the variable of information quality was also ISSM proposed by DeLone and McLean (1992). It is interpreted as the measurement of information in a particular information system. On the basis of absorbing and learning results, C. L. Hsu, Lu, and Hsu (2007)  further pointed out that the information quality of network products could be measured by using indicators such as readability, richness, and timeliness of the information.

Based on the research results of scholars, this study incorporated the richness and timeliness of the mobile food delivery apps into the measurement dimension of the information quality of the mobile food delivery apps, combined with the self-sustainability of the mobile food delivery apps. Among them, richness refers to whether the catering information on mobile food delivery apps is rich, diverse, and complete. Timeliness refers to whether the information provided on the mobile food delivery apps is updated promptly and quickly. In addition, as a mobile platform for

consumers to obtain catering-related information, the mobile food delivery app is also an important dimension to measure the quality of its information (Hanjaya et al., 2019). Therefore, this study defines information quality as the timeliness, relevance, high quality, and accurate subjective judgment of mobile food delivery apps.

Based on previous studies, this study defines the information quality (shown in Table 3.5).

Table 3.5  Definition of Information Quality

| Variable | Concept Meaning | Theoretical Source |
| --- | --- | --- |
| *Information Quality* | The mobile food delivery app provides subjective judgments on the timeliness, relevance, accuracy, and accuracy of information. | *(DeLone & McLean, 1992; Hanjaya et al., 2019; C. L. Hsu et al., 2007)* |

3.2.2.4  Service Quality

Gronroos (1982) proposed that "service quality" is a kind of "perceived service quality", which refers to the comparison between the service expected by the consumer and the service actually perceived. Zeithaml, Berry, and Parasuraman (1996) believed that service quality was the subjective evaluation of consumers on the services provided by suppliers. This was the result of comparing consumers' subjective expectations with actual perceptions.

Compared with traditional catering, the store service is different. The mobile food delivery catering is not only the service of the mobile platform but also the service of the merchant and delivery (Y. Q. Liu, 2017). Therefore, the service quality in this article refers to the system platform service, offline merchant service,

and mobile food delivery service that consumers enjoy during the entire process of purchasing takeaway catering in the mobile food delivery apps.

In the current fierce competition in mobile takeaway catering, It is very important to improve the service quality.

This article selects evaluation indicators from the following aspects: Customer service attitude of the ordering platform, timeliness of mobile food delivery, service attitude of delivery staff, timely update of delivery information, timeliness of handling issues, effectiveness of problem remedial measures, whether it can meet the additional needs of customers, online evaluation system and so on.

Based on previous studies, this study defines the service quality as shown in Table 3.6.

Table 3.6  Definition of Service Quality

| Variable | Concept Meaning | Theoretical Source |
|---|---|---|
| *Service Quality* | *It refers to the system platform services, offline merchant services, and takeaway delivery services that consumers enjoy during the entire process of purchasing takeaway catering in the mobile food delivery app.* | *(Berry, Zeithaml, & Parasuraman, 1985; Gronroos, 1982; Y. Q. Liu, 2017)* |

### 3.2.3    Mediating Variables

3.2.3.1  Perceived Ease of Use

Perceived Ease of Use referred to the individual's subjective perception of the difficulty of using certain information technology.  It is a core variable in TAM that has an important impact on technology acceptance. In this study, perceived ease of use refers to how difficult it is for consumers to perceive an individual mobile food delivery app to order meals. If the user-perceived that a certain technology or platform

was relatively simple and convenient to use, they would explore the platform or resources more proactively, which would greatly help their work performance improvement (Yudiarti & Puspaningrum, 2018). Assuming that consumers think it's easier to use mobile food delivery apps to order meals that satisfy them, they will use the mobile food delivery app as the main tool in their daily life and apply it in all aspects of life and work. And then they will have a positive attitude and willingness to continue using them.

Table 3.7  Definition of Perceived Ease of Use

| Variable | Concept Meaning | Theoretical Source |
|---|---|---|
| *Perceived Ease of Use (PEU)* | Individual consumers perceive how difficult it is to use a mobile food delivery app to order meals. | (F. D. Davis, 1989; Yudiarti & Puspaningrum, 2018) |

3.2.3.2  Perceived Usefulness

F. D. Davis (1989)  defined perceived usefulness as the degree to which an individual believed or expected to perceive the use of a particular application system, which would improve its performance. Perceived ease of use is another core dependent variable in the original TAM model. In the use of mobile food delivery apps, this usefulness can mean that mobile food delivery apps provide customers with useful information. It provides customers with a lot of conveniences so that customers can save time and energy needed to prepare meals. It can also mean that customers want to use their favorite meals to improve the efficiency of life and work (Chen & Aklikokou, 2020). If consumers think that using the app will bring greater help to their lives and work, they will change their attitudes towards information technology, thereby increasing their continuous use intention. If learners find that their work and life have not been greatly improved after being exposed to the platform and technology many times, they will easily lose their enthusiasm for the information technology and gradually give up using it. Phillips and Sternthal (1977) believed that perceived usefulness referred to the user's subjective perception of the possibility and degree of benefit of new technology for learning, living, and working.

Combining the views of Davis and other scholars, this study defines perceived usefulness as individuals or groups who use mobile food delivery app to order food. The degree of perception of the efficiency changes brought about by mobile food delivery app is shown in Table 3.8.

Table 3.8  Definition of Perceived Usefulness

| Variable | Concept Meaning | Theoretical Source |
|---|---|---|
| *Perceived Usefulness* | *It means that mobile food delivery apps provide customers with useful information and provide customers with a lot of conveniences, allowing customers to save the time and energy required to prepare meals. It can also mean that customers want to use their favorite meals to improve their lives and work efficiency.* | *(Chen & Aklikokou, 2020; F. D. Davis, 1989)* |

3.2.3.3  Switching Costs

The research on switching costs initially focused on economics. Based on the viewpoint of switching costs, Williamson (1981)  studied the problem of how to minimize switching costs in the process of organizational exchange. He proposed that the increased cost of customers changing suppliers creates an exit barrier. In the field of marketing, Fornell (1992) was the first to introduce the concept of switching costs into customer loyalty behavior and combine the switching costs into the conversion relationship between customer satisfaction and loyalty. Switching costs are also an important factor that determines the intensity of market competition. Higher switching costs can inhibit or hinder consumers from frequently changing suppliers. It weakens the competitive motivation of enterprises to some extent.

In essence, X. C. Yang and Zuo (2008) proposed that switching costs were a kind of "deterrence" for customers to change suppliers. Only when the customer really terminates the relationship with the existing supplier and cooperates with the new supplier. Switching costs will be transformed into real "losses" and "risks." Customers often become dependent on existing suppliers.

The switching costs in this study included not only the time, manpower, and financial costs that customers need to invest in finding new suppliers, but also the money, material, and interpersonal losses that might be incurred to abandon existing mobile food delivery apps Dick and Basu (1994). And it included the psychological risks, consumption habits, and emotional costs that customers perceived when switching to a new mobile food delivery app (Yan, She, & Xiong, 2020).

Based on previous studies, this study defines the switching costs as follows in Table 3.9.

Table 3.9  Definition of Switching Costs

| Variable | Concept Meaning | Theoretical Source |
|---|---|---|
| *Switching costs (SC)* | *It refers to the time, manpower, and financial costs that consumers spend when switching from one mobile food delivery app to another, as well as the money, material, and interpersonal costs that may be required to give up the existing mobile food delivery app; The loss of relationship interruption also includes the psychological risks, consumption habits and emotional costs that customers perceive when switching to a new mobile food delivery app.* | *(Allen, 1965; Dick & Basu, 1994; Fornell, 1992; Yan et al., 2020).* |

3.2.3.4  Satisfaction

Cardozo (1965) conducted an analysis and research on customer satisfaction. He has made an in-depth exploration of the relationship between customer input, customer expectations, and customer satisfaction. He is the first person that extended the concept of satisfaction into the marketing field.

Customer satisfaction refers to the customer's perception of the degree to which the expectations or needs that are usually implicit, explicit, or must be fulfilled have been met. Combined with the situation in this study, satisfaction is the feedback of customers' satisfaction with the mobile food delivery app. It is the consumer's evaluation of the characteristics and performance of the mobile food delivery app, as well as the service level of the business. It was a psychological experience that reflected the level of satisfaction of consumers with regard to the goods or services they consumed, including the level of satisfaction that exceeded or fell below (Fang, 2018).

Customer satisfaction is essentially a variable indicator. A customer is satisfied with this thing in a certain situation. When changing a situation, it may change the customer's satisfaction. Based on previous studies, this study defines satisfaction as shown in Table 3.10.

Table 3.10  Definition of Satisfaction

| Variable | Concept Meaning | Theoretical Source |
| --- | --- | --- |
| *Satisfaction (SAT)* | *It is the consumer's evaluation of the characteristics and performance of the mobile food delivery app, as well as the service level of the business.* | *(Cardozo, 1965; Fang, 2018).* |

### 3.2.4 Moderating Variable

In this study, herd behavior is the moderating variable. Herd behavior has an important impact on the adoption of information systems, consumer online shopping behavior, investor decision-making behavior, and the development of online public opinion. Based on Banerjee (1992); Handarkho (2020) researched the herd behavior, the decision-making behavior of online users is easy to follow the trend and refer to others, with obvious herd behavior. Therefore, the herd behavior in this study refers to the degree of ignorance of the system information that consumers have already mastered when they use the mobile food delivery app. They observe the behavior of others and then adopt the same behavior as others.

This study introduces the herd behavior into the research framework and explores its influence on customers' continuous use intention on using it under different levels of switching costs and satisfaction. According to scholars' related research on the herd behavior, the herd behavior in this study is defined as the behavior of users imitating others, ignoring their own information, and adopting consistent attitudes toward the continued use of the application during the use of mobile food delivery app.

Based on previous studies, this study defines the herd behavior as follows, as shown in Table 3.11.

Table 3.11  Definition of Herd Behavior

| Variable | Concept Meaning | Theoretical Source |
| --- | --- | --- |

| | | |
|---|---|---|
| ***Herd Behavior (HB)*** | *When consumers use the mobile food delivery app to buy food and beverages, they ignore the degree of ignorance of the system information they already have and observe the consistency between the behavior of others and their behavior.* | *(Banerjee, 1992; Handarkho, 2020).* |

## 3.3   Questionnaire Development

The survey questionnaire in this study is formed on the basis of the scale. Each research variable corresponds to 4-7 measurement items. The scale development draws on the mature scales of classic research literature. In this study, the statement was modified based on the characteristics of the specific scenarios of mobile food delivery, and three review experts were invited to modify the topic design, sentence description, and structure of the scale to form a preliminary survey questionnaire. The reasons for using the maturity scale are as follows: on the one hand, it had been repeatedly tested and verified by other scholars. which had a high degree of credibility. On the other hand, it could save a lot of time (Bulmer, Gibbs, & Hyman, 2006).

The survey questionnaire in this study is divided into the following three parts, with a total of 60 questions:

Foreword: This part is mainly about the questionnaire description, paving the way for a smooth survey.

The first part is the logical options. In order to ensure the pertinence of the tested samples, this study first asks the interviewees whether they have the experience of ordering food on the mobile food delivery (website/mobile app); and then the frequency on the mobile food delivery (website/mobile app) in the last month; and whether they have used and continuously used mobile food delivery for ordering experience; and whether to recommend other people to use the mobile food delivery app the most recent use. There are five questions in this part.

The second part is the scale test questions. Aiming at the latent variables involved in this study, this study uses the Likert scale to measure the attitudes of the survey subjects. All measurement items are measured using a 7-level Likert scale (1=Strongly Disagree, 2=Disagree, 3=Basically Disagree, 4=Unsure, 5=Basically Agree, 6=Agree, 7= Strongly Agree). Brown (2011) proposed that the scale of the questionnaire design should be at least five questions, preferably seven questions. Scale test questions are the core part of the questionnaire. There are eight items about perceived risk, four items about perceived ease of use, four items about perceived usefulness, five items about system quality, four items about information quality, seven items about service quality, four items about switching costs, and five items about satisfaction, four items about the herd behavior and four items about the continuous use intention. 49 questions in total (shown in Table 3.12).

The third part is the basic information. It is mainly to understand a series of questions about the basic situation of the testee, including gender, age, education level, marital status, occupation, and city tier for demographic analysis. There are six questions                       in                       this                       part.

Table 3.12  Measurement Scales of All Variables and Their Sources

| Variable | Task | Items | Sources |
|---|---|---|---|
| **Perceived Risk (PR)** | PR1 | 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) |
| | PR2 | I am worried that the personal registration information on the mobile food delivery app will be stolen by others; | |
| | PR3 | I'm worried that the mobile food delivery purchased with the mobile food delivery app does not match the description on the platform; | |
| | PR4 | I am worried that mobile food delivery food purchased using the mobile food delivery app will cause potential harm to the body; | |
| | PR5 | I'm worried that the time from purchase to delivery using the mobile food delivery app is beyond the tolerable range; | |
| | PR6 | I am worried that ordering food using the mobile food delivery app will cause people around me to have a bad evaluation of me; | |
| | PR7 | I am worried that using the mobile food delivery app to order low-quality products or services will make me feel regret and anxiety; | |
| | PR8 | I am worried that there is too much information on the mobile food delivery app, and too much time is spent browsing and searching. | |
| **Perceived Ease of** | PEU1 | Using the mobile food delivery app, I can easily search for the mobile food delivery | |

| Variable | Task | Items | Sources |
|---|---|---|---|
| Use (PEU) | | information I need; | (Yudiarti & Puspaningrum, 2018) |
| | PEU2 | It is easy for me to learn to use the mobile food delivery app to buy food; | |
| | PEU3 | The operation process of using the mobile food delivery app shopping process is simple and easy to understand; | |
| | PEU4 | I can easily use the various functions of the mobile food delivery app. | |
| Perceived Usefulness (PU) | PU1 | I can find a lot of useful information on this mobile food delivery app I currently use; | (Cheng et al., 2020) |
| | PU2 | Using the mobile food delivery app can save me time and improve my work efficiency; | |
| | PU3 | Using the mobile food delivery app can improve my quality of life; | |
| | PU4 | Using the mobile food delivery app has brought a lot of convenience to my life. | |
| System Quality (SQ) | SQ1 | The operation process of the mobile food delivery app is clear and clear; | (M. Y. Zhang, 2018) |
| | SQ2 | The mobile food delivery app is beautifully designed; | |
| | SQ3 | The mobile food delivery app has a fast response speed; | |
| | SQ4 | The search classification of the mobile food delivery app is clear, and you can quickly find the catering you need; | |
| | SQ5 | The mobile food delivery app has good stability, you can log in at any time. | |
| Information Quality | IQ1 | The mobile food delivery app information is updated on time; | |
| | IQ2 | The mobile food delivery app provides relatively complete information; | (Hanjaya et al., 2019) |

| Variable | Task | Items | Sources |
|---|---|---|---|
| **(IQ)** | IQ3 | The mobile food delivery app can provide accurate search results; | |
| | IQ4 | The information on this mobile food delivery app is reliable. | |
| | SCQ1 | The service attitude of the mobile food delivery app customer service is very good; | |
| | SCQ2 | The mobile food delivery app dealt with the problem promptly; | |
| | SCQ3 | The portable food delivery app has a very good effect on the remedy of the problem; | (Y. Q. Liu, 2017) |
| **Service Quality (SCQ)** | SCQ4 | The customer service of the mobile food delivery app can meet the additional needs of customers; | |
| | SCQ5 | The customer appraisal system of the mobile food delivery app is very good; | |
| | SCQ6 | The delivery of the mobile food delivery app is timely; | |
| | SCQ7 | The mobile food delivery and delivery staff have a good service attitude; | |
| **Switching costs (SC)** | SC1 | I need to spend some time to find other mobile food delivery app to replace the ones I am using; | (Yan et al., 2020) |
| | SC2 | I need to lose a certain discount and choose another mobile food delivery app to replace the one I am using; | |
| | SC3 | If I uninstall the mobile takeaway app, I need to spend some time to register and become familiar with other mobile food delivery apps; | |
| | SC4 | I am not sure that other mobile food delivery apps can bring me better products and services. | |
| **Satisfaction** | SAT1 | I am satisfied with the online ordering process of mobile food delivery; | (Alalwan, 2020) |

| Variable | Task | Items | Sources |
|---|---|---|---|
| **(SAT)** | SAT2 | I am satisfied with the offline food delivery of mobile food delivery; | |
| | SAT3 | I am satisfied with the processing of mobile food delivery change orders; | |
| | SAT4 | I am satisfied with the consumer experience of mobile food delivery; | |
| | SAT5 | Compared with other consumption methods, I am satisfied with mobile consumption. | |
| **Continuous Use Intention (CUI)** | CUI1 | If I want to order a meal in the future, I will continue to consider using the mobile food delivery app I currently use; | (S. W. Lee et al., 2019) |
| | CUI2 | Even if there are other ways to order food, I will still prefer the mobile food delivery app I currently use; | |
| | CUI3 | In the future, I will use the mobile food delivery app I currently use often; | |
| | CUI4 | I will recommend this mobile food delivery app I currently use to my family and friends to use. | |
| **Herd Behavior (HB)** | HB1 | I use this mobile food delivery app for everyone around; | (Handarkho, 2020) |
| | HB2 | I chose this mobile food delivery app because it has become a popular discussion topic; | |
| | HB3 | The mobile food delivery app I chose is at the top of the ranking; | |
| | HB4 | I will pay attention to the discounts of others using mobile food delivery apps. | |

## 3.4   The Population

China Internet Network Information Center (CNNIC) (2020) reported that as of March 2020, the population of mobile food delivery users reached 398 million, accounting for 44.2% of the overall mobile Internet users.

## 3.5   Sampling Method

This study takes Chinese Mobile food delivery users as the research object. In China, the scale of mobile food delivery users is relatively large, and the scope of use is relatively wide. This study uses WeChat, QQ, Weibo, Email, and adding groups of the online cross-filling questionnaire to conduct electronic questionnaire surveys using convenient sampling methods under non-probability situations.

The advantages of electronic questionnaires are mainly reflected in the following three aspects: Compared with paper questionnaires, electronic questionnaires are delivered faster and more cost-effective; The recipient can fill in the questionnaire at a convenient time; The contact between the recipient and the sender is more direct, no third party involved (Sproull, 1986).

With the rapid development and popularization of computer technology, network technology, and communication technology, electronic questionnaire surveys have become a common questionnaire survey method (Kerkhof, Parlow, Goldstein, & Milne, 2004).

## 3.6   Sample

This study takes users of mobile food delivery apps in China as the research population. In order to make the sample meet the needs of the research purpose and minimize the waste of various resources, according to the sample scale provided by Krejcie and Morgan (1970) and the population size of this study, and invalid

questionnaire, the actual sample expected in this study is about 1100, of which the reliability will be close to 97% and P is 0.5 (shown in Table 3.13).

Table 3.13  Sample Size

| Population | Sample Size (Accuracy is within ±5%) |
|---|---|
| 500 | a |
| 1,000 | a |
| 2,000 | 714 |
| 3,000 | 811 |
| 4,000 | 870 |
| 5,000 | 909 |
| 7,000 | 959 |
| 9,000 | 989 |
| 10,000 | 1,000 |
| 15,000 | 1,034 |
| 20,000 | 1,053 |
| 25,000 | 1,064 |
| 50,000 | 1,087 |
| 100,000 | 1,099 |
| >100,000 | 1,111 |

## 3.7　Data Collection Tool

The questionnaire in this study is mainly forwarded and disseminated through WeChat, Weibo, QQ, Email, etc. between relatives and friends in China. More questionnaires are filled out for compensation by adding online mutual questionnaire groups.

This article uses a questionnaire designed by Wenjuan Xing. In order to prevent duplicate responses of samples, the IP address can only be used once in the collection settings of the data collection page.

Wenjuan Xing use process is divided into the following steps.

### 3.7.1　Design a Questionnaire Online

Wenjuan Xing provides a simple and easy to understand design questionnaire interface. It provides dozens of professional questionnaire templates to choose from. Users can set various question types, information columns, and page columns, as well as question scores or test questionnaire options. You can also set the item as a jump logic problem.

### 3.7.2　Post Questionnaire and Set Attributes

After the questionnaire is designed. The relevant attributes containing questionnaire classification, Description, Public level, Access password, IP usage, and so on should be set. Then the questionnaire can be directly published.

### 3.7.3　Send Questionnaire

The published questionnaire can be sent to the target sample by means of WeChat, QQ, Weibo, Email, Adding an online interactive questionnaire group, etc.

### 3.7.4  Download Survey Data

After the investigation is completed, the user can download the statistical data to a Word or Excel file for preservation and further analysis. This result can be imported into SPSS, Warp-PLS, and other data analysis software for further analysis.

## 3.8  Data Analysis Tools

Structural equation models (SEM) are often used to estimate and test multivariate causality. Among them, variance analysis methods based on maximum likelihood estimation (such as SPSS) and partial least squares (PLS) are the most commonly used.

This study mainly uses SPSS to conduct descriptive statistical analysis of the sample's gender, age, education, marital status, occupation, city tiers, frequency of use, etc., uses Warp-PLS to test the quality of scales, confirmatory factor analysis, structural equation model fit, test hypothesis paths, test the role of moderators, etc.; uses Mplus to test the mediating effect of the four mediation variables involved in the model in this study.

In order to make the data used in this study more effective and reliable, this study first conducts a pre-investigation.

## 3.9  Pre-investigation and Questionnaire Adjustment

This study conducted a small-scale pre-investigation through the designed initial questionnaire, and again ensured the adaptability of the questionnaire items in a quantitative way, so that each item can meet the needs of the research, thereby ensuring the integrity of the formal questionnaire.

In order to improve the quality of data collection and better determine what needs to be modified, the forecast samples in this study are obtained by convenience sampling. The test subjects are all users who have ordered food delivery through mobile food delivery apps and have certain experiences in using them. A total of 300 questionnaires were distributed in this study. After excluding invalid questionnaires, a total of 246 valid questionnaires were obtained, with a recovery rate of 82%. There is no reverse scoring for all items in this study.

In order to test the suitability and reliability of each item prepared in accordance with the characteristics of the research object, after the pre-survey is over, the pre-test questionnaire will be analyzed. And these results are the basis for item selection or modification.

This study adopts the method of combining the correlation coefficient of the total score of the correction item and factor analysis. The analysis steps are as follows: The first step is to analyze the reliability of the scale. The main measure is CITC (Corrected Item-Total Correlation) and Cronbach's Alpha; The second step is to test whether the data can be factored. The measurement index is KMO and Bartlett sphericity test; Finally, this study conducts common factor analysis, by extracting factor loading value. According to Spielberger and Gorsuch (1983), the ratio of the number of items to the subjects of a scale with the largest number of items in the questionnaire should be at least 1:5 to be suitable for factor analysis. And the total number of samples should not be less than 100. In this questionnaire, most numbers of items on the scale are 7 items, which corresponds to the number of samples for factor analysis. The retention criteria of measurement items in this study are shown in Table 3.14.

Table 3.14  Evaluation Criteria and Basis for Each Indicator

| Metrics | Evaluation Criteria | Reference Source |
|---------|---------------------|------------------|
| Corrected Item-Total Correlation (CITC) | >0.5, After deleting the item Cronbach's Alpha does not increase. | (M. L. Wu, & Tu, J. T., 2014) |
| Cronbach's a | >0.7 The closer to 1, the more reliable. | (Gravetter & Forzano, 2018; B. Nunnally, 1994) |
| KMO | >0.5, The closer to 1, the more suitable for factor analysis. | (Kaiser, 1974) |
| Bartlett | The bigger, the more suitable for factor analysis | (Kaiser, 1974) |
| Factor Loading Value | >0.5, And there cannot be more than 0.4 in different components, It shows that the scale has good convergence validity. | (DiStefano, Zhu, & Mindrila, 2009) |
| Cumulative Variance Explained Rate | >60% Indicates good representation. | (Hair, Black, Babin, Anderson, & Tatham, 2006) |

### 3.9.1    The Scale Analysis of Perceived Risk

This study uses SPSS 23.0 to analyze the reliability of the eight items of PR1-PR8 of the perceived risk scale. It can be seen from the analysis results in Table 3.15 that: Among the CITC values of each item of the perceived risk scale, the CITC value of PR7 is -0.007, and the value of its deleted Cronbach's a is 0.873; The CITC value of PR8 is -0.069, and the value of its deleted Cronbach's a is 0.898; CITC values of all other items are greater than 0.7; So this article decided to delete PR7 and PR8, Other items can be kept. The analysis results of the KMO and Bartlett sphericity test show that the KMO value of this scale is 0.914, Bartlett's sphericity test value is 1244.107 (P< 0.001), It shows that the measured variables are very suitable for factor analysis. Then, the principal component analysis method is used for the perceived risk, the extracted factors are orthogonally rotated, and the factor feature value is greater than 1.00 as the extraction standard. The result of the factor analysis showed that two factors were extracted from the eight items of the perceived risk scale. The cumulative explained variance was 71.069%. The factor loading value except PR7 and PR8 were both above 0.8, and the Cronbach's a value of the perceived risk scale was 0.839. The reliability of the scale is better.

Table 3.15  Scale Analysis of Perceived Risk (N=246)

| Item | CITC | Cronbach's a if Item Deleted | The Factor Loading Value |
|------|------|------------------------------|--------------------------|
| **PR1** | 0.750 | 0.797 | 0.858 |
| **PR2** | 0.806 | 0.788 | 0.883 |
| **PR3** | 0.823 | 0.785 | 0.898 |
| **PR4** | 0.814 | 0.787 | 0.898 |
| **PR5** | 0.772 | 0.794 | 0.866 |
| **PR6** | 0.772 | 0.793 | 0.865 |
| **PR7** | -0.007 | 0.873 | 0.002 |
| **PR8** | -0.069 | 0.898 | -0.082 |

| Item | CITC | Cronbach's a if Item Deleted | The Factor Loading Value |
|------|------|------------------------------|--------------------------|
| **The Factor Explains the Total Variance: 71.069%** | | | |
| **KMO: 0.914; Bartlett Sphericity Test Value: 1244.107 (P< 0.001)** | | | |
| **Cronbach's a: 0.839** | | | |

### 3.9.2    The Scale Analysis of Perceived Ease of Use

Use the same method, this study can get the reliability of the four items of PEU1- PEU4 of the perceived ease of use scale. It can be seen from the analysis results in Table 3.16 that: Among the CITC values of each item of the perceived ease of use scale, the analysis results of KMO and Bartlett sphericity test show that the KMO value of this scale is 0.761, Bartlett's sphericity test value is 981.89 (P< 0.001), It shows that the measured variables are very suitable for factor analysis. Then, the principal component analysis method is used for the perceived ease of use, the extracted factors are orthogonally rotated, and the factor feature value is greater than 1.00 as the extraction standard. The result of the factor analysis showed that one factor was extracted from the four items of the perceived ease of use scale. The cumulative explained variance was 81.363%. The Cronbach's value of the perceived ease of use scale was 0.923. The reliability of the scale is better.

Table 3.16  Scale Analysis of Perceived Ease of Use (N=246)

| Item | CITC | Cronbach's a if Item Deleted | The Factor Loading Value |
|------|------|------------------------------|--------------------------|
| **PEU1** | 0.754 | 0.922 | 0.855 |
| **PEU2** | 0.788 | 0.911 | 0.878 |
| **PEU3** | 0.888 | 0.877 | 0.945 |
| **PEU4** | 0.860 | 0.887 | 0.928 |

**The Factor Explains the Total Variance: 81.363%**

**KMO:  0.761; Bartlett Sphericity Test Value:981.89 (P< 0.001)**

**Cronbach's a: 0.923**

### 3.9.3    The Scale Analysis of Perceived Usefulness

Use the same method, this study can get the reliability of the four items of PU1- PU4 of the Perceived Usefulness Scale. It can be seen from the analysis results in Table 3.17 that: Among the CITC values of each item of the Perceived Usefulness Scale, the analysis results of KMO and Bartlett sphericity test show that the KMO value of this scale is 0.841, Bartlett's sphericity test value is 534.685 (P< 0.001), It shows that the measured variables are very suitable for factor analysis. Then, the principal component analysis method is used for the Perceived Usefulness, the extracted factors are orthogonally rotated, and the factor feature value is greater than 1.00 as the extraction standard. The result of the factor analysis showed that one factor was extracted from the four items of the Perceived Usefulness Scale. The cumulative explained variance was 74.892%. The Cronbach's a value of the Perceived Usefulness Scale was 0.888. The reliability of the scale is better.

Table 3.17  Scale Analysis of Perceived Usefulness (N=246)

| Item | CITC | Cronbach's a if Item Deleted | The Factor Loading Value |
|------|------|------------------------------|--------------------------|
| PU1 | 0.731 | 0.865 | 0.850 |
| PU2 | 0.746 | 0.859 | 0.860 |
| PU3 | 0.770 | 0.850 | 0.876 |
| PU4 | 0.771 | 0.850 | 0.876 |

**The Factor Explains the Total Variance: 74.892%**

**KMO:  0.841; Bartlett Sphericity Test Value: 534.685 (P< 0.001)**

**Cronbach's a:  0.888**

### 3.9.4    The Scale Analysis of System Quality

Use the same method, this study can get the reliability of the five items of SQ1- SQ5 of the system quality scale. It can be seen from the analysis results in Table 3.18 that: Among the CITC values of each item of the system quality scale, the analysis results of KMO and Bartlett sphericity test show that the KMO value of this scale is 0.893, Bartlett's sphericity test value is 889.110 (P< 0.001), It shows that the measured variables are very suitable for factor analysis. Then, the principal component analysis method is used for the system quality, the extracted factors are orthogonally rotated, and the factor feature value is greater than 1.00 as the extraction standard. The result of the factor analysis showed that one factor was extracted from the five items of the system quality scale. The cumulative explained variance was 76.123%. The Cronbach's a value of system quality scale was 0.921. The reliability of the scale is better.

Table 3.18  Scale Analysis of System Quality (N=246

| Item | CITC | Cronbach's a if Item Deleted | The Factor Loading Value |
|------|------|------------------------------|--------------------------|
| **SQ1** | 0.707 | 0.920 | 0.805 |
| **SQ2** | 0.854 | 0.891 | 0.912 |
| **SQ3** | 0.812 | 0.900 | 0.884 |
| **SQ4** | 0.822 | 0.898 | 0.892 |
| **SQ5** | 0.785 | 0.905 | 0.865 |

**The Factor Explains the Total Variance: 76.123%**

**KMO: 0.893; Bartlett Sphericity Test Value: 889.110 (P< 0.001)**

**Cronbach's a: 0.921**

### 3.9.5  The Scale Analysis of Information Quality

Use the same method, this study can get the reliability of the four items of IQ1- IQ4 of the information quality scale. It can be seen from the analysis results in Table 3.19 that: Among the CITC values of each item of the information quality scale, the analysis results of KMO and Bartlett sphericity test show that the KMO value of this scale is 0.848, Bartlett's sphericity test value is 746.623 (P< 0.001), It shows that the measured variables are very suitable for factor analysis. Then, the principal component analysis method is used for the information quality, the extracted factors are orthogonally rotated, and the factor feature value is greater than 1.00 as the extraction standard. The result of the factor analysis showed that one factor was extracted from the four items of the information quality scale. The cumulative explained variance was 81.190%. The Cronbach's a value of the information quality scale was 0.923. The reliability of the scale is better.

Table 3.19  Scale Analysis of Information Quality (N=246)

| Item | CITC | Cronbach's a if Item Deleted | The Factor Loading Value |
|------|------|------------------------------|--------------------------|
| **IQ1** | 0.828 | 0.897 | 0.905 |
| **IQ2** | 0.804 | 0.905 | 0.890 |
| **IQ3** | 0.874 | 0.881 | 0.933 |
| **IQ4** | 0.781 | 0.913 | 0.875 |

**The Factor Explains the Total Variance:81.190%**

**KMO:  0.848; Bartlett Sphericity Test Value:746.623 (P< 0.001)**

**Cronbach's a:  0.923**

### 3.9.6    The Scale Analysis of Service Quality

Use the same method, this study can get the reliability of the seven items of SQ1- SQ7 of the service quality Scale. It can be seen from the analysis results in Table 3.20 that: Among the CITC values of each item of the service quality Scale, the analysis results of KMO and Bartlett sphericity test show that the KMO value of this scale is 0.935, Bartlett's sphericity test value is 1216.165 (P< 0.001), It shows that the measured variables are very suitable for factor analysis. Then, the principal component analysis method is used for the service quality, the extracted factors are orthogonally rotated, and the factor feature value is greater than 1.00 as the extraction standard. The result of the factor analysis showed that one factor was extracted from the seven items of the service quality scale. The cumulative explained variance was 71.012%. The Cronbach's a value of service quality scale was 0.932. The reliability of the scale is better.

Table 3.20  Scale Analysis of Service Quality (N=246)

| Item | CITC | Cronbach's a if Item Deleted | The Factor Loading Value |
|------|------|------------------------------|--------------------------|
| SCQ1 | 0.790 | 0.920 | 0.850 |
| SCQ2 | 0.786 | 0.921 | 0.846 |
| SCQ3 | 0.758 | 0.924 | 0.824 |
| SCQ4 | 0.754 | 0.924 | 0.821 |
| SCQ5 | 0.791 | 0.921 | 0.851 |
| SCQ6 | 0.799 | 0.920 | 0.857 |
| SCQ7 | 0.790 | 0.920 | 0.849 |

**The Factor Explains the Total Variance: 71.012%**

**KMO: 0.935; Bartlett Sphericity Test Value:1216.165 (P< 0.001)**

**Cronbach's a:  0.932**

### 3.9.7    The Scale Analysis of Switching Costs

Use the same method, this study can get the reliability of the four items of SC1- SC4 of the switching costs scale. It can be seen from the analysis results in Table 3.21 that: Among the CITC values of each item of the switching costs scale, the analysis results of KMO and Bartlett sphericity test show that the KMO value of this scale is 0.837, Bartlett's sphericity test value is 563.262 (P< 0.001), It shows that the measured variables are very suitable for factor analysis. Then, the principal component analysis method is used for the switching costs, the extracted factors are orthogonally rotated, and the factor feature value is greater than 1.00 as the extraction standard. The result of the factor analysis showed that one factor was extracted from the four items of the switching costs scale. The cumulative explained variance was

75.746%. The Cronbach's a value of switching costs scale was 0.893. The reliability of the scale is better.

Table 3.21  Scale Analysis of Switching Costs (N=246)

| Item | CITC | Cronbach's a if Item Deleted | The Factor Loading Value |
|------|------|------------------------------|--------------------------|
| SC1 | 0.719 | 0.878 | 0.840 |
| SC2 | 0.785 | 0.854 | 0.884 |
| SC3 | 0.776 | 0.858 | 0.879 |
| SC4 | 0.774 | 0.858 | 0.878 |
| **The Factor Explains the Total Variance: 75.746%** | | | |
| **KMO: 0.837; Bartlett Sphericity Test Value:563.262 (P< 0.001)** | | | |
| **Cronbach's a:  0.893** | | | |

### 3.9.8    The Scale Analysis of Satisfaction

Use the same method, this study can get the reliability of the five items of SAT1- SAT5 of the satisfaction scale. It can be seen from the analysis results in Table 3.22 that: Among the CITC values of each item of the satisfaction scale, the analysis results of KMO and Bartlett sphericity test show that the KMO value of this scale is 0.882, Bartlett's sphericity test value is 740.947 (P< 0.001), It shows that the measured variables are very suitable for factor analysis. Then, the principal component analysis method is used for the satisfaction, the extracted factors are orthogonally rotated, and the factor feature value is greater than 1.00 as the extraction standard. The result of the factor analysis showed that one factor was extracted from the five items of the satisfaction scale. The cumulative explained variance was 72.388% The Cronbach's a value of satisfaction scale was 0.904. The reliability of the scale is better.

Table 3.22  Scale Analysis of Satisfaction (N=246)

| Item | CITC | Cronbach's a if Item Deleted | The Factor Loading Value |
|------|------|------|------|
| SAT1 | 0.777 | 0.880 | 0.862 |
| SAT2 | 0.785 | 0.877 | 0.869 |
| SAT3 | 0.778 | 0.879 | 0.864 |
| SAT4 | 0.739 | 0.887 | 0.834 |
| SAT5 | 0.725 | 0.890 | 0.824 |

**The Factor Explains the Total Variance: 72.388%**

**KMO: 0.882; Bartlett Sphericity Test Value:740.947 (P< 0.001)**

**Cronbach's a:  0.904**

### 3.9.9    The Scale Analysis of Herd Behavior

Use the same method, this study can get the reliability of the four items of HB1- HB5 of the herd behavior scale. It can be seen from the analysis results in Table 3.23 that: Among the CITC values of each item of the herd behavior scale, the analysis results of KMO and Bartlett sphericity test show that the KMO value of this scale is 0.851, Bartlett's sphericity test value is 677.264 (P< 0.001), It shows that the measured variables are very suitable for factor analysis. Then, the principal component analysis method is used for the herd behavior, the extracted factors are orthogonally rotated, and the factor feature value is greater than 1.00 as the extraction standard. The result of the factor analysis showed that one factor was extracted from the five items of the herd behavior scale. The cumulative explained variance was 79.381% The Cronbach's a value of the herd behavior scale was 0.913. The reliability of the scale is better.

Table 3.23  Scale Analysis of Herd Behavior (N=246)

| Item | CITC | Cronbach's a if Item Deleted | The Factor Loading Value |
|------|------|------|------|
| **HB1** | 0.745 | 0.907 | 0.852 |
| **HB2** | 0.836 | 0.875 | 0.912 |
| **HB3** | 0.808 | 0.885 | 0.895 |
| **HB4** | 0.820 | 0.881 | 0.903 |

**The Factor Explains the Total Variance: 79.381%**

**KMO:0.851; Bartlett Sphericity Test Value: 677.264 (P< 0.001)**

**Cronbach's a:  0.913**

### 3.9.10   The Scale Analysis of Continuous Use Intention

Use the same method, this study can get the reliability of the four items of CUI1- CUI4 of the continuous use intention scale. It can be seen from the analysis results in Table 3.24 that: Among the CITC values of each item of the continuous use intention scale, the analysis results of KMO and Bartlett sphericity test show that the KMO value of this scale is 0.858, Bartlett's sphericity test value is 683.562 (P< 0.001), It shows that the measured variables are very suitable for factor analysis. Then, the principal component analysis method is used for the continuous use intention, the extracted factors are orthogonally rotated, and the factor feature value is greater than 1.00 as the extraction standard. The result of the factor analysis showed that one factor was extracted from the five items of the continuous use intention scale. The cumulative explained variance was 80.037% The Cronbach's a value of continuous use intention scale was 0.917. The reliability of the scale is better.

Table 3.24  Scale Analysis of Continuous Use Intention (N=246)

| Item | CITC | Cronbach's a if Item Deleted | The Factor Loading Value |
|------|------|------------------------------|--------------------------|
| CUI1 | 0.822 | 0.888 | 0.903 |
| CUI2 | 0.809 | 0.892 | 0.895 |
| CUI3 | 0.812 | 0.891 | 0.896 |
| CUI4 | 0.794 | 0.897 | 0.884 |

**The Factor Explains the Total Variance:80.037%**

**KMO: 0.858; Bartlett Sphericity Test Value:683.562 (P< 0.001)**

**Cronbach's a:  0.917**

### 3.9.11   Modification of the Initial Questionnaire

According to the above analysis of the items in the pre-test questionnaire, since the value of Corrected Item-Total Correlation (CITC) of PR7 and PR8 is relatively small, Cronbach's a value of the deleted item is relatively high, these two items are deleted. The CITC value and reliability of the final scale after these two items are deleted are both high. The constituent dimensions of all variables are the same as the initial questionnaire used in the final formal questionnaire (shown in Appendix II).

# CHAPTER 4

# RESULTS AND DISCUSSION

It can be seen from the results of the pre-investigation that the questionnaire used in this study and the preliminary data obtained can meet the requirements. In this chapter, this study will conduct a formal investigation, analyze, and discuss the results. There are three parts in this chapter: 4.1 This section mainly introduces a number of issues in the formal investigation of this article, including the selection of the targets of the questionnaire, the specific process of the questionnaire, and the results of the questionnaire; 4.2 This section mainly introduces the descriptive statistics of the samples in this study, mainly focusing on the detailed description, collation, and discussion of the first and third parts of the questionnaire; 4.3 This section is the statistical analysis of this study. The main content includes sample data reliability test, validity test, confirmatory factor test, discriminative validity test, normality test, VIF, GOF, and other model fitting factors, hypothesis test, PLS result, and the mediating effect of mediating variables, etc.

## 4.1   Formal Survey

### 4.1.1   Selection of the Target of the Questionnaire

This study selects college students and key user groups working in society who often use mobile food delivery apps as research objects. The reasons are as follows:

(1) Since this study is a study on the continuous use intention of mobile food delivery app users, the sample needs to have certain experience in use. According to related research, consumers in China who use mobile food delivery apps to order food are mainly white-collar workers and students in the universities. What they have in common is that they have independent consumption power and are more willing to accept new technologies. Are you hungry, Meituan Waimai app and Meal Secretary have also developed on their extensive use.

(2) Using the mobile food delivery app to order food not only allows consumers to enjoy more affordable prices but also more convenient and faster services. For the "lazy people" of otaku and otaku type, this just meets their consumption requirements. Therefore, taking college students and working young white-collar workers as sample data is universal. The issuance of questionnaires is easy and random to collect.

### 4.1.2    Questionnaire Survey Procedure

The official investigation of this study is from June 10, 2020. The questionnaire is officially distributed in two ways. On the one hand, distribute through the Wenjuan Xing. Distribution methods include WeChat, Weibo, QQ, email, etc. On the other hand, fill out paid questionnaires by adding an online cross-filling questionnaire group.

### 4.1.3    Survey Results

This study has distributed 1,200 questionnaires online that lasted about two months. A total of 1,040 valid survey data were obtained by screening, sorting out, and eliminating filling errors and missing data, with a recovery rate of 86.67%. According to (Glenn, 1992) description of the sample size which showed the valid questionnaire approximately reached the 97% confidence interval. Because this study

focuses on the continuous use intention, it sets up differentiated items which firstly screened the survey objects. This study only investigates users who have used mobile food delivery apps. In order to ensure that there is no obvious non-response bias in the data, this paper selects the first 100 and the last 100 data for comparative analysis. No significant difference is found. Therefore, there is no obvious non-response bias in this survey.

## 4.2   Descriptive Statistics

The descriptive statistics in this study involve the first and third parts of the questionnaire which has a total of ten statistical factors. The frequency and percentage of descriptive statistics are presented in Table 4.1. Among 1040 valid questionnaires, the most commonly used mobile food delivery apps by customers are you hungry, Meituan Waimai, and Baidu Waimai, accounting for 25.8%, 21.2%, and 20.1% respectively; So far, the total time that customers used mobile food delivery apps for more than five years contains 25.4%. About half of the customers have used it for more than three years; 38.8% of customers used mobile food delivery apps 6-10 times in the last month; The vast majority of customers would recommend/share their better mobile takeaway apps to friends and relatives; According to gender, the proportions of males and females were 46.1% and 53.9% respectively; Approximately half (47.8%) of the customer's age group was 18-30; 42.1% of customers had a bachelor degree; The customer occupation was the more 80% of students and corporate employees; In marital status, customers were slightly more unmarried than married; The proportion of customers in first-tier cities and second-tier cities was larger. The specific descriptive statistics were shown in Table 4.1 below:

Table 4.1  Demographic and Study Information of the Samples

| Statistical Indicators | Options | Frequency | Percentage |
|---|---|---|---|
| **Which is your most commonly used mobile food delivery app** | Meituan Waimai | 209 | 20.1% |
| | Are You Hungry | 268 | 25.8% |
| | Baidu Waimai | 220 | 21.2% |
| | Little Secretary | 49 | 4.7% |
| | Word of Mouth | 63 | 6.1% |
| | Dianping Takeaway | 61 | 5.9% |
| | Daojia Gourmet Club | 54 | 5.2% |
| | Takeaway Superman | 60 | 5.8% |
| | Order Me | 56 | 5.4% |
| **So far, the total time you have used the mobile food delivery app** | Within 1 year | 65 | 6.3% |
| | 1-2 year | 110 | 10.6% |
| | 2-3 year | 70 | 6.7% |
| | 3-4 year | 282 | 27.1% |
| | 4-5 year | 249 | 23.9% |
| | More than 5 years | 264 | 25.4% |
| **Times of mobile food delivery apps used in the last month** | 0-5 times | 315 | 30.3% |
| | 6-10 times | 404 | 38.8% |
| | 11-20 times | 131 | 12.6% |
| | 21-30 times | 147 | 14.1% |
| | More than 31 times | 43 | 4.1% |
| **How often do you recommend/share mobile food delivery apps to friends and family** | Never recommended/shared | 101 | 9.7% |
| | Not recommended/shared often | 156 | 15.0% |
| | Occasionally recommended/shared | 173 | 16.6% |
| | Generally recommended/shared | 348 | 33.5% |
| | Often recommended/shared | 161 | 15.5% |
| | Frequently recommended/shared | 101 | 9.7% |
| **Gender (GEN)** | Female | 479 | 46.1% |
| | Male | 561 | 53.9% |
| **Age (AGE)** | Less than 18 years old | 96 | 9.2% |
| | 18-30 years old | 497 | 47.8% |
| | 31-50 years old | 292 | 28.1% |

| Statistical Indicators | Options | Frequency | Percentage |
|---|---|---|---|
| | More than 51 years old | 155 | 14.9% |
| **Education level** | Below Junior College | 339 | 32.6% |
| **(EDU)** | Bachelor | 438 | 42.1% |
| | Above master | 263 | 25.3% |
| **Occupation** | Student in university | 361 | 34.7% |
| **(OCCU)** | Employee or enterprise | 462 | 44.4% |
| | Others | 217 | 20.9% |
| **Marital Status (MARR)** | Unmarried | 587 | 56.4% |
| | Married | 453 | 43.6% |
| **City Tiers** | The first- tier city | 424 | 40.8% |
| **(TIES)** | The second-tier city | 317 | 30.5% |
| | The third- tier city | 144 | 13.8% |
| | Below and the fourth- tier city | 155 | 14.9% |

### 4.2.1    The Distribution of Mobile Food Delivery Apps
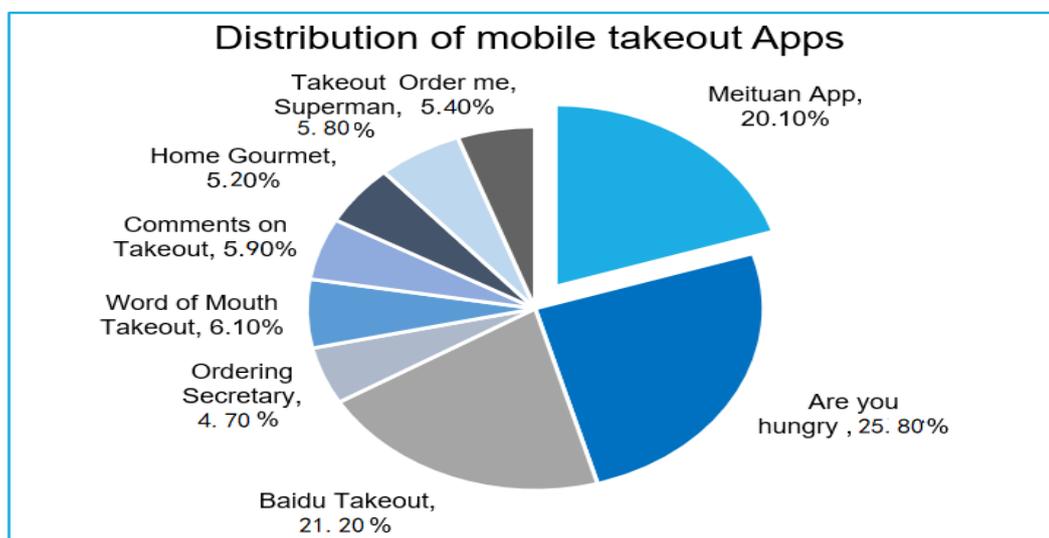


Figure 4.1  Distribution Map of Mobile Food Delivery Apps

From Figure 4.1 above, it was easy to see that the customers of the mobile food delivery app were mainly users of Are you hungry, Meituan Waimai, and Baidu Waimai. Among them, there were not only the transformation of the past mature brands of food delivery but also the emerging mobile food delivery app companies. But overall, competition in the mobile food delivery app market was still fierce. There is no single mobile food delivery app that dominates the entire mobile food delivery industry.

**4.2.2    The Distribution of the Total Time Spent Using Mobile Food Delivery Apps**
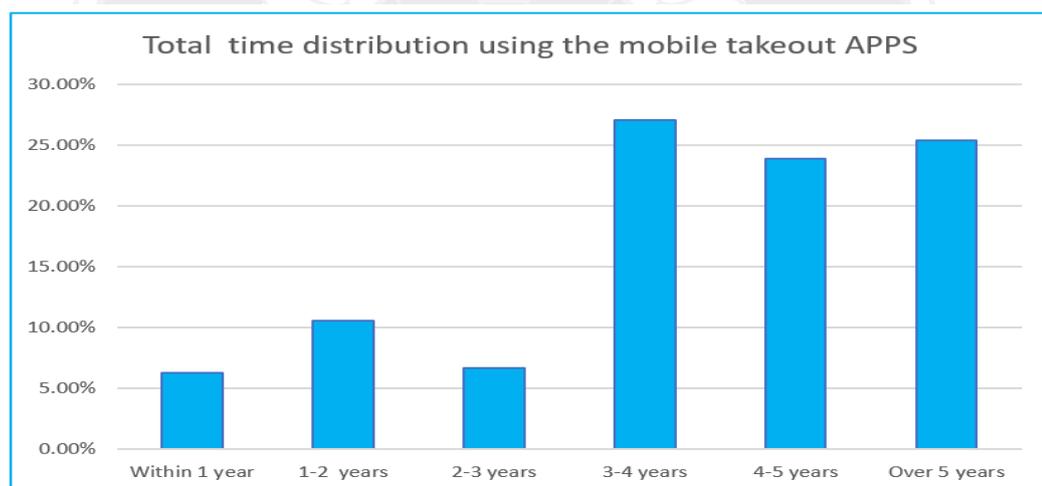


Figure 4.2  Distribution Map of Total Time Spent Using Mobile Food Delivery Apps

From Figure 4.2 above, it was easy to see that due to the popularity of mobile networks in China, most of the surveyed samples have used mobile food delivery apps for more than three years. Only a few customers were new to the mobile food delivery app. Many people used a certain mobile food delivery app relatively steadily. It was not so easy for them to switch to mobile food delivery apps.

**4.2.3** **The Distribution of the Average Monthly Frequency Distribution**
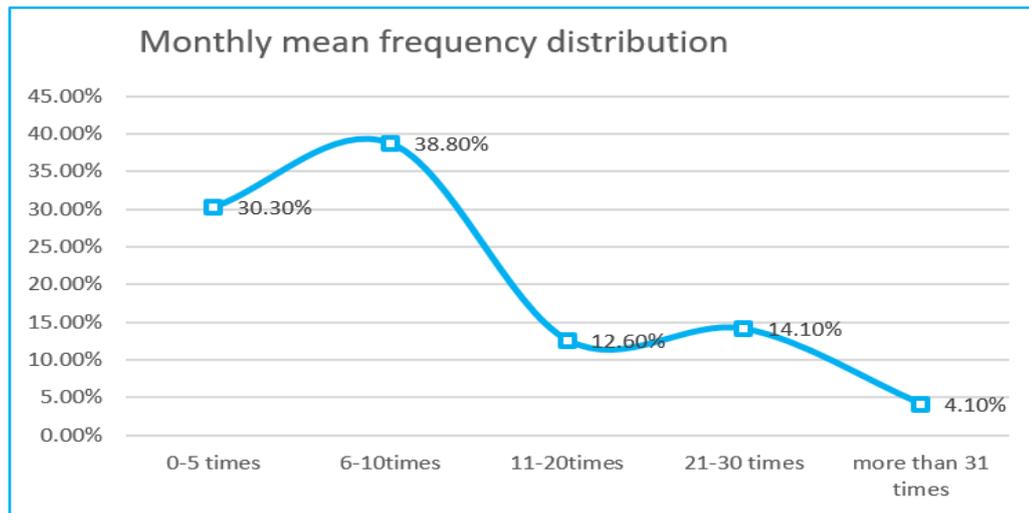


Figure 4.3  Distribution Map of Monthly Average Frequency

It was easy to see from the monthly average frequency in Figure 4.3 that most people use mobile food delivery apps to order less than ten times a month. There are three meals a day, 90 meals a month can be ordered. It can be predicted that in the next few years, the takeaway market still has great potential for development.

### 4.2.4    The Distribution of the Recommendations/Sharing
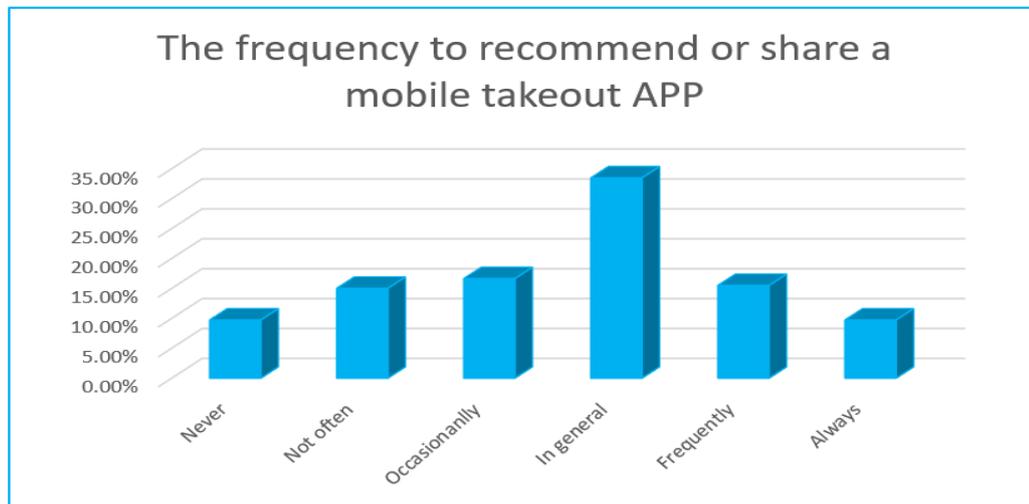


Figure 4.4  Distribution Map of Recommendations/Sharing

From Figure 4.4 above, it was easy to see that the number of people recommending or sharing with others when they felt that using a certain mobile food delivery app was better. Therefore, mobile food delivery app merchants still need to do a good job in pre-sales, in-sales, and after-sales services. They should strive to improve customer satisfaction and establish their own brand. Not only can customers continue to use the mobile food delivery app, but also recommend it to friends and family.

**4.2.5** **The Distribution of the Sample Gender**
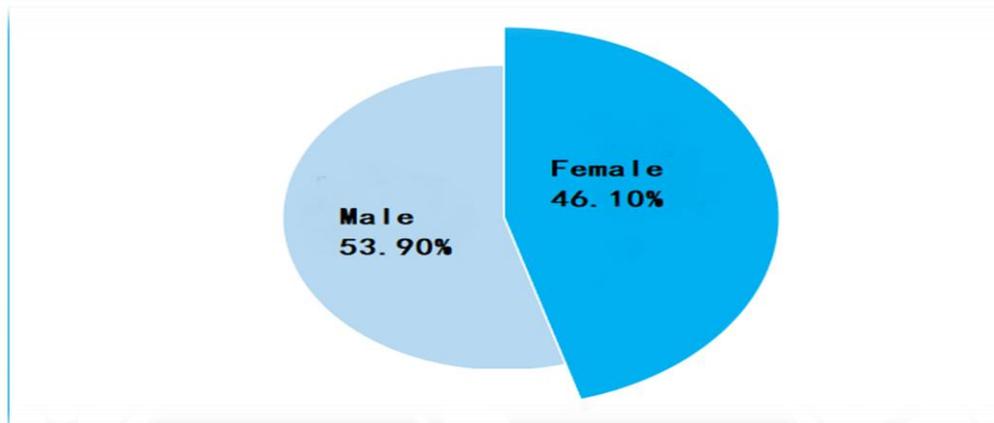


Figure 4.5  Distribution Map of Sample Gender

Figure 4.5 showed that although there were slightly more women than men, the overall gender ratio of the samples tends to be the same. This may indirectly indicate that men and women tend to be more consistent in ordering food.

**4.2.6    The Distribution of the Sample Age**
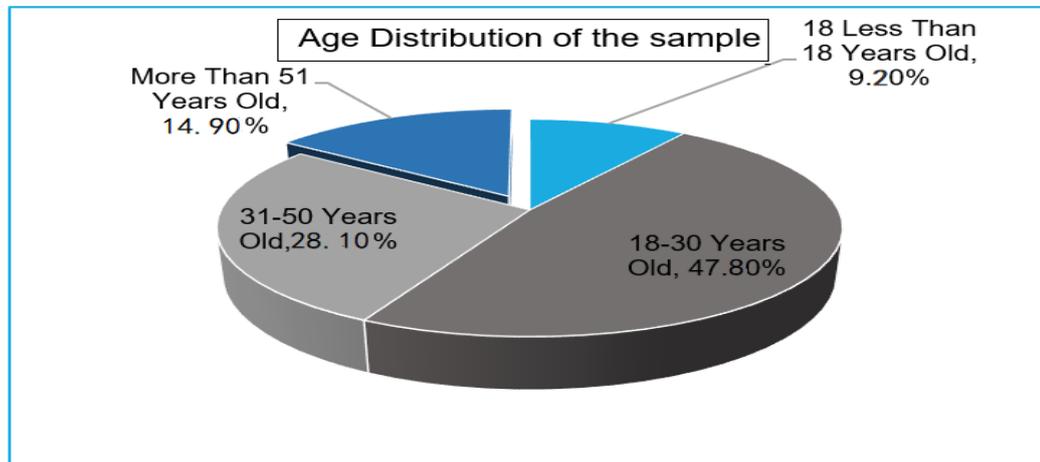


Figure 4.6  Distribution Map of Sample Age


It was easy to see from Figure 4.6 above that the sample distribution of this study was also more in line with the sample distribution characteristics of the mobile commerce survey conducted by the China Internet Information Center. The main force of China's mobile commerce consumption was still the people born after 1980, 1990, and 2000. Therefore, the mobile commerce operation enterprise should give priority to meeting their needs.

### 4.2.7    The Distribution of the Education Level
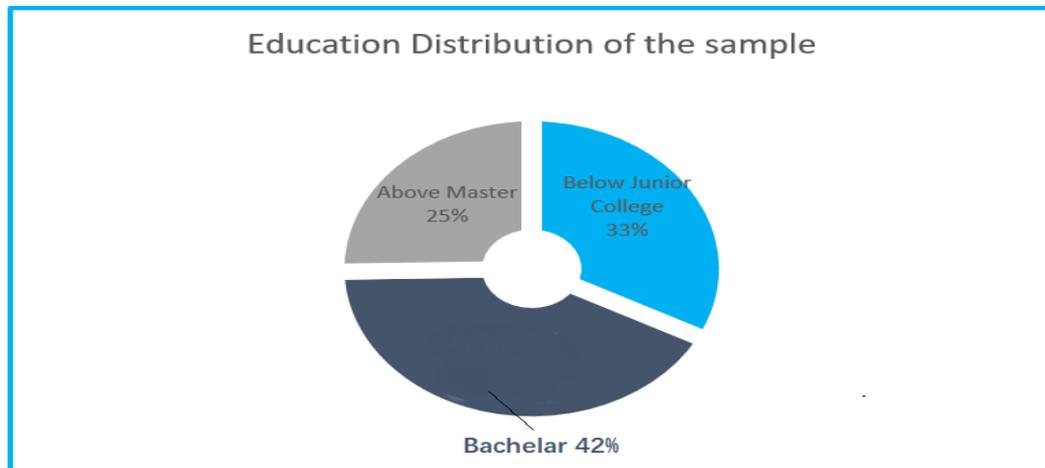


Figure 4.7  Distribution Map of Education Level

In terms of the degree distribution in Figure 4.7 above, undergraduate education and above accounted for the main share. However, it should also be noted that the use of mobile food delivery apps did not vary linearly according to academic qualifications. There were still a large number of non-educated people who adapted to the changes in the mobile Internet and participated in it.

**4.2.8    The Distribution of the Occupation**
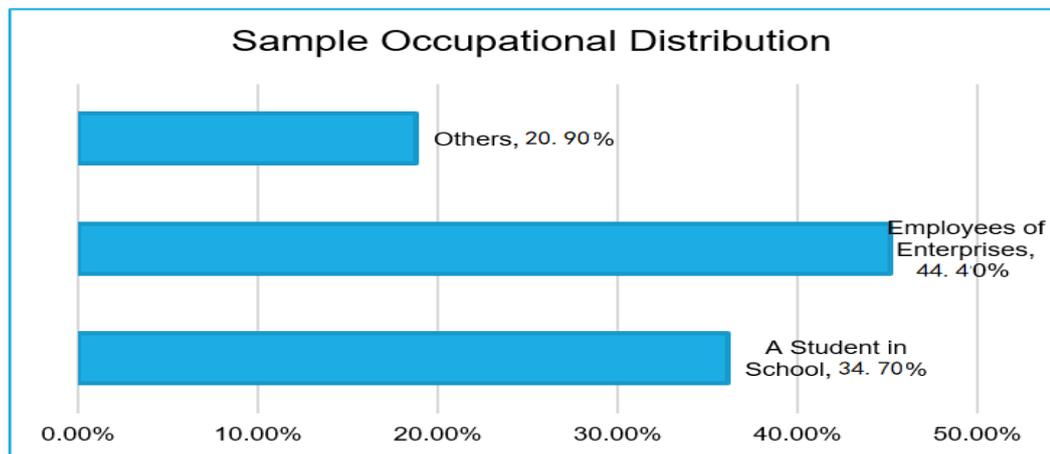


Figure 4.8  Distribution Map of Occupation

As can be seen from Figure 4.8 above, the current main sample of mobile food delivery apps was basically students and employees of enterprises and institutions. More importantly, the main force of mobile food delivery consumption had basically changed from students as the main body to a situation where students and professionals were divided. In the foreseeable future, this trend will become more apparent. This also shows from the side that people born after 1980, 1990, and 2000 have grown into a generation of mature mobile food delivery participants.

**4.2.9    The Distribution of the Marital Status**
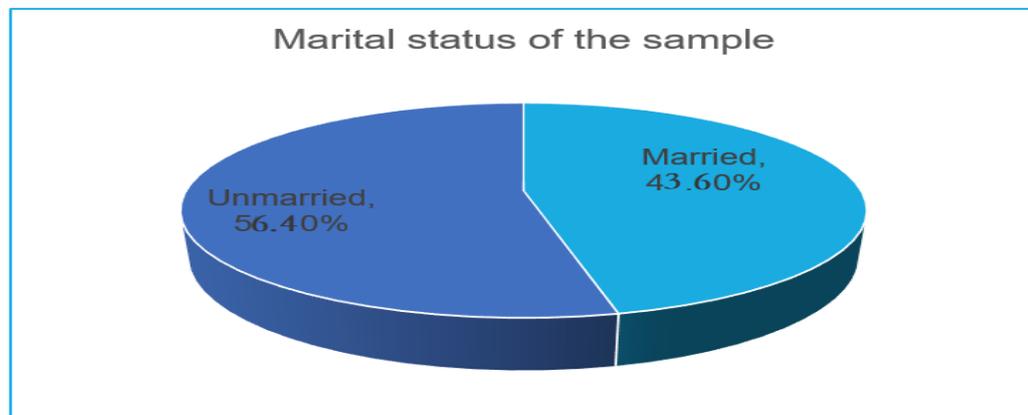


Figure 4.9  Distribution Map of the Marital Status

From Figure 4.9 above, it was easy to see that there were slightly more unmarried people than married samples. But the overall proportion of the sample tended to be the same. The difference was not very large. This may indirectly indicate that unmarried and married customers have the same tendency in ordering food.

### 4.2.10 The Distribution of the City Tiers
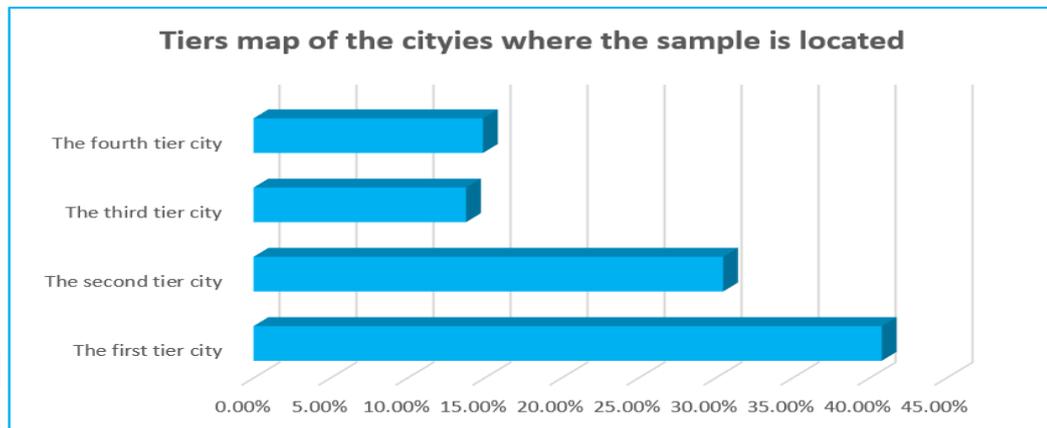


Figure 4.10  Distribution Map of the City Tiers

From the distribution of the city tiers in Figure 4.10 above, the first- and second-tier cities were still the main mobile food delivery markets. The main reason is that in first- and second-tier cities, office workers usually commute longer and have smaller families. Mobile food delivery can easily be a large part of the home cooking needs.

First-tier cities such as Beijing, Shanghai, Guangzhou, and Shenzhen have always been the main markets for mobile food delivery. These cities have been leading the development of the food delivery market in the past few years. However, the food delivery industry has entered its seventh year, with fierce competition in first-tier cities, facing wave after wave of brand replacement. At this time, the mobile food market in first-tier and second-tier cities is basically saturated. As the penetration rate of food delivery becomes faster and faster. The battlefield of the mobile food market is slowly shifting from the city center to the suburbs and counties. So, the development space for the takeaway market is still very broad.

## 4.3    Statistical Analysis Results And Discussion

This study uses Warp-PLS 7.0, Bootstrapping 999 times (the maximum value of the software) to run the model proposed in this study and get the following results.

### 4.3.1    Factor Analysis

In the measurement model, the results of the pre-investigation showed that the data in this article were valid and reliable. Structural validity was a test to verify the consistency between data and theory (Messick, 1998). Construct validity includes two aspects: convergence validity and discriminative validity. Convergence validity is used to verify the relationship between structural variables and related variables. Exploratory factor analysis is mainly used. The factor analysis method evaluated the validity and correlation of the measured variables through factor loading (Vogt, 2007). This study uses Warp-PLS 7.0 to test the factor analysis of the formal survey data. The results are shown in Table 4.2. The load factors of all variables in this paper were greater than 0.700 which were all at the significance level of P <0.001. This result showed that the scale in this paper had good convergence validity(Chin, 1998; Hair, Anderson, Babin, & Black, 2010; J. C. Nunnally, 1978).

Table 4.2  Exploratory Factor Analysis, EFA (EFA)

|      | PR    | PEU   | PU | SQ | IQ | SCQ | SC | SAT | CUI | HB |
|------|-------|-------|----|----|----|-----|----|-----|-----|----|
| PR1  | 0.868 | -     | -  | -  | -  | -   | -  | -   | -   | -  |
| PR2  | 0.870 | -     | -  | -  | -  | -   | -  | -   | -   | -  |
| PR3  | 0.893 | -     | -  | -  | -  | -   | -  | -   | -   | -  |
| PR4  | 0.888 | -     | -  | -  | -  | -   | -  | -   | -   | -  |
| PR5  | 0.838 | -     | -  | -  | -  | -   | -  | -   | -   | -  |
| PR6  | 0.848 | -     | -  | -  | -  | -   | -  | -   | -   | -  |
| PEU1 | -     | 0.88  | -  | -  | -  | -   | -  | -   | -   | -  |
| PEU2 | -     | 0.868 | -  | -  | -  | -   | -  | -   | -   | -  |
| PEU3 | -     | 0.946 | -  | -  | -  | -   | -  | -   | -   | -  |
| PEU4 | -     | 0.927 | -  | -  | -  | -   | -  | -   | -   | -  |

| | PR | PEU | PU | SQ | IQ | SCQ | SC | SAT | CUI | HB |
|---|---|---|---|---|---|---|---|---|---|---|
| **PU1** | - | - | 0.876 | - | - | - | - | - | - | - |
| **PU2** | - | - | 0.877 | - | - | - | - | - | - | - |
| **PU3** | - | - | 0.88 | - | - | - | - | - | - | - |
| **PU4** | - | - | 0.887 | - | - | - | - | - | - | - |
| **SQ1** | - | - | - | 0.849 | - | - | - | - | - | - |
| **SQ2** | - | - | - | 0.896 | - | - | - | - | - | - |
| **SQ3** | - | - | - | 0.871 | - | - | - | - | - | - |
| **SQ4** | - | - | - | 0.884 | - | - | - | - | - | - |
| **SQ5** | - | - | - | 0.869 | - | - | - | - | - | - |
| **IQ1** | - | - | - | - | 0.895 | - | - | - | - | - |
| **IQ2** | - | - | - | - | 0.889 | - | - | - | - | - |
| **IQ3** | - | - | - | - | 0.925 | - | - | - | - | - |
| **IQ4** | - | - | - | - | 0.865 | - | - | - | - | - |
| **SCQ1** | - | - | - | - | - | 0.842 | - | - | - | - |
| **SCQ2** | - | - | - | - | - | 0.862 | - | - | - | - |
| **SCQ3** | - | - | - | - | - | 0.853 | - | - | - | - |
| **SCQ4** | - | - | - | - | - | 0.86 | - | - | - | - |
| **SCQ5** | - | - | - | - | - | 0.867 | - | - | - | - |
| **SCQ6** | - | - | - | - | - | 0.873 | - | - | - | - |
| **SCQ7** | - | - | - | - | - | 0.851 | - | - | - | - |
| **SC1** | - | - | - | - | - | - | 0.858 | - | - | - |
| **SC2** | - | - | - | - | - | - | 0.884 | - | - | - |
| **SC3** | - | - | - | - | - | - | 0.874 | - | - | - |
| **SC4_** | - | - | - | - | - | - | 0.879 | - | - | - |
| **SAT1** | - | - | - | - | - | - | - | 0.863 | - | - |
| **SAT2** | - | - | - | - | - | - | - | 0.866 | - | - |
| **SAT3** | - | - | - | - | - | - | - | 0.892 | - | - |
| **SAT4** | - | - | - | - | - | - | - | 0.860 | - | - |
| **SAT5** | - | - | - | - | - | - | - | 0.843 | - | - |
| **CUI1** | - | - | - | - | - | - | - | - | 0.886 | - |
| **CUI2** | - | - | - | - | - | - | - | - | 0.899 | - |
| **CUI3** | - | - | - | - | - | - | - | - | 0.877 | - |
| **CUI4** | - | - | - | - | - | - | - | - | 0.879 | - |
| **HB1** | - | - | - | - | - | - | - | - | - | 0.862 |
| **HB2** | - | - | - | - | - | - | - | - | - | 0.895 |
| **HB3** | - | - | - | - | - | - | - | - | - | 0.878 |
| **HB4** | - | - | - | - | - | - | - | - | - | 0.886 |

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

### 4.3.2    Variable Reliability Test

In the PLS verification of the data in the formal survey, convergent validity is used to measure whether the measurement variables of the same construct fall on the same factor. And it is used to detect whether the measurement variables falling on the same factor are highly correlated indicators. AVE is one of the indicators to measure the convergence validity of latent variables. When the value of AVE was greater than 0.5, it indicated that the latent variable had good convergence validity (Gregory, 2004). For the ten variables involved in this study, the load used to extract the average variance (AVE) of the relationship between any two variables is greater than 0.700. The smallest value is the system quality whose value of AVE was 0.737, and they were all at a significant level of $P<0.001$((Hair et al., 2010) (shown in table 4.3).

Composite Reliability (CR) was an indicator that measured the internal consistency of the variables in the structural model (Netemeyer, Bearden, & Sharma, 2003). It is calculated from the standard regression weights in the CFA model. When CR was greater than 0.6, it indicated that the latent variable had good combination reliability (A. Diamantopoulos, Siguaw, & Siguaw, 2000). Through verification, it was found that the combined reliability (CR) of all variables in this study was greater than 0.9, and the smallest value was the switching costs whose value of CR was 0.928 (shown in Table 4.3).

Reliability was used to measure the consistency and stability of the questionnaire (B. Nunnally, 1994). Cronbach's a is used to measure the reliability of

scales in structural equation models. When the value of Cronbach's a was greater than 0.7, it indicated that the scale had good reliability (Gravetter & Forzano, 2018). It can be seen from Table 4.3 that among the values of Cronbach's a of all the observed variables in this study, the smallest value of Cronbach's a of the switching costs was 0.897 which was greater than 0.7.

Cronbach's alpha, composite reliability coefficients, and extracted average variance (AVE) of all variables in this study could meet the requirements. Therefore, the model in this study has high credibility, reliability, and convergence.

Table 4.3  Variable Reliability Index

| The Name of the Variable | The code | AVE | CR | Cronbach's a |
|---|---|---|---|---|
| Perceived Risk | PR | 0.753 | 0.948 | 0.934 |
| Perceived Ease of Use | PEU | 0.821 | 0.948 | 0.927 |
| Perceived Usefulness | PU | 0.775 | 0.932 | 0.903 |
| System Quality | SQ | 0.764 | 0.942 | 0.923 |
| Information Quality | IQ | 0.799 | 0.941 | 0.916 |
| Service Quality | SCQ | 0.737 | 0.951 | 0.940 |
| Switching Costs | SC | 0.764 | 0.928 | 0.897 |
| Satisfaction | SAT | 0.748 | 0.937 | 0.916 |
| Continuous Use Intention | CUI | 0.784 | 0.935 | 0.908 |
| Herd Behavior | HB | 0.775 | 0.932 | 0.903 |

Note:   CR = Composite Reliability, Cronbach's a = Cronbach's alpha, AVE = Average Variances Extracted.

### 4.3.3    Discriminant Validity Test

Discriminant validity was an index used to test whether there were significant differences between latent variables. The square root of the AVE of each variable should be greater than the Pearson correlation coefficient between this variable and

others (Cronbach & Meehl, 1955; Paspallis, Andreou, & Bullo, 2018). The results in Table 4.4 showed that the square root of the AVE of each latent variable in this study was greater than the Pearson correlation coefficient between this variable and others. The minimum mean-variance extraction of the latent variable AVE positive square root is 0.858, which is greater than the maximum correlation coefficient of 0.427. The relationship between any latent variable and itself was greater than the relationship between any two latent variables. It shows that any two latent variables in this article have good discrimination validity.

Therefore, the discriminant validity level of all the latent variables in this paper is satisfactory. In summary, the combination reliability and structural validity of the questionnaire structure model are relatively good. The fit with actual data is relatively high. The questionnaire model was tested by confirmatory factor analysis. The questionnaire and dimension setting are reasonable.

Table 4.4  Discriminant Validity Test

|  | PR | PEU | PU | SQ | IQ | SCQ | SC | SAT | CUI | HB |
|---|---|---|---|---|---|---|---|---|---|---|
| **PR** | **0.868** | - | - | - | - | - | - | - | - | - |
| **PEU** | -0.106 | **0.906** | - | - | - | - | - | - | - | - |
| **PU** | -0.093 | 0.103 | **0.880** | - | - | - | - | - | - | - |
| **SQ** | -0.077 | 0.094 | 0.245 | **0.874** | - | - | - | - | - | - |
| **IQ** | -0.029 | 0.019 | 0.254 | 0.233 | **0.894** | - | - | - | - | - |
| **SCQ** | -0.145 | 0.101 | 0.396 | 0.201 | 0.255 | **0.858** | - | - | - | - |
| **SC** | -0.14 | -0.038 | 0.263 | 0.427 | 0.248 | 0.204 | **0.874** | - | - | - |
| **SAT** | -0.098 | 0.203 | 0.352 | 0.312 | 0.274 | 0.297 | 0.321 | **0.865** | - | - |
| **CUI** | -0.167 | -0.023 | 0.408 | 0.198 | 0.245 | 0.362 | 0.286 | 0.286 | **0.885** | - |
| **HB** | -0.179 | 0.099 | 0.351 | 0.67 | 0.299 | 0.374 | 0.572 | 0.257 | 0.376 | **0.881** |

Note: PR = Perceived Risk, PEU = Perceived Ease of Use, PU = Perceived Usefulness, SQ = System Quality, IQ = Information Quality, SCQ = Service Quality,

SC = Switching Costs, SAT = Satisfaction, HB = Herd Behavior, CUI = Continuous Use Intention

### 4.3.4 Multicollinearity Test

In addition to testing the reliability and validity of the variables, it is also necessary to measure the full variance inflation factor (VIF) to ensure that multicollinearity is not the main problem in the analysis. Multicollinearity will lead to high correlations or interrelationships between independent variables, which will lead to deviations in the results. According to the conclusion drawn by Petter, Straub, and Rai (2007), the VIF value should be less than 5, ideally less than 3.30. The PLS analysis in Table 4.5 and Table 4.6 showed that the VIF of all variables was less than the standard value of 3.30, which indicated that there was no collinearity between them.

Table 4.5  Variance Inflation Factors

|  | PR | PEU | PU | SQ | IQ | SCQ | SC | SAT | CUI | HB | HB*SC | HB*SAT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **VIF** | 1.074 | 1.127 | 1.441 | 2.021 | 1.225 | 1.408 | 1.823 | 1.548 | 1.428 | 2.87 | 1.396 | 1.303 |

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

### 4.3.5 Normality

There are two normality tests in Warp PLS 7.0: the Jarque-Bera test (Normal-JB) and the Robust Jarque-Bera test (Normal-RJB). The results were reported in Table 4.7 and Table 4.8, where "Yes" means the data is normally distributed, and "No" means the opposite. The measurement results of all variables in this study were shown as non-normal data distribution which showed that the PLS measurement is more suitable for this test (Astrachan, Patel, & Wanzenried, 2014).

Table 4.6  Normality of the Data

|  | PR | PEU | PU | SQ | IQ | SCQ | SC | SAT | CUI | HB | HB*SC | HB*SAT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Normal-JB** | No | No | No | No | No | No | No | No | No | No | No | No |
| **Normal-RJB** | No | No | No | No | No | No | No | No | No | No | No | No |

Note:  Normal-JB = Jarque-Bera, Normal-RJB = Robust Jarque-Bera, PR = Perceived Risk, PEU = Perceived Ease of Use, PU = Perceived Usefulness, SQ = System Quality, IQ = Information Quality, SCQ = Service Quality, SC = Switching Costs, SAT = Satisfaction, HB = Herd Behavior, CUI = Continuous Use Intention.

### 4.3.6    Model Fit Factors

Kock (2010) concluded that the estimation of the PLS structure depended on the average path coefficient (APC), average $R^2$ (ARS), Average Full Collinearity (AFVIF), Goodness-Of-Fit (GOF); Simpson's Paradox ratio (SPR), Contribution Ratio (RSCR), Statistical Suppression Ratio (SSR), and Nonlinear Bivariate Causality Direction Ratio (NLBCDR). The size of these values can determine the fitness of the model.

Kock (2017) described the strong correlation of the path in the entire model in APC and Warp PLS. Furst, Connors, Bisogni, Sobal, and Falk (1996) suggested that whether the model had explanatory power depends on the R2 value of each variable. Here the R2 includes average R2 (ARS) and average adjusted R2 (AARS). Ringle (2004) proved that the Average R-square (ARS) had the right to interpret the entire model. For a given model, AARS was usually lower than ARS (Kock, 2015). The p-values of APC, ARS, and AARS should all be equal to or less than 0.05 (Kock, 2010).

In the model, Average Full Collinearity (AFVIF) was used to measure vertical collinearity, lateral collinearity, and multicollinearity. The value of AFVIF equal to or

less than 5 was acceptable, and equal to or less than 3.3 was ideal (Cassel, Hackl, & Westlund, 2000; S. Diamantopoulos, 2006; Fornell & Bookstein, 1982; Gujarati & Porter, 2003).

Goodness-Of-Fit (GOF) is the value of the geometric mean of the product of these two values: the average value of the common factor variance of the variable and the average value of R2. The formula is expressed as GOF= $\sqrt{\text{Communality} * \overline{R^2}}$ . If the value of GOF was greater than 0.1, the model fitting index was relatively small; greater than 0.25 and less than 0.36, a median value; greater than 0.36, a very good large value (Tenenhaus, Amato, & Esposito Vinzi, 2004).

Sympson's Paradox Ratio (SPR) meant that two sets of data under certain conditions would satisfy certain properties when discussed separately. But once these two sets of data are considered together, it may lead to the opposite conclusion. It was used to measure the degree of paradox in the data in the model. Its acceptable value was equal to or greater than 0.70, which meant that 70% of the paths in the model were asymptomatic (Kock, 2015; Kock & Gaskins, 2016; Pearl, 2009).

Contribution Ratio (RSCR) was used to measure the degree to which the model was not affected by negative R2. The acceptable value was equal to or greater than 0.90, which meant that the sum of R2 influence in the model was at least 90% of the sum of absolute R2 influence in the model (Pearl, 2009; Kock, 2015; Kock & Gaskins, 2016). Statistical Suppression Ratio (SSR) was used to measure how well the model was not affected by statistical suppression. Its acceptable value was equal to or greater than 0.70, the ideal value was 1.0 (Kock & Gaskins, 2016; MacKinnon, Krull, & Lockwood, 2000). Nonlinear bivariate causality direction ratio (NLBCDR) was used to judge whether there was a nonlinear relationship between any two variables, its acceptable value was equal to or greater than 0.70, the ideal value was 1.0 (Kock, 2010).

PLS analysis results of the above indicators were shown in Table 4.7. All model fitting indexes of the model in this study can meet the required standard value stated above.

Table 4.7  Model Fit Indicators

| Statistical Test | A suitable Standard or Critical Value | Data of Model Fitness | The Judgment of Model Fitness |
|---|---|---|---|
| **Average path coefficient (APC)** | P<0.001(Significant) Acceptable if >=0 | 0.097 | Suitability |
| **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 |
| **Average full collinearity VIF (AFVIF)** | Acceptable if <= 5, Ideally <= 3.3 | 1.410 | Ideally |
| **A global criterion of goodness-of-fit (GOF)** | Small >= 0.1, Medium >= 0.25, Large >= 0.36 | 0.306 | Suitability |
| **Simpson's paradox ratio (SPR)** | Acceptable if >= 0.7, Ideally = 1 | 0.913 | Good |
| **R-square contribution ratio (RSCR)** | Acceptable if >= 0.9, Ideally = 1 | 0.960 | Good |
| **Statistical suppression ratio (SSR)** | Acceptable if >=0 .7 | 0.913 | Good |
| **Nonlinear bivariate causality direction ratio (NLBCDR)** | Acceptable if >=0 .7 | 0.913 | Good |

The results show that the model's simulation indices match well. Next, it should be tested whether the path coefficient of the constructed model is significant.

### 4.3.7    Hypotheses Testing-PLS and Logit Results

The path coefficient and P-value analysis results of the constructed model in this study were shown in Table 4.8 and Figure 4.9.

Table 4.8  PLS Analysis Results

| Hypothetical Path | Path Coefficient (β) | P-Value | Positive or Not | Supported or Not |
|---|---|---|---|---|
| H1: CUI<--PR | -0.106 | <.001 | No | Yes |
| H2: PEU<--PR | -0.138 | <.001 | No | Yes |
| H3: PU<--PR | -0.155 | <.001 | No | Yes |
| H4: PU<-- PEU | 0.156 | <.001 | Yes | Yes |
| H5: SC<-- PEU | -0.053 | 0.164 | No | No |
| H6: SAT<-- PEU | 0.122 | <.001 | Yes | Yes |
| H7: SAT<-- PU | 0.187 | <.001 | Yes | Yes |
| H8: SAT <-- SQ | 0.225 | <.001 | Yes | Yes |
| H9: SAT<-- IQ | 0.143 | <.001 | Yes | Yes |
| H10: SAT <-- SCQ | 0.125 | <.001 | Yes | Yes |
| H11: CUI <--SQ | -0.025 | 0.336 | No | No |
| H12: CUI <-- IQ | 0.104 | .001 | Yes | Yes |
| H13: CUI <-- SCQ | 0.239 | <.001 | Yes | Yes |
| H14: CUI<-- SAT | 0.073 | 0.032 | Yes | Yes |
| H15: CUI<-- SC | 0.095 | 0.033 | Yes | Yes |
| H16: CUI<-- HB* SC | 0.060 | 0.175 | Yes | No |
| H17: CUI<--HB* SAT | -0.096 | 0.036 | No | Yes |

Note: PR = Perceived Risk, PEU = Perceived Ease of Use, PU = Perceived Usefulness, SQ = System Quality, IQ = Information Quality, SCQ = Service Quality, SC = Switching Costs, SAT = Satisfaction, HB = Herd Behavior, CUI = Continuous Use Intention; when P - Value<0.05, Significant.

After verification, among all the hypotheses, the hypothesis paths were not established as follows: H5: SC<-- PEU (β=-0.053, P=0.164), H11: CUI <--SQ (β=-0.025, P=0.336), and H19: CUI<-- HB* SC (β=0.06, P=0.175). Three hypothetical paths that are not Supported. The other fourteen paths are Supported.

This study presupposed that perceived risk negatively significantly affected continuous use intention, perceived ease of use, and perceived usefulness (H1-H3). The verification results were shown in Table 4.8.

Hypothesis H1 predicts that customers' perceived risk will negatively and significantly affect customers' continuous use intention. The analysis results show that there is a significant negative relationship between the two variables (H1) ($\beta$=-0.106, P<.001). Analysis result supports H1. At the same time, because of the existence of perceived risk, this study also assumes that perceived risk has negative effects on customers perceived ease of use, and perceived usefulness (H2, H3). After verification, it is found that H2 ($\beta$=-0.138, P<.001) and H3 ($\beta$=-0.155, P<.001) also have negative and significant effects.

Secondly, this study assumes the relationship between perceived ease of use, perceived usefulness, switching costs, and satisfaction (H4-H7).

This study assumes that H4: customers' perceived ease of use will positively and significantly affect customers' perceived usefulness. The analysis result shows that there is a positive and significant relationship between these two variables. The analysis result supports H4 ($\beta$=0.156, P<.001). However, the customer's perceived ease of use assumed in this study has a positive and significant effect on customer switching costs (H5). After verification, it is found that H5 ($\beta$=-0.053, P=0.164), P>0.05, is not supported. The main reasons may now be as follows: If the ease of use of mobile food delivery apps is higher, customers will consume less time and effort when switching to other mobile food delivery apps. The components of switching costs include: It takes a certain amount of time to find another mobile food delivery app to replace the one you are using; It takes a certain amount of time to register and familiarize yourself with other mobile food delivery apps; You need to lose a certain discount and choose another mobile food delivery app to replace the one you are using; If you uninstall the mobile food delivery app currently in use, you are not sure

that other mobile food delivery apps can bring you better products and services. Most likely because the latter two account for a relatively high share. That is if customers switch to other mobile food delivery apps. Customers will lose more discounts accumulated in the original mobile food delivery app. And it is still not sure that the new mobile food delivery app will bring better products and services. So this leads to customer perception of ease of use without a significant and negative impact on switching costs.

This study also predicts that the customer's perceived ease of use has a positive and significant impact on customer satisfaction (H6). After verification, it is found that H6 ($\beta$=0.13, P<.001), was supported. This study assumes that customer perceived usefulness has a positive and significant impact on customer satisfaction (H7). Through the results in Table 4.9, it is found that H7 ($\beta$=0.168, P<.001), the hypothesis was supported.

The relationship among system quality, information quality, service quality, satisfaction, and continuous use intention predicted in this study is H8—H13. In these six hypothetical relationships, it can be seen from Table 4.9 that hypothesis H8 ($\beta$=0.17, P<.001) was supported, system quality positively and significantly affected satisfaction; Hypothesis H9 ($\beta$=0.124, P<.001) was supported, Information quality positively and significantly affected customer satisfaction; Hypothesis H10 ($\beta$=0.121, P<.001) is established, service quality positively and significantly affected satisfaction.

But for hypothesis H11 ($\beta$=-0.025, P=0.336), P>0.05 was not supported. System quality did not significantly affect customers' continuous use intention. The reasons may be as follows: first of all, system quality did not positively affect customers' continuous use intention. This is because if the information provided by the mobile food delivery app platform is untrue, insufficient, and does not meet the needs of customers. Although the system quality of the mobile food delivery app is very high, it will also affect the customer's shopping experience and naturally reduce the customer's continuous use intention. The second is that the system quality did not significantly affect the customer's continuous use intention. There are many reasons that affect customers' continued use. So even if the system quality of a certain mobile food delivery app is very high. The operation process of the mobile food delivery app currently used by customers is clear; Beautiful interface is wee designed; quick response; Clear search classification; Good stability, you can log in at any time. However, such a system does not guarantee that the catering of the mobile food

delivery app can meet customer tastes; meet the requirements for customer information search; It is also possible that the customer service of the mobile food delivery service or the service of the food delivery staff did not satisfy the customer, so the customer will terminate the use of the mobile food delivery app. The hypothesis H12 ($\beta$=0.104, P=.001), was supported, indicating that the information quality would positively and significantly affect the continuous use intention. The hypothesis H13 ($\beta$=0.239, P<.001), was supported. This confirmed that the service quality would positively and significantly affect the continuous use intention.

Regarding the hypotheses satisfaction and continuous use intention (H14), switching costs, and continuous use intention (H15). The verification results showed H14 ($\beta$=0.073, P=0.032) H15 ($\beta$=0.095, P=0.033) were supported. Satisfaction positively significantly affects continuous use intention. Switching costs significantly affect continuous use intention.

In this study, in the hypothesis about the moderating variable-- herd behavior. From the verification results in Table 4.10, it was can be seen that H16 ($\beta$=0.06, P=0.175) and H17 ($\beta$=-0.096, P=0.036). In H16, P>0.05, the hypothesis was not supported. The herd behavior has no negative significant influence on customer switching costs and the continuous use intention. The reasons may be as follows: Customers continue to use this mobile food delivery app not because of the switching costs but more because customers choose whether to continue using it according to their true feelings about the mobile food delivery app they are using. For example, they are familiar with the software of this mobile food delivery app being used, with the food it provides, with the services provided to its offline mobile food merchants, platform service providers, and mobile food delivery personnel. So, the customers choose to continue using mobile food delivery apps based on their true feelings, instead of switching to other mobile food delivery apps because of others's use. Hypothesis H17 was supported, herd behavior has a negative and significant impact

on the relationship between satisfaction and continuous use intention. When satisfaction is low, herd behavior plays a greater role. On the contrary, herd behavior plays a smaller role.
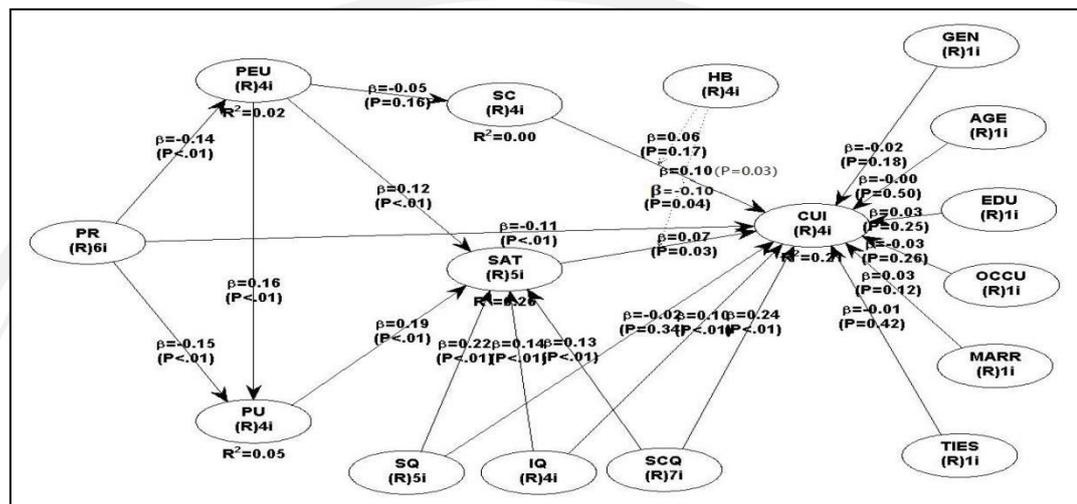


Figure 4.11 PLS Analysis Results

Note: PR = Perceived Risk, PEU = Perceived Ease of Use, PU = Perceived Usefulness, SQ = System Quality, IQ = Information Quality, SCQ = Service Quality, SC = Switching Costs, SAT = Satisfaction, HB = Herd Behavior, CUI = Continuous Use Intention; GEN = Gender, AGE = Age, EDU = Education, OCCU = Occupation, MARR = Marriage, TIES = TIES of cities.

### 4.3.8 Influence of Control Variables

The control variables in this study are gender, age, education level, occupation, marital status, and city tiers. From the results of the PLS analysis, (shown in Table 4.9), it was seen that the P values of these control variables between the dependent variable were all greater than 0.05. It indicates that they have no significant effect on the continuous use intention. If which control variable has a significant effect on the

dependent variable, it can be included in the ranks of latent variables for analysis in future studies.

Table 4.9  The Influence of the Control Variables on the Dependent Variables

| Paths | Path Coefficient ($\beta$) | P -value | Significant Impact or not |
|---|---|---|---|
| CUI<-- GEN | -0.024 | 0.178 | No |
| CUI<-- AGE | 0.00 | 0.495 | No |
| CUI<-- EDU | 0.028 | 0.249 | No |
| CUI<-- OCCU | -0.028 | 0.260 | No |
| CUI<-- MARR | 0.033 | 0.124 | No |
| CUI<-- TIES | -0.009 | 0.417 | No |

Note:  CUI = Continuous Use Intention, GEN = Gender, AGE = Age, EDU = Education, OCCU = Occupation, MARR = Marriage, TIES = TIES of cities.

### 4.3.9    Analyses of Moderating Effects

4.3.9.1  Hypothesis Moderating Paths H16 (CUI <-- HB* SC) was not
        Supported

The verification results are shown in Table 4.10.H15: CUI<-- SC, ($\beta$= 0.096, P =0.033). P<0.05, this showed that switching costs had a significant positive impact on the continuous use intention. This also means that if the switching costs increase by one unit, the continuous use intention will increase by 0.096 units.

In addition, H16: CUI <-- HB* SC, ($\beta$=0.06, P =0.175) P>0.05, herd behavior had no significant influence on the relationship between the switching costs and the continuous use intention. This hypothesis was not supported. That is, the herd behavior does not have a moderating effect on the relationship between the switching costs and the continuous use intention.

4.3.9.2 Hypothesis moderating paths H17 (CUI <-- HB* SAT) was

Supported

The verification results are shown in Table 4.10. H14: CUI<-- SAT, (β= 0.073, P =0.032) P<0.05, this showed that customer satisfaction has a significant positive impact on continuous use intention. This also means that if customer satisfaction increases by one-unit, continuous use intention will increase by 0.073 units.

In addition, H17: CUI <-- HB* SAT, (β=-0.098, P =0.036) P<0.05, herd behavior had a significant influence on the relationship between satisfaction and continuous use intention. That is, the herd behavior has a significant negative moderating effect on the relationship between customer satisfaction and continuous use intention. When satisfaction is low, customers will be willing to switch to other mobile food delivery apps because of herd behavior. As a result, the original continuous use intention about mobile food delivery is reduced.

The moderating relationship between them is as follows: For every increase in satisfaction, the continuous use intention will decrease by (0.073 -0.098=-0.025) 0.025 units.

In order to express the relationship between them more clearly, this study uses single Figure 4.12, high and low-value comparison Figure 4.13, and 3D Figure 4.13 to show respectively. This article assumes that the mobile food delivery app used by surrounding users is different from the mobile food delivery app used by the sample.

For single Figure 4.12: When the herd behavior is low, and the satisfaction is low, the continuous use intention to use mobile food delivery is low. The moderating effect of herd behavior does not exist. The relationship diagram in the figure is the relationship between satisfaction and continuous use intention. With the improvement of satisfaction, when the herd behavior is low, customers do not have a

herd mentality and choose to continue using the original mobile food delivery app, the continuous use intention is high. At the same time, the moderating effect of herd behavior does not exist. When herd behavior is high when 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. The regulation of the herd effect is negative H17 ($\beta$=-0.098, P =0.036). As the herd behavior increases and satisfaction continues to increase, the continuous use intention of using it will gradually increase. But when the satisfaction continues to increase, the continuous use intention will reach the maximum. Due to the combination of people's curiosity and the herd effect, customers will switch to other mobile food delivery apps. The customer is using both the old and new mobile food delivery app. After using it for a while, customers found that the original mobile food delivery app was better. The customer will continue to use the original mobile food delivery app. Therefore, in the end, continuous use intention of using it increases in proportion to satisfaction.
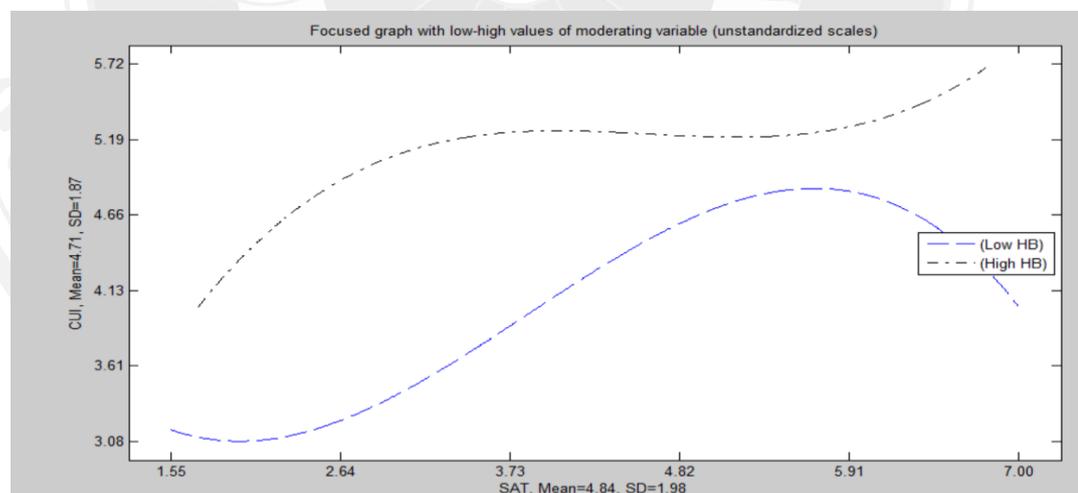


Figure 4.12  Single Map of the Influence of Herd Behavior on the Relationship Between Satisfaction and Willingness to Continue Use (Unstandardized Scales)

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

For high and low-value comparisons were shown in Figure 4.13: In the figure on the left, in an environment of low herd behavior, when customers' satisfaction is low, customers' continuous use intention to use other mobile food delivery apps is low. the moderating effect of herd behavior does not exist. When there is no herd mentality and choose to continue using the original mobile food delivery app, the continuous use intention is first increased in a positive proportion and then decreased in a negative proportion. The moderating effect of herd behavior does not exist.

In the figure on the right, in the environment of high herd behavior, when satisfaction is low, customers will have a herd mentality and they will have low continuous use intention. The regulation of the herd effect is negative H17 ($\beta$=-0.098, P =0.036). However, when the satisfaction level reaches a certain level, even if it continues to be used, the satisfaction level will continue to increase. Consumers may switch to other mobile food delivery apps due to curiosity and herd behavior. At this time, the continuous use intention will decrease. Therefore, the relationship between satisfaction and continuous use intention in Figure 4.13 is not a straight line but a warped line.
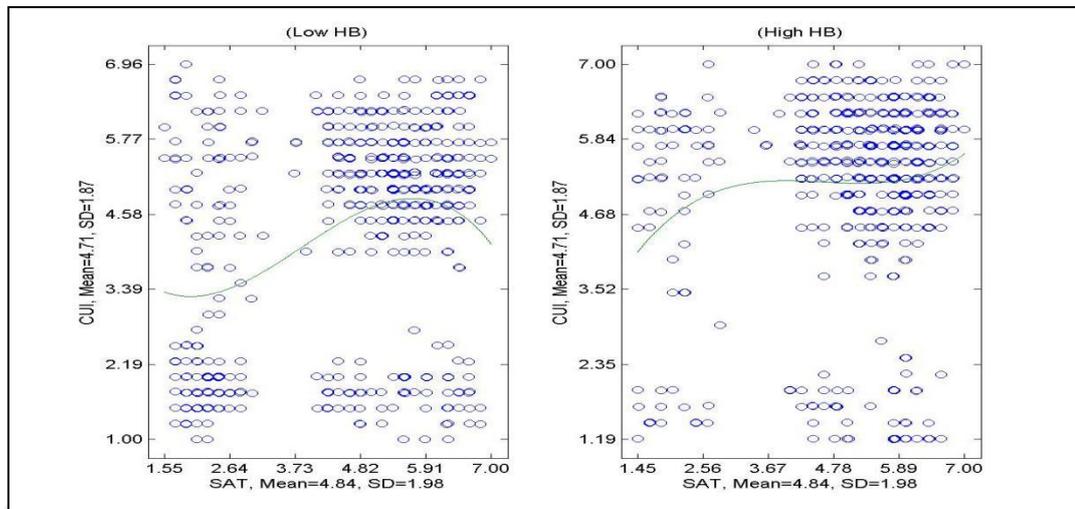
Figure 4.13  The Comparison Map of the Influence of Low Herd Behavior and High

Herd Behavior on the Relationship Between Satisfaction and

Continuous Use Intention (Unstandardized Scales)

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

SD = Standard Deviation.

This study chose to set a view from the top in Warp-PLS 7.0 to get the 3D Figure 4.13. When satisfaction is low and in an environment with low herd behavior, customers' continuous use intention is low. The moderating effect of herd behavior does not exist. With the improvement of satisfaction, customers are still in an environment with low herd behavior. Customers do not have a herd mentality and choose to continue using the original mobile food delivery app. Their continuous use intention is high. The moderating effect of the herd behavior does not exist. When satisfaction increases and the herd behavior is higher, customers will have a herd mentality and choose to use other mobile food delivery apps. Customers' continuous use intention may be low, which makes the herd behavior have a negative moderating effect H17 ($\beta$=-0.098, P =0.036). The result is a 3D gravel map with bumps from the

front view (When HB and SAT are the minima). It is convex first, then concave, and then convex.
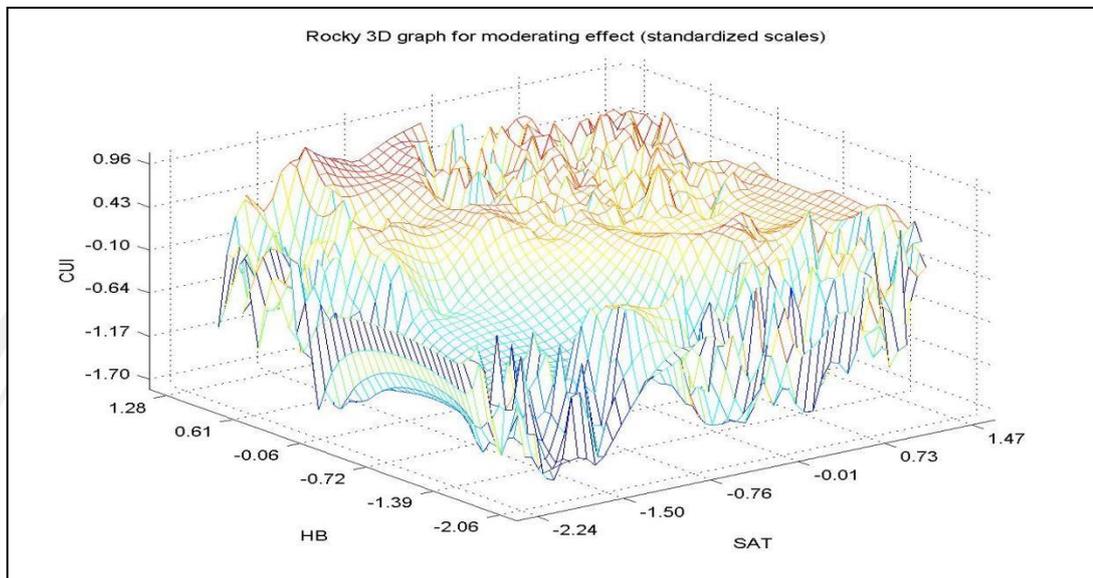


Figure 4.14  The 3D Map of the Influence of Herd Behavior on the Relationship

Between Satisfaction and Willingness to Continue to Use

(Unstandardized Scales)

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

### 4.3.10  Mediating Effect Test of Mediating Variables

Baron and Kenny (1986) stated the meaning of mediating variables and how to test their mediating effect. With the improvement of people's cognition, among all intermediary testing methods, the causal step method used in B-K testing was the least feasible testing method. At present, another method used to determine whether the mediation effect is significant, the Sobel test method is used. But the premise of the Sobel test was that the tested data needs to obey a normal distribution. But under

normal circumstances, the data is not in a normal distribution, so the Z value calculated by the Sobel test was biased (MacKinnon, Fairchild, & Fritz, 2007).

This study uses Mplus 8.0 to test and confirm the mediating effect of mediating variables. In structural equations, the coefficient product method and Bootstrap are often used to test the total effect, direct effect, and indirect effect between variables (MacKinnon et al., 2007) .

Among them, the mediating variable (M) is between the independent variable (X) and the dependent variable (Y). It is the internal cause of the influence of the independent variable on the dependent variable (Duncan, Featherman, & Duncan, 1972) (shown in 4.16). If the independent variable can affect the dependent variable through the intermediate variable, it is considered that the mediating variable plays a mediating effect between the independent variable and the dependent variable.
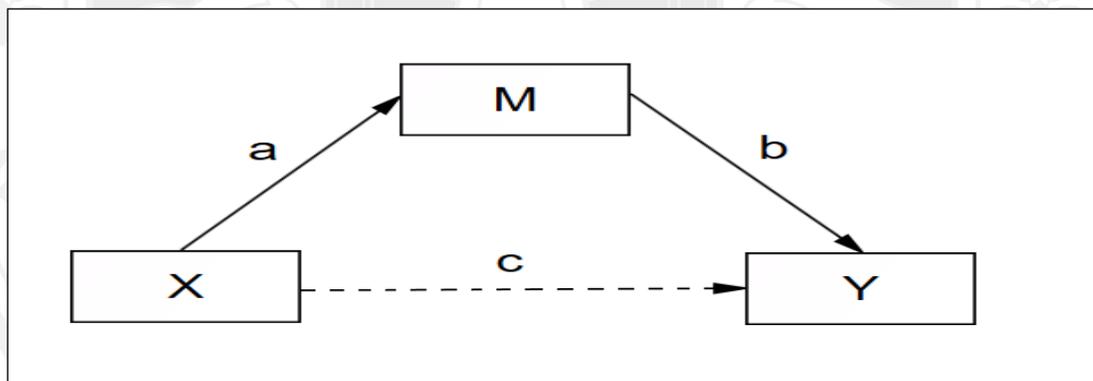


Figure 4.15  The Process of Testing the Mediating Effect (A Mediating Variable in SEM)

A model with a mediating variable is a simple mediating model. A model with two or more mediating variables is called a multiple mediating model (shown in Figure 4.16, 4.17, 4.18). The multiple mediation model had advantages over the simple mediation model. Firstly, the total mediation effect could be obtained. Secondly, under the premise of controlling other mediating variables (such as controlling M1), the specific mediating effects of another mediating variable (such as M2) could be studied (Preacher & Hayes, 2008). For a chain of intermediate variable models (Figure 4.16, 4.17),

For a chain of mediation variable models (shown in Figure 4.16, 4.17). It is also named the chain intermediate variable. So, the role of these chain mediation variables was also called the chain mediation effect (Chung & Bhattacherjee, 2009). It is necessary to first study the specific mediating effects of M1 and M2 separately. When the specific mediating effect of M1 exists and the specific mediating effect of M2 exists, then the specific mediating effect of M1 and M2 also exists, At this time, M1 and M2 have multiple intermediary effects (Fang, 2018). When the mediating variables are three or more, the same principle can be used to obtain multiple mediating effects of multiple mediating variables.

When analyzing the mediation variables separately first, see if the specific mediation effect of this mediation variable exists; Then reanalyze whether the specific mediating effects of the two mediating variables exist when there are two mediating variables; And then analyze whether the specific mediating effects of these three mediating variables exist when there are three mediating variables Finally, analyze whether the mediating effect of M1, M2... Mn including all mediating variables on this path exists. For parallel intermediary variable models (shown in Figure 4.18). When the mediating variables are three or more, the same principle can be used to obtain multiple mediating effects of multiple mediating variables. It is enough to analyze whether the specific mediating effect of each mediating variable exists.
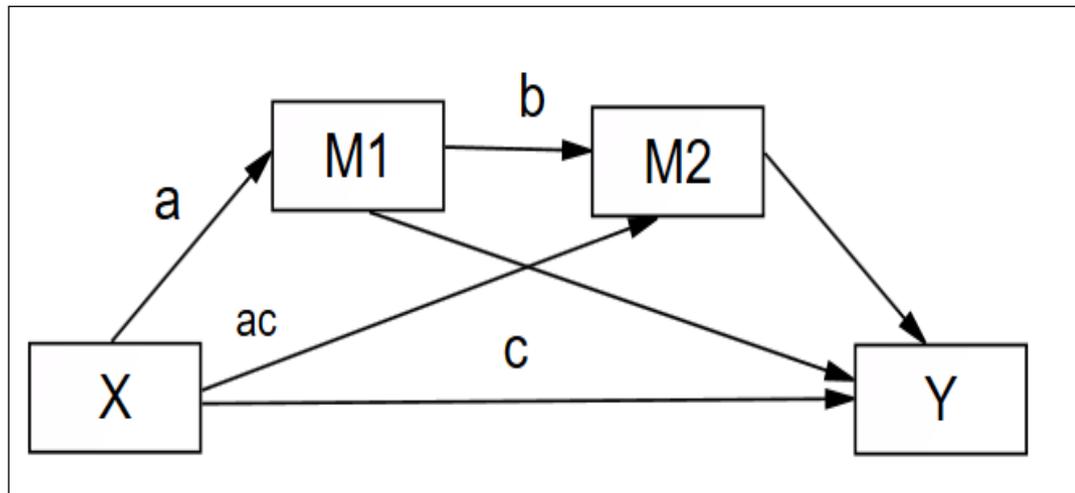
Figure 4.16  The Process of Testing the Intermediary Effects (SEM of Two Mediating
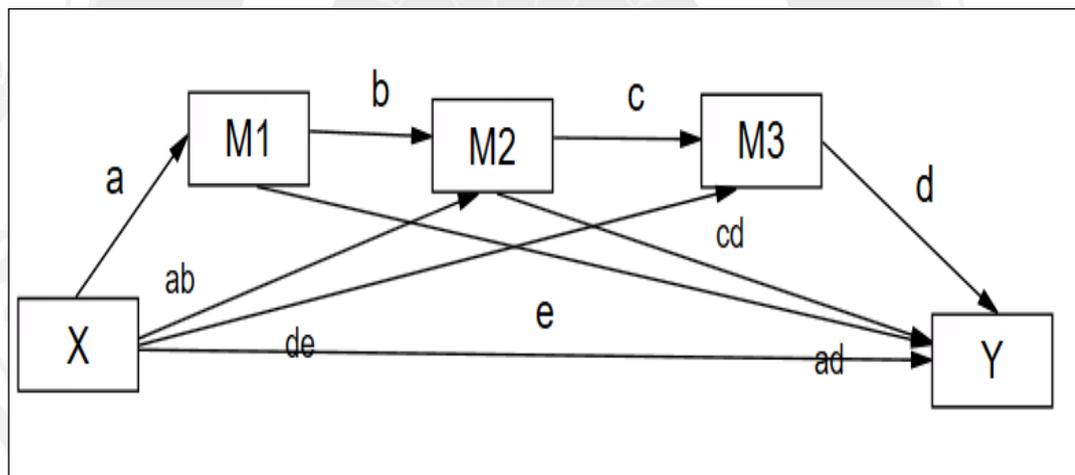
Variables)



Figure 4.17  The Process of Testing the Intermediary Effects (SEM of Multiple

Chains Intermediary Variables)
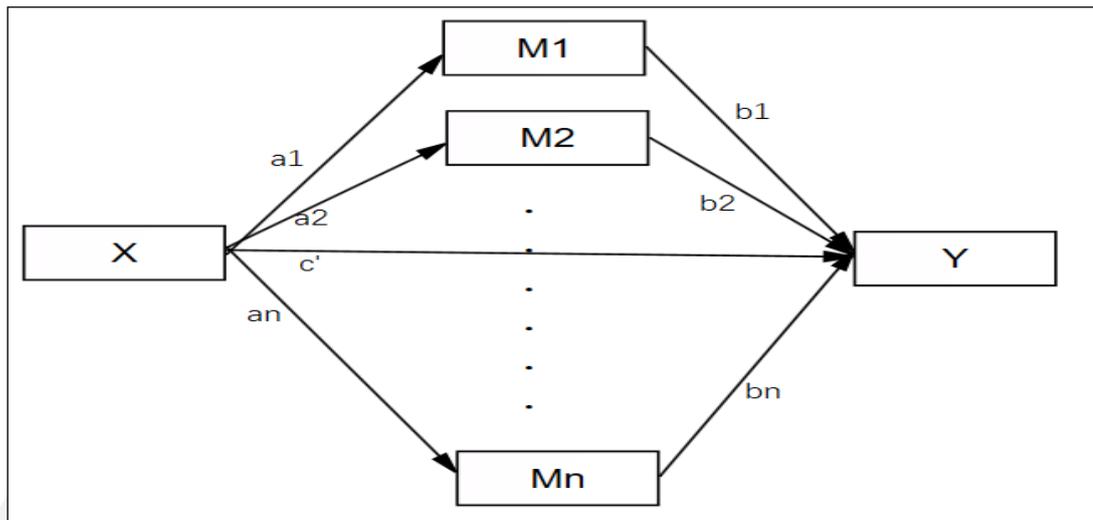
Figure 4.18  The Process of Testing the Intermediary Effects (SEM of Multiple

Parallel Intermediate Variables)
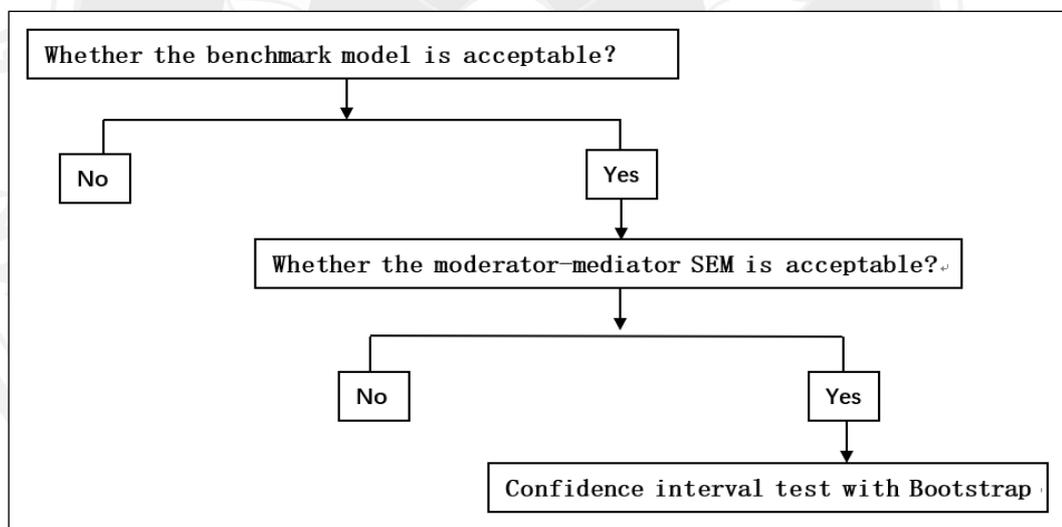


Figure 4.19  Analysis Process of the Moderated Mediating Effect in SEM

If the mediating SEM with moderating variables is acceptable, then the moderated mediating effect analysis can be carried out. Fang (2018) systematically combed the development process of the explicit variable analysis method with a moderated mediation effect. He suggested using the coefficient product method proposed by Hayes (2009) to analyze. That is, if the bootstrap confidence interval does not include 0, it means that the moderated mediating effect significantly exits. In the face of a regulated intermediary SEM analysis task, how should researchers analyze it? Fang (2018) summarized an analysis process of moderated mediating effect in SEM (shown in Figure 4. 20).

(1)    Judge whether the benchmark SEM model is acceptable. If it is not, then the analysis ends; otherwise, go to step 2.

(2)    Judge whether the moderated mediating SEM model is acceptable, if not, then the analysis ends, otherwise go to step 3.

(3)    Use the coefficient product method to analyze the moderated mediating effect, If the BOOTSTRAP confidence interval does not include 0, it means that the moderated mediating effect is significant.

At present, citing the confidence interval method is the most correct way to test the mediation effects. The principle is as follows: firstly the null hypothesis was put forward, If the 95% confidence interval contained 0, the mediating effect did not exist; If the 95% confidence interval did not contain 0, then SEM rejected the original hypothesis, the mediating effect existed. At the same time, the absolute value of Z divided by SE was greater than 1.96. The P-value was less than 0.05 to reach a significant level (Biesanz, Falk, & Savalei, 2010). Its inspection steps are as follows: Take Figure 4.15 as an example. Firstly, check the regression coefficient c. If c is not significant, stop the regression test; If C is significant, at least one of regression coefficients a and b is not significant. The estimated value of the mediation effect needs to be tested by Bootstrap. Secondly, when the Bootstrap test is performed on

whether the mediation effect is significant. If the confidence interval does not include 0, the mediation effect is significant; Otherwise, the mediation effect does not exist.

In addition, the type of intermediary effect can also be judged based on the direct effect of Bootstrap test results. If the direct effect was significant, the mediating variable played a partial mediating effect; If the direct effect does not exist, the mediating variable plays a completely mediating role (Baron & Kenny, 1986).

This study uses Mplus 8.3 to test the mediating effect. The results obtained when the bootstrap is set to 1000 are shown in Table 4.10.

Table 4.10  Test Result of Intermediary Effect

| Path | Point Estimate | Product of Coefficients | | P-Value | Bootstrapping 95% Confidence Interval | | the Effect Exist Or Not |
|---|---|---|---|---|---|---|---|
| | | Standard Error (SE) | Z | | Low | High | |
| | Total Effects | | | | | | |
| CUI<--PR | -0.147 | 0.032 | -4.560 | 0.000 | -0.212 | -0.085 | Yes |
| CUI <--SQ | 0.008 | 0.041 | 2.086 | 0.003 | 0.047 | 0.110 | --- |
| CUI <---IQ | 0.093 | 0.033 | 2.824 | 0.005 | 0.030 | 0.155 | Yes |
| CUI <-- SCQ | 0.213 | 0.038 | 5.636 | 0.000 | 0.142 | 0.290 | Yes |
| | Indirect Effects | | | | | | |
| CUI <-- PEU <--PR | 0.010 | 0.005 | 2.043 | 0.041 | 0.003 | 0.022 | Yes |
| CUI <-- PU <--PR | -0.029 | 0.012 | -2.458 | 0.014 | -0.054 | -0.009 | Yes |
| CUI <-- SC <--PR | -0.018 | 0.008 | -2.236 | 0.025 | -0.038 | -0.005 | Yes |
| CUI <-- SAT <--PR | -0.002 | 0.003 | -0.654 | 0.513 | -0.013 | 0.002 | No |
| CUI<--PU<-- PEU <--PR | -0.002 | 0.001 | -1.672 | 0.095 | -0.006 | 0.000 | No |
| CUI<--SC<-- PEU <--PR | 0.000 | 0.000 | 0.924 | 0.356 | 0.000 | 0.002 | ---- |
| CUI<--SAT<-- PEU <--PR | -0.002 | 0.001 | -1.560 | 0.119 | -0.005 | 0.000 | No |
| CUI<--SAT<--PU<--PR | -0.002 | 0.001 | -1.647 | 0.100 | -0.006 | 0.000 | No |
| CUI<--SAT <--PU <--PEU <--PR | 0.000 | 0.000 | -1.315 | 0.189 | -0.001 | 0.000 | No |

| Path | Point Estimate | Product of Coefficients | | P-Value | Bootstrapping 95% Confidence Interval | | the Effect Exist Or Not |
|---|---|---|---|---|---|---|---|
| | | Standard Error (SE) | Z | | Low | High | |
| CUI<--SAT<--SQ | 0.019 | 0.008 | 2.231 | 0.026 | 0.005 | 0.039 | Yes |
| CUI<--SAT<--IQ | 0.014 | 0.007 | 2.032 | 0.042 | 0.003 | 0.029 | Yes |
| CUI<--SAT<--SCQ | 0.013 | 0.007 | 1.823 | 0.068 | 0.002 | 0.031 | Yes |
| | Direct Effects | | | | | | |
| CUI<--PR | -0.103 | 0.030 | -3.476 | 0.001 | -0.165 | -0.046 | Yes |
| CUI <--SQ | 0.009 | 0.042 | 0.213 | 0.831 | -0.072 | 0.095 | No |
| CUI <---IQ | 0.079 | 0.033 | 2.393 | 0.017 | 0.016 | 0.144 | Yes |
| CUI <-- SCQ | 0.201 | 0.038 | 5.307 | 0.000 | 0.131 | 0.280 | Yes |

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

The results in Table 4.10 show that the two paths are not significant H5: SC<--PEU (β=-0.053, P=0.164), H11: CUI <--SQ (β=-0.025, P=0.336). Therefore, the intermediary effect of these two paths is not considered.

From path CUI<--PR, Z>1.96, P<0.05, and the low and high values in the 95% confidence interval do not contain 0, so the total effect exists. It is known that from the empirical results in this study, the total effect from the independent variable PR to the dependent variable CUI exists, the direct effect exists, the mediating effects of the four mediating variables between the two are summarized as follows:

(1) Ease of use has a partial mediating effect between perceived risk and continuous use intention;

(2) Perceived usefulness has a partial mediating effect between perceived risk and continuous use intention;

(3) Switching costs has a partial mediating effect between perceived risk and continuous use intention;

(4) Satisfaction has no mediating effect between perceived risk and continuous use intention;

(5) Perceived ease of use and perceived usefulness together have no chain mediating effect between perceived risk and continuous use intention;

(6) This study does not consider the chain intermediary effect of perceived ease of use and switching costs between perceived risk and continuous use intention, because perceived ease of use does not significantly affect switching costs.

(7) Perceived ease of use and satisfaction does not have a chain intermediary effect between perceived risk and continuous use intention;

(8) Perceived usefulness and satisfaction do not have a chain intermediary effect between perceived risk and continuous use intention.

(9) Perceived ease of use, Perceived usefulness, and satisfaction do not have a chain intermediary effect between perceived risk and continuous use intention.

The last three paths (7), (8), (9) are the chain mediation effects that need to be considered in the three mediation paths from independent variable PR to dependent variable CUI in this article. However, after empirical verification, none of the three chain intermediary effects exist.

In CUI <--IQ and CUI <--SCQ, Z >1.96, P<0.05, and the low and high values in the 95% confidence interval do not contain 0, so their total effect exists. In CUI <--SQ, the indirect effects exist, the direct effect does not exist. Therefore, satisfaction has a completely intermediary effect in CUI <--SQ. In CUI <--IQ and CUI <--SCQ, total effect exists, the indirect effects exist, the direct effect exists, Therefore, satisfaction has a partial intermediary effect in CUI <--IQ and CUI <--SCQ.

Table 4.11  Summary Table of the Intermediary Effect of all Paths in This Study

| Paths | Relationships | Exist or Not |
| --- | --- | --- |
| CUI<--SC<-- PEU <--PR | Perceived ease of use and switching costs have the chain mediating effects from perceived risk to continued use intention; | No |
| CUI<--SAT<-- PEU <--PR | Perceived ease of use and satisfaction have the chain mediating effects from perceived risk to continued use intention; | No |
| CUI<--SAT<--PU<--PR | Perceived usefulness and satisfaction have the chain mediating effects from perceived risk to continued use intention; | No |
| CUI<--SAT <--PU <--PEU <--PR | Perceived ease of use, perceived usefulness, and satisfaction have the | No |

| Paths | Relationships | Exist or Not |
|-------|---------------|--------------|
| | chain mediating effects from perceived risk to continued use intention; | |
| **CUI<--SAT<--SQ** | Satisfaction has the mediating effect from system quality to continued use intention; | Partial |
| **CUI<--SAT<--IQ** | Satisfaction has the mediating effect from information quality to continued use intention; | Partial |
| **CUI<--SAT<--SCQ** | Satisfaction has the mediating effect from service quality to continued use intention. | Partial |

4.3.10.1  Discussion on the Mediating Effect of Perceived Ease of Use

Perceived ease of use is one of the key factors of the Technology Acceptance Model (TAM). It focuses on a measure of how difficult it was for customers to use the information system of mobile food delivery apps. It enabled customers to purchase their favorite takeaway meals more quickly and accurately (J. Xu, 2018). So, what are the components of perceived ease of use? What is the mechanism of perceived ease of use between the customer's perceived risk and the customer's continuous use intention?

First, after empirical research, ease of use has a partial mediating effect between perceived risk and continuous use intention. But if satisfaction is added to this path, it becomes a path perceived risk ->perceived ease of use -> satisfaction -> continuous use intention. In this path, after empirical research, the perceived risk negatively significantly affects the perceived ease of use H6 ($\beta$=0.122, P<0.001). Satisfaction positively significantly affects continuous use intention H14 ($\beta$=0.073, P=0.032). Service providers of mobile food delivery apps believe that improving the ease of use of the platform will increase customer satisfaction and customers will continue to use mobile food delivery apps. However, through empirical research, it is found that perceived ease of use and satisfaction do not have a partial mediating effect between perceived risk and continuous use intention. Although the perceived risk partially affects the continuous use intention through the ease of use, it does not affect the continuous use intention through the ease of use and satisfaction (H. L. Yan, F. Xu, H. Xiong, & Q. Wang, 2018).

Finally, the path studied in this article perceived risk ->perceived ease of use -> perceived usefulness -> satisfaction -> continuous use intention. In this path, the perceived ease of use, perceived usefulness, and satisfaction do not have the chain mediating effect. The main reason for this should be attributed to the fact that the presence of perceived risks does not increase customer satisfaction due to the increase in perceived ease of use and increase in perceived usefulness, and ultimately increase the continuous use intention (C. C. Wang, Lee, Yau, & Lee, 2019).

4.3.10.2 Discussion on the Mediating Effect of Perceived Usefulness

Firstly, perceived usefulness has a partial mediating effect between perceived risk and continued use intention. Although customers can perceive many risks when using mobile food delivery apps. But because the mobile food delivery app can save customers time, improve the quality of life, and bring a lot of conveniences, they will continue to use the mobile food delivery app.

Perceived usefulness and satisfaction do not have a chain mediating effect between perceived risk and continuous use intention. It has been verified that customer perceived usefulness positively and significantly affects satisfaction H7 (β=0.187, P<0.001). However, customers can perceive that many risks are not affected by the increase in usefulness and satisfaction. Perceived risk does not affect the continuous use intention through perceived usefulness and satisfaction due to the addition of satisfaction.

In path perceived risk ->perceived ease of use -> perceived usefulness -> satisfaction -> continuous use intention. Through empirical research, it is found that the mediating effect of perceived ease of use, perceived usefulness, and satisfaction does not exist. Although the perceived risk negatively affects the perceived ease of use H2 (β=-0.106, P<0.001); Perceived ease of use positively significantly affects perceived usefulness H4 (β=0.156, P<0.001); Perceived usefulness positively and significantly affect satisfaction H7 (β=0.187, P<0.001); Satisfaction also significantly affects the continuous use intention H14 (β=0.073, P=0.032). But the continuous use intention is more directly affected by the perceived risk, because of the direct effect of perceived risk exists, customers experience the usefulness of mobile food delivery apps. It makes customers feel that although they find a lot of useful information. It can improve work efficiency and the quality of life, bring a lot of convenience to life (Alshurideh et al., 2019). However, customers will not continue to use the mobile food delivery app just because of these contents.

4.3.10.3 Discussion on the Mediating Effect of Switching Costs

Switching costs have a mediating effect between perceived risk and continuous use intention. The existence of customer perceived risk affects customers' continuous use intention through the size of the switching costs

Perceived ease of use and switching costs do not have a chain mediating effect between perceived risk and continuous use intention. In path:

perceived risk ->perceived ease of use -> switching costs -> continuous use intention. Switching cost does not significantly affect the switching cost as negatively as preset H5 (β=-0.053, P=0.164) because of the presence of perceived ease of use. Therefore, the switching costs do not play a mediating effect under the influence of ease of use in the perceived risk environment. The reasons for this result may be in actual use, customers in a higher perceived risk environment, although the negative side significantly affects perceived ease of use H2: (β=-0.106, P<0.001). When customers encounter higher switching costs, customers need to spend a certain amount of time to find other mobile food delivery apps to replace the ones they are using; they also need to lose a certain discount and choose another mobile takeaway app to replace the one they are using; If they uninstall the mobile food delivery app, it takes a certain amount of time to register and familiarize with other mobile food delivery apps. There are also times when it is uncertain that other mobile food delivery apps can bring better products and services to customers. All these reasons did not affect the customer's continuous use intention.

4.3.10.4 Discussion on the Mediating Effect of Satisfaction

(1) Satisfaction has no mediating effect between perceived risk and continuous use intention. The existence of customer perceived risk does not affect customers' continuous use intention through satisfaction. More reasons are through other influencing factors to influence customers' continuous use intention.

(2) Perceived ease of use and satisfaction do not have a chain mediating effect between perceived risk and continuous use intention. In path: perceived risk ->perceived ease of use -> satisfaction -> continuous use intention, perceived risk negatively affected perceived ease of use H2 (β=-0.106, P<0.001); perceived ease of use positively significantly affected satisfaction H6 (β=0.073, P=0.032); satisfaction positively significantly affects continuous use intention H14 (β=0.122, P<0.001). Although the perceived risk affected the continuous use intention

through the ease of use, it does not affect the continuous use intention through satisfaction. So, if consider the perceived ease of use and satisfaction as an unit, the perceived risk does not affect the continuous use intention through perceived ease of use and satisfaction.

(3) Perceived usefulness and satisfaction do not have a chain mediating effect between perceived risk and continuous use intention. In path: perceived risk -> perceived usefulness -> satisfaction -> continuous use intention, perceived risk negatively affected perceived usefulness H3 ($\beta$=-0.155, P<0.001); perceived usefulness positively and significantly affected satisfaction H7 ($\beta$=0.187, P<0.001); satisfaction positively and significantly affected continuous use intention H14: ($\beta$=0.073, P=0.032). Although the perceived risk affects the continuous use intention through usefulness, it does not affect the continuous use intention through satisfaction. Therefore, when the perceived usefulness and satisfaction are considered as an unit, the perceived risk does not affect the continuous use intention through the perceived usefulness and satisfaction.

(4) Perceived ease of use, perceived usefulness, and satisfaction do not have a chain mediating effect between perceived risk and continuous use intention. In path: perceived risk->perceived ease of use -> perceived usefulness -> satisfaction -> continuous use intention, after empirical verification, satisfaction did not have a mediating effect in this path. The main reasons may be as follows: Although perceived risk negatively significantly affected perceived ease of use H2: ($\beta$=-0.106, P<0.001), perceived ease of use positively and significantly affected perceived usefulness H4 ($\beta$=0.156, P<0.001), perceived ease of use positively and significantly affected satisfaction H6 ($\beta$=0.073, P=0.032), satisfaction positively significantly affected continuous use intention H14 ($\beta$=0.122, P<0.001). Although the perceived risk affected the continuous use intention through usefulness; but it did not affect the continuous use intention through satisfaction. So, if consider the perceived

ease of use, usefulness, and satisfaction as an unit, the perceived risk did not affect the continuous use intention through perceived ease of use, perceived usefulness, and satisfaction.

(5) Satisfaction has a partial mediating effect between system quality and continuous use intention. In path: system quality -> satisfaction -> continuous use intention, H11: CUI <--SQ ($\beta$=-0.025, P=0.336) was not significant, there was no direct effect between the two variables. Z>1.96, P<.05, And the low and high values in the 95% confidence interval did not contain 0, there was an indirect effect but no direct effect between the two variables, therefore, satisfaction has a completely mediating effect in CUI <--SQ.

(6) Satisfaction has a partial mediating effect between information quality and continuous use intention. In path: information quality -> satisfaction -> continuous use intention, Z >1.96, P<.05, And the low and high values in the 95% confidence interval did not contain 0, there was a total effect, indirect effect and direct effect between the two variables, therefore, satisfaction has a partial mediating effect in CUI <--IQ. The influence of information quality on the continuous use intention is partly indirectly affected by satisfaction.

(7) Satisfaction has a partial mediating effect between service quality and continuous use intention. In path: service quality -> satisfaction -> continuous use intention, Z >1.96, P<.05, And the low and high values in the 95% confidence interval did not contain 0, the total effect exists, indirect effect and direct effect exists, too, satisfaction has a partial mediating effect in CUI <--SQ. The influence of service quality on the continuous use intention is partly indirectly affected                                      by                                      satisfaction.

# CHAPTER 5

# CONCLUSION

There are four parts in this chapter: 5.1 Analysis conclusion. This section introduces the conclusion about the factors affecting the continued use of mobile food delivery customers, the relationships between influencing factors, and their influence; the conclusion about the mediation effect of the mediating variables introduced in this study; the conclusion about the moderating effects of the Herd Behavior of the moderator introduced in this study; 5.2 Based on the results of empirical research, this section proposes strategies to increase user stickiness to enhance users' continued use intention in using mobile food delivery apps; 5.3 The academic contribution of this study; 5.4 Research deficiency and future research prospects.

## 5.1    Main Results

In the context of the rapid development and popularization of mobile Internet technology, If mobile food delivery companies want to gain more market capacity and create more profits, It is not only necessary to integrate the internal resources of the enterprise to improve customer satisfaction and complete the initial customer acceptance, but more importantly, to retain old customers and allow more customers to continue to use the enterprise's mobile food delivery apps. Therefore, this study combines the combing of relevant research literature to construct a theoretical framework for mobile food delivery customers that can continue to use and puts forward the research hypothesis. Through the analysis of 1040 valid questionnaire data, the framework and hypothesis in this article have been verified using Warp-PLS and Mplus. The detailed summary is as follows:

Based on the revised Technology Acceptance Model (TAM), Improved Information System Success Model (ISSM), and Expected Confirmation Model

(ECM), take mobile food delivery customers as the research object, this paper empirically demonstrates the impact of perceived risk, perceived ease of use, perceived usefulness, system quality, information quality, service quality, switching costs, satisfaction, and herd behavior effecting on the continuous use intention in using mobile food delivery customers. It reveals how these influencing factors affect the internal mechanism of mobile food delivery customers' continuous use intention. It also provides path guidance for mobile food delivery service providers to successfully develop strategies to improve customer stickiness.

### 5.1.1    Perceived Risk is an Unavoidable Environment

This article assumes that the perceived risk of mobile food delivery customers negatively affects customers' continuous use intention, perceived ease of use, perceived usefulness, system quality, information quality, and service quality. The content of perceived risk is: When buying food through a mobile food delivery app, customers will worry about personal privacy information and property information, they will worry that the food ordered is inconsistent with the description on the platform, worry potential harm to the body caused by the food ordered; worry about waiting a long time and worry about the bad evaluation of people around. In the mobile network environment, these perceived risks are unavoidable if choose to buy catering from mobile food delivery apps.

The empirical study found the perceived risk negatively affects customers' continuous use intention, perceived ease of use, and perceived usefulness.

First of all, customer perceived risk has a negative and significant impact on continuous use intention H1: ($\beta$=-0.106, P<.001). The higher the customer's perceived risk, the lower the customer's continuous use intention (M. Zhang, Tang, & Zhang, 2017).

The more customers worry about the leakage of personal privacy information and property information, it will more affect customers to choose the right mobile food delivery app; they will not choose mobile food delivery to meet the needs of catering because worrying about the long waiting; worrying about the insecurity of online payment and delays in payment; worrying about the meals purchased by the mobile food delivery apps are not in line with the appetite of family members or

friends. Customers' concerns will make it harder for mobile food delivery to maintain the relationship with customers. Once customers have unpleasant things with mobile food delivery service providers, whether it is offline sellers or online platforms or delivery personnel, it would affect customers' continuous use intention of mobile food delivery apps (F. Liu et al., 2019).

For the impact of customer perceived risk on perceived ease of use H2: (β=-0.138, P<.001) and perceived usefulness H3：(β=-0.155, P<0.001), It will cause inconvenience if customers worry that personal privacy information and property information will be leaked and deliberately not enter their actual situation when registering information. For example, if they don't enter their real phone number, that will result in the inability to receive the login verification code when the login password is forgotten; and so on. 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 (Meng, Venn, Cicuttini, et al., 2019). Naturally, such a shopping experience does not make consumers feel the usefulness of mobile food delivery.

### 5.1.2 Perceived Ease of Use and Perceived Usefulness are Important Links

In this study, perceived ease of use and perceived usefulness are mediating variables, this article assumes that perceived ease of use positively significantly affects perceived usefulness; Perceived ease of use and perceived usefulness have a positive and significant impact on satisfaction; Perceived ease of use negatively affects switching costs significantly.

Through empirical research: perceived ease of use positively significantly affected perceived usefulness; both of them positively and significantly affected customer satisfaction; However, the perceived ease of use did not significantly

negatively affect switching costs as predicted. In addition, perceived ease of use and perceived usefulness have no mediating chain effect between perceived risk and continuous use intention.

First, perceived ease of use has a positive impact on perceived usefulness H4($\beta$=0.156, P<0.001). J. C. Davis and Sampson (1986); Muchran and Ahmar (2019) confirmed it. The easier it is for customers to operate mobile food delivery apps, the more they can feel the benefits of using mobile food delivery apps. They can feel that mobile food delivery can bring more convenience to them, they can feel that the quality of life and work efficiency have been significantly improved.

Secondly, the impact of perceived ease of use on conversion costs H5 ($\beta$=-0.053, P=0.164), P>0.05, perceived ease of use through empirical analysis did not significantly affect switching costs as negatively as predicted. The main reasons are summarized as follows: The switching costs include: customers will spend more time looking for other mobile food delivery apps; customers will lose the discount offered by the current mobile food delivery apps; customers will spend more time registering and getting familiar with other mobile food delivery apps; customers are not sure that other mobile food delivery apps can bring themselves better products and services. The reasons why customers switch to other mobile food delivery app is because other mobile food delivery app can bring them better food, more thoughtful and considerate service, more discount offers, so even if the current mobile food delivery apps are relatively easy to use, customers will not care about the time, energy, and loss they spend in switching to other mobile food delivery apps(Jin, Jin, Qian, & Yang, 2019).

Finally, the perceived ease of use and perceived usefulness had a positive effect on satisfaction H6($\beta$=0.13, P<0.001) and H7($\beta$=0.168, P<0.001). Customers feel that mobile food delivery can bring them a lot of conveniences and improve their quality of life and work efficiency. Naturally, their satisfaction with mobile food delivery will also increase. At the same time, perceived usefulness can bring greater satisfaction to customers (Alshurideh et al., 2019; Shao, 2020).

### 5.1.3 System Quality, Information Quality, and Service Quality are the Core Competitive Factors of Enterprises

In this study, system quality, information quality, and service quality are independent variables. This study assumes that they positively and significantly affect satisfaction and continuous use intention.

The empirical study found: System quality had a significant positive impact on satisfaction. Information quality and service quality had a positive impact on satisfaction and continuous use intention. However, the quality of the system did not significantly affect the continuous use intention as predicted. In addition, satisfaction plays a completely mediating effect in from quality to continuous use intention. Satisfaction plays a partially mediating effect in the information quality and continuous use intention, as well as the service quality and continuous use intention. Therefore, satisfaction can be got by improving the system quality, information quality, and service quality of mobile food delivery to improve satisfaction, the ultimate goal of increasing the continuous use intention can be achieved.

Firstly, the system quality significantly affected the satisfaction H8($\beta$=0.17, P<0.001), Consumers feel that the mobile food delivery app has a clear and clear operation process, beautiful design interface, quick response, the clear search classification. They can quickly find the food they need; system stability is good, they can log in at any time, all of the experience of using the mobile food delivery platform allows them to find your favorite food and beverage quickly and accurately. This naturally improves consumers' satisfaction (Y. Q. Liu, 2017).

Secondly, information quality and service quality had positive impacts on satisfaction H9($\beta$=0.143, P<0.001), H10($\beta$=0.125, P<0.001) and continuous use intention H12($\beta$=0.104, P<0.001), H13($\beta$=0.239, P<0.001). The information on the mobile food delivery apps used by consumers is updated timely, complete, and accurate; good customer service attitude, effective remedial measures for problems, good customer service, reasonable evaluation system; timeliness of delivery, better service attitude of delivery staffs. Consumers' all these buying experiences can make consumers feel happy and quickly and accurately buy their favorite mobile food, which naturally increases consumer satisfaction and continuous use intention (H. L. Guo, Chen, & Lee, 2019).

Finally, the system quality did not significantly affect satisfaction in a positive way H11($\beta$=-0.025, P =0.336), P>0.05. The hypothesis was not supported. The reasons are summarized as follows: There are many reasons that affect customers' continuous use intention except perceived risk, perceived ease of use, perceived usefulness, system quality, information quality, service quality, switching costs, satisfaction, herd behavior introduced in this study. There are many other social, economic, and political factors that may affect customers' continuous use intention. So even if the system quality of a certain mobile food delivery app is very high. It is also possible that the customer service of the mobile food delivery or the service of the mobile food delivery app staff did not satisfy the customer, so the customer would stop using the mobile food delivery app (M. S. Kim et al., 2020).

### 5.1.4 Customer Satisfaction is an Important Way to Achieve Continuous Use

In this study, satisfaction is a mediating variable, in all hypothetical relationships on satisfaction, only the influence of remaining satisfaction on the continuous use intention remains to be analyzed. This article assumes that satisfaction has a positive and significant impact on the continuous use intention. After empirical research, this hypothesis is found to be supported. Either by improving the ease of use and usefulness of the mobile food delivery app or by improving the system quality, information quality, and service quality, the goal of increasing satisfaction and ultimately increasing the continuous use intention can be achieved.

In this study, satisfaction had a positive effect on the continuous use intention H14 ($\beta$=0.073, P=0.032). Customers feel a high degree of satisfaction in the ordering mood, the offline meal delivery, the processing of the refund order, the consumer experience of the mobile food delivery apps. Compared with other consumption methods, the satisfaction of using mobile food delivery was relatively high. So, consumers will continue to use mobile food delivery apps.

#### 5.1.4.1 Switching Costs Constitutes an Important Factor in Enterprise Competition Barriers

In the hypothetical relationship about switching costs, only the analysis of the impact of switching costs on the continuous use intention. This article assumes that switching costs have a significant positive impact on the continuous use intention.

In this study, switching costs had a positive and significant impact on continuous use intention H15 ($\beta$=0.095, P<0.001). In this study, switching costs had a greater impact on satisfaction than on continuous use intention. If consumers spent more time and effort when switching from one mobile food delivery app to another, the more the original discounts were lost, and it was still uncertain that other mobile takeaway apps could bring better products and services, then consumers were more reluctant to give up the mobile food delivery app that they were currently using, they would be more satisfied with the mobile food delivery app they were currently using and would continue to use the mobile food delivery app they were currently using (T. H. Zhao, 2018).

In the perceived risk environment, the perceived ease of use, and switching costs this study researches whether the theoretical model of continuous use intention plays a mediating effect.

Empirical research found perceived ease of use had a partial mediating effect between perceived risk and continuous use intention. But in the path: perceived risk -> perceived ease of use -> switching costs -> continuous use intention, Perceived ease of use and switching costs did not have a chain mediating effect between perceived risk and continuous use intention. This is contrary to the research conclusions of most scholars. The purpose of this study is to find the optimal ratio of influence distribution to perceived risk, perceived ease of use, and switching costs. That is to say, the influence that affects continuous use intention of mobile food delivery is not allocated to these influencing factors in the best proportion. This is mainly because the perceived ease of use did not significantly and negatively affect the switching costs as preset H5 ($\beta$=-0.053, P=0.164). Therefore, there is no partial chain mediation between perceived ease of use and switching costs between perceived risk and continuous use intention (Fang, 2018).

### 5.1.5   The Herd Behavior is a Common Market Behavior Phenomenon

Through combing related theoretical models, this study found that most scholars treated users as rational people in the study of continuous use intention. They only considered individual perception and ignored the external environment and the influence of others (Yin, 2019). Therefore, this study introduces the influence of the surrounding environment--the herd behavior as a moderating variable into the framework. This study includes two hypothetical relationships about the moderating variables. One is the moderating effect of the herd behavior on the relationship between switching costs and continuous use intention, and the other is the moderating effect of the herd behavior on the relationship between satisfaction and continuous use intention.

Found through empirical testing: the herd behavior had no negative and significant relationship between the switching costs and continuous use intention H16 ($\beta$=-0.06, P=0.175), P>0.05, the hypothesis was not supported. That is, the herd behavior had no obvious moderating effect on the relationship between the switching costs and the continuous use intention. The reasons are summarized as follows: the higher the cost for customers to switch to other mobile food delivery apps, the more he feels that it was better to use this mobile food delivery, he will continue to use the mobile food delivery app currently in use, he will not follow the trend and choose the mobile food delivery app that others use because of others. Nor will it be because a certain mobile food delivery app is popular, and it is at the forefront of the rankings, nor will it pay attention to other people's discounts on the use of mobile food delivery app. That is, customers themselves continue to use this mobile food delivery app, not because of the switching costs. More because customers are more familiar with the software, mobile food, services provided by offline mobile food delivery merchants, platform service providers, and mobile food delivery personnel. So, the customer chooses to continue to use the mobile food delivery app he is using (Chulkov, 2017).

Secondly, the herd behavior negatively and significantly affected the relationship between satisfaction and continuous use intention H17 ($\beta$=-0.096, P=0.036), P<0.05, the hypothesis was supported. It was analyzed that satisfaction positively and significantly affected the continuous use intention H14 ($\beta$=0.073, P=0.032). That is, for every increase in satisfaction by one unit, the continuous use

intention will decrease (0.073 -0.098=-0.025) 0.025 units. The herd behavior works when customer satisfaction is low. Customers will follow the trend and follow the crowd to use the mobile food delivery app used by the people around them. They will use the mobile food delivery app that is at the top of the food delivery rankings, and they will also pay attention to the discounts on other people's use of the mobile food delivery app (Yin, 2019). But when customer satisfaction is high, customers will not pay much attention to the mobile food delivery situation used by others, and only focus on the mobile food delivery app they use.
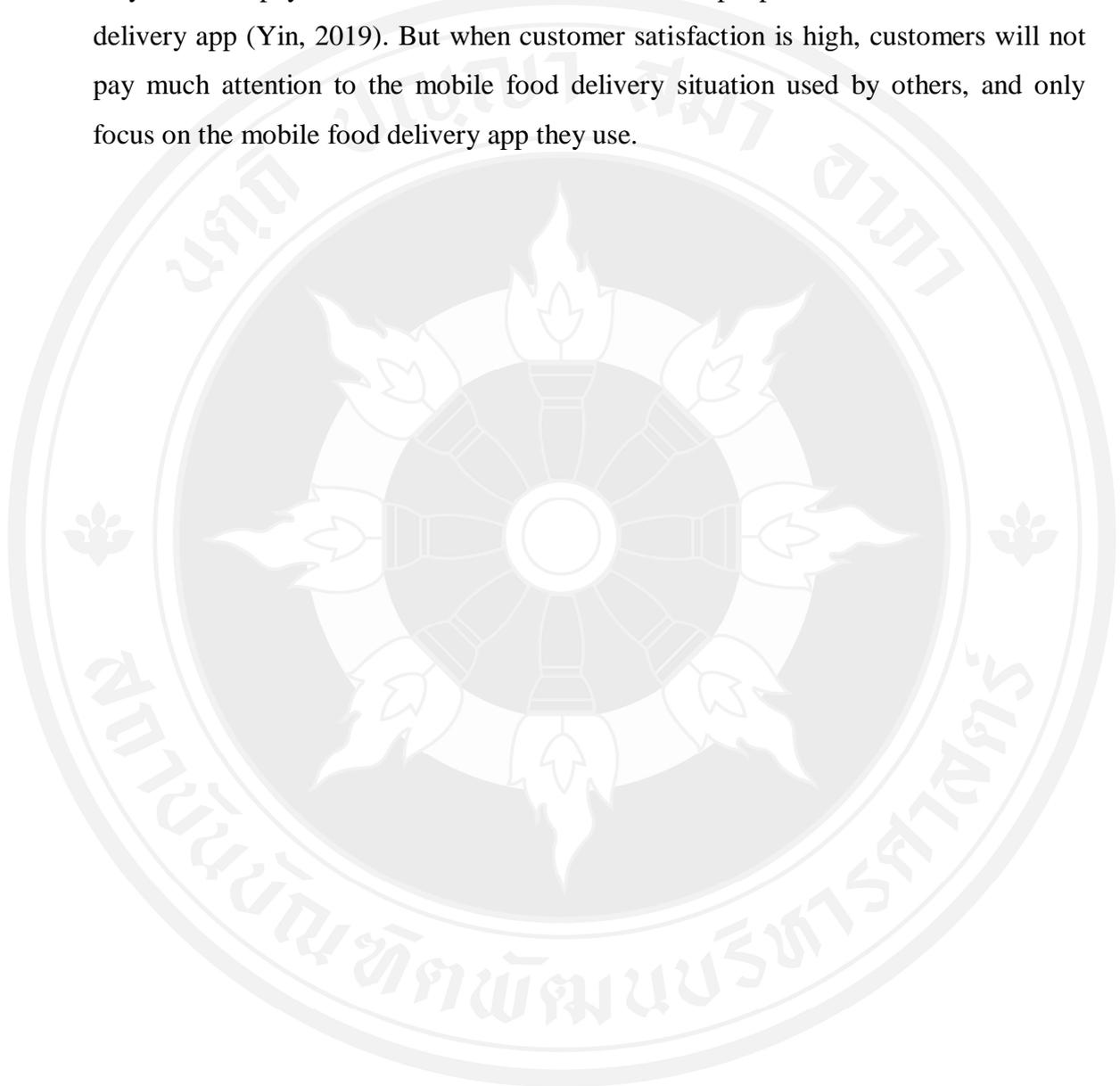
## 5.2    Strategies to Enhance Customers' Continuous Use Intention

### 5.2.1    Strategies to Reduce or Avoid the Perceived Risk

From the results of empirical analysis, perceived risk directly and significantly affected consumers' continuous use intention H1 ($\beta$=-0.106, P<0.001), perceived ease of use H2: ($\beta$=-0.138, P<0.001), perceived usefulness H3: ($\beta$=0.155, P<0.001). Therefore, this study will take measures to reduce consumers' perceived risks, which can effectively increase consumers' willingness to make continuous purchases through mobile food delivery apps.

5.2.1.1  Strategies to Reduce Privacy Risk

Sellers in online shopping should attach importance to and strengthen the protection of consumers' personal information and privacy. A big hidden danger in online shopping is that consumers' personal information is leaked. As a result, consumers' property loss or distrust of the Internet (Wang, 2011). Therefore, companies in mobile food delivery should formulate detailed and legal privacy policies. In the terms of registration, they should explain to consumers why they need to provide personal information, how the personal information provided will be stored and used, who can access this information, and so on. And put it in a prominent position on the homepage with concise and eye-catching text. Consumers are particularly worried about whether their own data is sold to a third party. Sellers apply guarantee clauses to eliminate consumers' concerns to build consumer trust in the website. They should pay attention to and protect the privacy of consumers.

5.2.1.2  Strategies to Reduce Financial Risk

One of the big reasons why consumers choose online shopping is because the prices of goods purchased online are cheaper. Therefore, the seller should meet the needs of consumers to collect and compare price information, they should provide convenience for consumers to compare product performance and price, enable consumers to use the Internet to obtain the most cost-effective product. This can reduce consumers' financial risks and guide consumers to gradually shift from traditional shopping methods to online shopping methods. In addition, to reduce the financial risks of consumers, the security of online shopping must also be strengthened. For example, the implementation of real-name systems for online

merchants can enhance the reliability of online sales companies and individuals. In addition to the seller should publish some objective information of its own on the website, it should also ensure the authenticity of the goods and price information provided. They should formulate clear product the guarantee and privacy protection policies, make consumers believe that their bank card and password information would not be leaked or deceived, and even cause property damage (Y. Yang, Wu, Dwyer, Winzenberg, & Jones, 2018).

5.2.1.3  Strategies to Reduce Time Risk

The seller in online shopping should reasonably arrange the content of the website, strive to improve the usefulness of the website to reduce the time and effort consumers spend in the purchase process. The seller must not only strive to improve the aesthetics of the website but also enhance the functionality of the website (H. Yang, Yu, Zo, & Choi, 2016). They should update the content of the webpage in time to provide comprehensive, detailed, and accurate product information. They should establish a professional image of the website, which specifically includes a friendly interactive interface, easy navigation, and easy operation. The web page should provide a variety of product classification and search methods to facilitate consumers to browse and query order queries, shopping cart viewing and modification, and help center, etc. This allows consumers to easily shop on the mobile food delivery app.

5.2.1.4 Strategies to Reduce Payment Risk

It is essential for mobile food delivery platforms to invest in network payment infrastructure. Such as strengthen network firewall technology, build an illegal intrusion detection system, and establish a virus prevention system, etc. It is possible to establish safety trust with customers by promoting the safety factor of the platform. When necessary, introduce a fourth-party guarantee platform, when there are disputes between offline mobile food delivery merchants, platform service providers and consumers, a safe and independent fourth-party platform can protect the interests of all parties from infringement (Ariffin et al., 2018).

5.2.1.5 Strategies to Reduce Social Risk

Sellers in online shopping should strive to change consumers' consumption concepts through communication and promises so that they can accept and respect online shopping as a new way of consumption. Strengthen the promotion of the advantages and convenience of online shopping, so that consumers think that using online shopping is representative of fashion and trend. On the other hand, merchants should also simplify the process and waiting time of online shopping, reduce and reduce consumers' psychological anxiety and anxiety, thereby reducing consumers' social perception risks to online shopping (Wai et al., 2019).

### 5.2.2 Strategies to Reduce Satisfaction

From results of empirical analysis, perceived ease of use H6 ($\beta$=0.13, P<.001), perceived usefulness H7 ($\beta$=0.168, P<.001), switching costs H15 ($\beta$=0.133, P<.001), system quality H8 ($\beta$ =0.17, P<.001), information quality H9 ($\beta$=0.124, P<.001) and service quality H10 ($\beta$=0.121, P<.001) all positively and significantly affected customer satisfaction. Customer satisfaction positively and significantly affected customers' continuous use intention H14 ($\beta$=0.073, P=0.032). So it's more important to improve customer satisfaction. This study will take measures to improve the ease of use, usefulness, system quality, information quality, and service quality of mobile food delivery apps to improve customer satisfaction for offline delivery merchants, food delivery platforms, and current delivery personnel of mobile food delivery.

5.2.2.1 Promotion Strategy for Offline Mobile Food Merchants

First, they should strengthen the qualification review of offline mobile food businesses. Control from the source, select merchants with complete qualifications, and good reputation to settle in. The establishment of a strict review mechanism can seek the intervention of third-party qualification review institutions such as the industrial and commercial regulatory authorities to double-checking the operating qualifications and products of foreign sellers. At the same time, they should clarify the proportion of responsibilities between catering platforms and businesses. When the settled merchants have problems, the mobile food delivery platform is jointly and severally liable. In order to reduce the platform being punished due to joint liability, for mobile food merchants that have already settled on the platform, a standard store scoring mechanism can be established. They should arrange for platform staff to conduct random checks on them from time to time, evaluate the sanitary condition of the takeaway merchant's store, warn and punish businesses that already have food safety hazards, and require them to make corrections. For uncooperative merchants, they will be directly disqualified from entering the mobile food platform. Only by strengthening supervision can the quality of products be improved so that customers can eat safe food. The platform should give certain incentive policies to offline merchants that have a high level of quality and safety of meals and can provide services according to the note placed by consumers (Y. Cui et al., 2020).

In addition, the mobile food delivery platform implements a standardized pricing mechanism for settled merchants, and the difference between the platform pricing and the actual pricing in the store is controlled within a certain percentage. If the price of a meal on the platform is too much higher than the actual price of the store, it will seriously affect the perception of price-sensitive customers. In combination with preferential policies, the meal will be reasonably priced.

The invisible communication between takeaway merchants and customers is mainly through catering. Therefore, by customizing store-specific packaging tableware, on the one hand, it can promote the brand of its own store, and on the other hand, it can reflect the quality of service for customers.

5.2.2.2  Promotion Strategy for Mobile Food Delivery Platform
Service Provider

(1)    Pay attention to its ease of use during the construction of the platform system. There is sufficient support in the construction of mobile food delivery platforms, various system interfaces, lightweight, installation-free modes, whether new customers who want to experience or old customers want to order quickly, all can be done in a short time Order food quickly at very low cost within time. In addition, applications that were closely integrated with the manufacturer's system platforms were an effective and reliable traffic channel other than native applications and WEB applications (M. Y. Zhang, 2018). For example, using an efficient search engine, the more humane the screening dimension, and the complete personalized navigation and positioning recommendation service can reduce the user's time cost. The intelligent information classification module can ensure that customers will not have web page crashes when using the mobile food delivery platform and make every effort to improve the ability of the system to operate stably (Cao et al., 2019).

(2)    The platforms should lay a solid foundation. For the newly launched mobile food delivery platform, if they want to squeeze into the already gradually formed takeaway market and gain a foothold, they must have a solid foundation. Only on this basis will consumers be willing and able to use the platform. After having customers, they should also use platform exclusive price, enhance entertainment, and other marketing methods to attract new customers and increase customer stickiness. With the continuous development of the platform and the increasing number of users, new marketing methods such as personalized recommendations could be adopted after the advantages of data were revealed, and personalized and unique exclusive services were provided to consumers based on data (J. Song, Baker, Wang, Choi, & Bhattacherjee, 2018).

(3)    The platform can add special functions to the system so that users can communicate conveniently. The current mobile food delivery app functions include product browsing, order query, and order evaluation. The system can add a community, in which users can create groups, topics, etc. for discussion. It also has a search and filtering function. When users type in keywords such as region and cuisine, they can make recommendations. When users search on the homepage, they can not only directly display store product information but also display relevant recommendation information in the community.

5.2.2.3 Promotion Strategy for Delivery and Delivery Facilities

Firstly, the basic literacy of distribution personnel should be improved.

At present, the employment threshold of the logistics and delivery market is not high, so the quality of the employees in the entire logistics distribution market is not high. Delivery personnel pays low attention to users' satisfaction, which leads to low service perception to users in the service contact link. Therefore, the mobile food delivery platform needs to train and manage the delivery personnel to enhance the importance of user satisfaction in the work of delivery personnel. Any details of the delivery staff may affect user satisfaction. For example, the clothing of the delivery staff is messy, the words are frivolous in telephone communication, and the delivery of meals is freely entrusted. All of these may directly affect perceived satisfaction. Zhou, Govindaraju, and Jones (2019) proposed the mobile food delivery platform should improve the basic quality of employees through training, standardize

employee etiquette and industry language, and take user service perception as the focus of delivery personnel's work assessment so that users can enjoy superior service every time they order meals. Delivery personnel has improved their own qualities, which is equivalent to indirectly improving the external image of the mobile food delivery platform. These changes will invisibly positively affect the user's service perception of the mobile food delivery platform and will also increase the company's revenue. This will be a virtuous circle of business development. At the same time, it is also necessary to improve the individualized service capabilities of the delivery personnel. At the same time, logistics services also require delivery personnel to provide personalized services according to the different needs of different users. Therefore, mobile food delivery companies should focus on cultivating delivery staff to recognize the needs of different customers

Secondly, the quality of takeaway equipment should be improved.

"Plastering" is an important process of takeaway production. The packaging of take-out meals can be said to be the "plating" concept in mobile food. The packaging is refreshing and pleasing to the eye can add an impression to the mobile food. But consumers value their functionality more. At present, consumers very much hope to improve the leakage of food packaging, insufficient insulation, and missing tableware in the mobile food delivery market. In particular, the reason that soup products were prone to spillage was the transportation during distribution, because they did not use responsive transportation equipment or did not have a deep awareness of the protection of meal packaging (Meng, Venn, Eckstein, et al., 2019).

To avoid the above problems, it is urgent to raise the awareness of the delivery personnel of the takeaway platform to protect the packaging of the food. More attention should be paid to the quality of mobile take-out food preservation equipment, including the primary preservation of the food after it is out of the pan and the secondary preservation of the meal box due to the particularity of mobile takeout.it has the characteristics of high fresh-keeping requirements. Only by ensuring the freshness of the food can the taste of the food eaten by the customer be better. At present, the most commonly used fresh-keeping equipment on the market mainly includes foam insulation boxes, plastic insulation boxes, metal insulation boxes, and waterproof cloth insulation boxes. With the development of advanced materials and

equipment, there are already more thermal and environmentally friendly EPP incubators on the market. This kind of incubator was light and wear-resistant, had stronger compression resistance, and could be recycled. The most important thing was that its thermal insulation performance was better than the previously mentioned equipment (Dai, 2018).

### 5.2.3  Appropriately Increase the Switching Costs to Maintain the Customer's Continuous Use Intention

Empirical analysis results showed that the switching costs of mobile food delivery customers positively and significantly affected customers' continuous use intention H15 ($\beta$=0.095, P=0.033). Therefore, in order to improve consumers' continuous use intention of the original mobile food delivery app, appropriately increase the cost of the total meal price, energy, and time spent when they switch to the new mobile food delivery app. But pay attention to the specific implementation strategy, methods, and strength, otherwise, it will cause the consumers' disgust. For example, by guiding consumers to exchange member points for red envelopes, recharge card binding, full red envelope reduction, and increase the perceived conversion cost based on membership level (Cheng et al., 2020).

### 5.2.4  Cultivate User Habits Through Efficient Promotion

Empirical analysis results showed that the herd behavior had a negative and significant influence on the relationship between satisfaction and the continuous use intention H17 ($\beta$=-0.096, P=0.036).  Therefore, mobile food delivery merchants can do a good job in promoting and cultivating user habits so that the herd behavior can play a role in promoting when customer satisfaction is low, allowing customers to continue to use mobile food delivery apps.

Nowadays, good promotion and marketing ability has become an important factor influencing the level of the core competitiveness of enterprises. In the rapid development of the mobile food delivery market, open up the market through good promotion methods, expand visibility, let more people experience and use. Taking advantage of people's love to conform to the crowd, using herd behavior to attract

customers was the first step to cultivate consumer habits. And only after doing this step would be everything to follow (W. Wang, Guo, & Sun, 2019).

According to current consumer data, those who have the habit of using mobile food delivery apps or have already used mobile food delivery apps are mainly young people and some middle-aged people who pursue trends. Moreover, it is concentrated in the areas of school students and white-collar workers. Although the living area has increased, the proportion is still very small. It can be seen from the forecast data that the market potential of mobile food delivery apps is huge.

To develop and fill the market, so that those who are not accustomed to using mobile food delivery apps can change their minds and become loyal customers of mobile food delivery apps. A lot of promotion is needed. Currently, the promotion of food delivery apps is mainly divided into online promotion and offline promotion. The main product is the take-out function of mobile food delivery apps, which is not well promoted for the functions of flowers, medicine, and supermarket products. The forms and methods of promotion can be more diverse

## 5.3   Academic Contribution

In the context of the rapid development of the global mobile Internet industry, this study focuses on the actual development of China's mobile food delivery apps, the main academic contributions are as follows:

Firstly, through empirical research in an environment of perceived risk based on the revised Technology Acceptance Model (TAM), Improved Information System Success Model (ISSM), and Expected Confirmation Model (ECM), Formed the theoretical framework of this article, this study found this theoretical framework can better explain the influencing factors of mobile food delivery customers' continuous use intention. It can also put forward some more targeted countermeasures and suggestions for service providers of mobile food delivery platforms to increase customer stickiness; This result not only verifies the comprehensive application of this theoretical framework based on previous research results, but also has certain guiding significance for practical app design assisted by the network (Alalwan, 2020; J. H. Kim et al., 2019).

Secondly, for the moderating variable introduced in this study-the herd behavior, through empirical research, it is found that herd behavior has a negative and significant impact on the relationship between satisfaction and continuous use intention; When customer satisfaction is low, customers will reduce the influence of customers' continuous use intention because of the higher herd behavior. However, herd behavior does not have a negatively significant impact on the relationship between switching costs and continuous use intention as assumed. There is no scholar's verification in the two relations. At the same time, it also shows that when mobile food delivery service providers implement group effects to improve customers' continuous use intention, they face different scenarios and require different response strategies.

Thirdly, this study introduces the key factors of the ISSM model: system quality, information quality, and service quality. Through empirical research, it is found that satisfaction has a completely mediating effect on the path from system quality to continuous use intention. There are some partial effects in the path from the information quality to the continuous use intention and from the service quality to the continuous use intention. The conclusion of this mediating effect in this study also confirms the influence of predecessors on satisfaction as a customer's continuous use intention. At the same time, it further subdivided the effect of each dimension in the original ISSM model on the continuous use intention through satisfaction.

## 5.4   Research Limitations and Prospects

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

Secondly, from the perspective of data collection, the data in this study mainly comes from the form of online questionnaires, inviting consumers who have ever ordered mobile food to fill out the questionnaire. However, due to the influence of external factors such as the difficulty of controlling the respondents, there may be situations where the data obtained through the questionnaire survey does not match the actual situation. Therefore, this study should expand the scope of the sample in

future research. The age of the study subjects further expanded from 12 to 60 years old. At present with the rapid development of digital information technology, future research can use some big data mining techniques to obtain more real and reliable samples, conduct more accurate empirical analysis, and propose more valuable management enlightenment.

Finally, this study 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 4.4.1, this empirical study can only explain 21% of customers' continuous use intention changes. If the $R^2$ value was greater than 10%, the model had strong explanatory power (Chin, 1998). According to the standard Chin proposed, the frame structure of this article also has strong explanatory power. However, 79% of the variance of the dependent variable needs to find other influencing factors for further research and discussion. Therefore, future research may introduce other aspects such as market trends in the catering industry, related policies, and market conditions in other areas of local life services. Therefore, the research can conduct a more comprehensive analysis and discussion on the continued use of mobile food consumers from multiple perspectives in the future.

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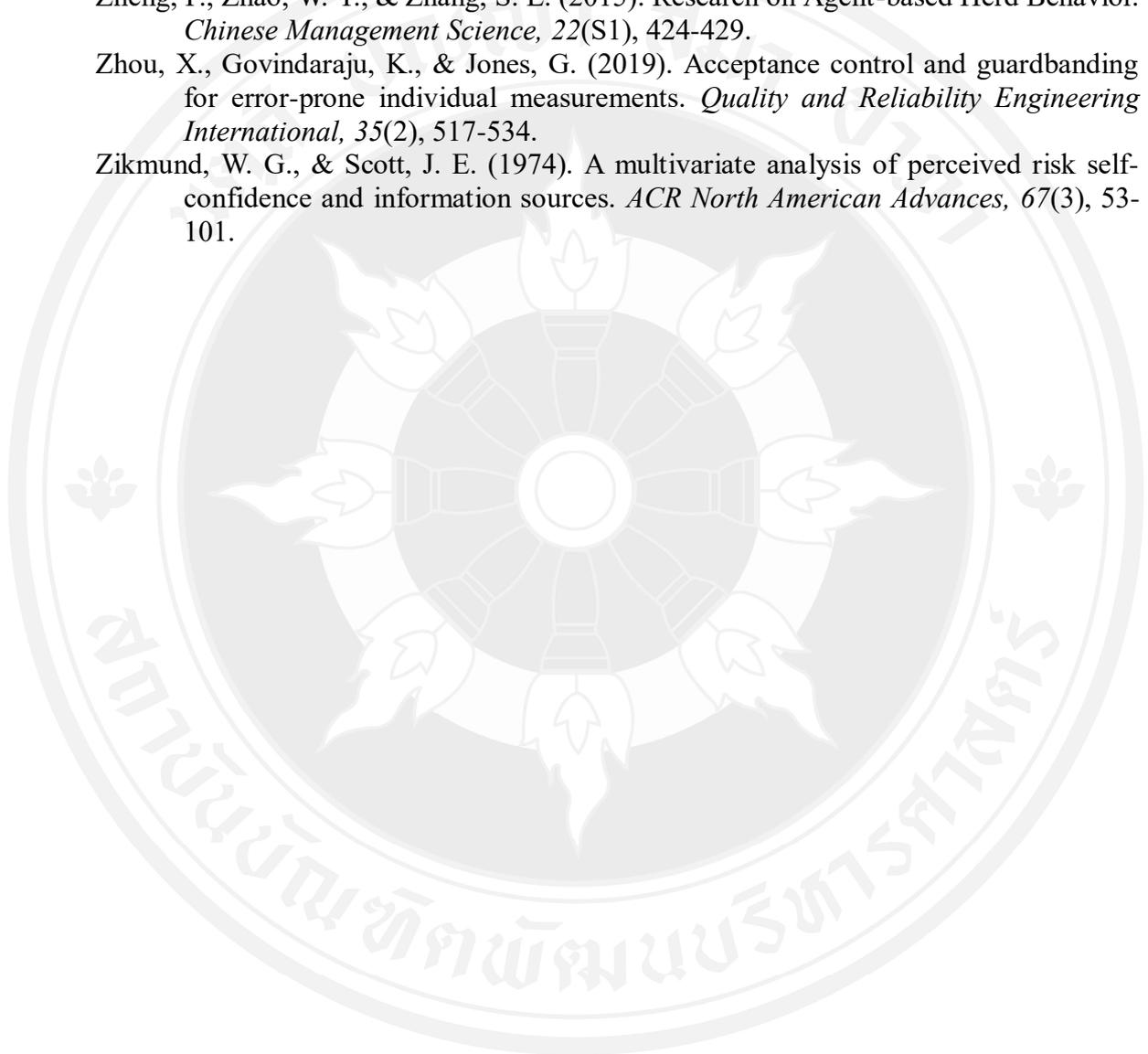
**APPENDIX I**

**DATA:**

       FILE IS DATA.dat;

VARIABLE:

    NAMES ARE PR1 PR2 PR3 PR4 PR5 PR6 PEU1 PEU2 PEU3 PEU4 PU1 PU2
        PU3 PU4 SQ1 SQ2 SQ3 SQ4 SQ5 IQ1 IQ2 IQ3 IQ4 SCQ1 SCQ2 SCQ3
        SCQ4 SCQ5 SCQ6 SCQ7 SC1 SC2 SC3 SC4 SAT1 SAT2 SAT3 SAT4
        SAT5 CUI1 CUI2 CUI3 CUI4 HB1 HB2 HB3 HB4;

  USEVARIABLES ARE PR1 PR2 PR3 PR4 PR5 PR6 PEU1 PEU2 PEU3 PEU4 PU1
        PU2 PU3 PU4 SQ1 SQ2 SQ3 SQ4 SQ5 IQ1 IQ2 IQ3 IQ4 SCQ1 SCQ2
        SCQ3
        SCQ4 SCQ5 SCQ6 SCQ7 SC1 SC2 SC3 SC4 SAT1 SAT2 SAT3
        SAT4 SAT5 CUI1 CUI2 CUI3 CUI4 HB1 HB2 HB3 HB4;

ANALYSIS:

      ESTIMATOR IS ML;
      BOOTSTRAP=1000;

MODEL:

      ! MEASUREMENT MODEL

   PR BY PR1 PR2 PR3 PR4 PR5 PR6;
  PEU BY PEU1 PEU2 PEU3 PEU4;
  PU BY PU1 PU2 PU3 PU4;
  SQ BY SQ1 SQ2 SQ3 SQ4 SQ5;
  IQ BY IQ1 IQ2 IQ3 IQ4;
  SCQ BY SCQ1 SCQ2 SCQ3 SCQ4 SCQ5 SCQ6 SCQ7;
  SC BY SC1 SC2 SC3 SC4;
  SAT BY SAT1 SAT2 SAT3 SAT4 SAT5;
  CUI BY CUI1 CUI2 CUI3 CUI4;
  HB BY HB1 HB2 HB3 HB4;

! STRUCTURAL MODEL

 PEU ON PR;

 PU ON PR PEU;

 SC ON PR PEU;

 SAT ON PR PEU PU SC SQ IQ SCQ;

 SQ ON PR;

 IQ ON PR;

 SCQ ON PR;

 CUI ON PR PEU PU SC SAT SQ IQ SCQ HB HB*SAT;

MODEL INDIRECT:

 CUI IND PR;

  CUI IND SQ;

  CUI IND IQ;

  CUI IND SCQ;

OUTPUT:

   SAMPSTAT CINTERVAL(BCBOOTSTRAP);

# Part I

**Please mark "√" in "□" before the appropriate option according to your actual situation.**

1. 【Screening Questions】Do you continue to use one or more mobile food delivery app?[Single Choice Question] [Required Answer]

□ NO (Please stop answering, thank you for your participation)

□ YES (Please continue to fill out the questionnaire)

2. Which is your most commonly used mobile food delivery app? [Single Choice Question] [Required Answer]

□ Meituan Waimai

□ Are You Hungry

□ Baidu Waimai

□ Little Secretary

□ Word of Mouth

□ Dianping Takeaway

□ Daojia Gourmet Club

□ Takeaway Superman

□ Order Me

□ Others _____

3. So far, how long have you used the mobile food delivery apps? [Single Choice Question] [Required Answer]

□ Within 1 year

□ 1-2 year

□ 2-3 year

□ 3-4 year

□ 4-5 year

□ More than 5 years

4. The number of times you have used the mobile food delivery apps in the last month? [Single Choice Question] [Required Answer]

□ 0-5 times

□ 6-10 times

□ 11-20 times

□ 20-30 times

□ 31 times

5. How often do you recommend/share mobile food delivery apps to friends and family? [Single Choice Question] [Required Answer]

□ Never recommended/shared

□ Not recommended/shared often

□ Occasionally recommended/shared

□ Generally recommended/shared

□ Often recommended/shared

□ Frequently recommended/shared

**APPENDIX II**

# Survey on Continuous Use Intention of Using Mobile Food Delivery apps

Dear Madam / Mr. :

　　Data shows that the use of mobile food delivery apps to order meals is very common. In order to deeply explore the specific driving factors of people's continuous use intention of using mobile food delivery apps. This study conducted this survey. This questionnaire is anonymous. The information you provide is for academic research purposes only. It will never be used for other purposes or disclosed to a third party. Please feel free to answer. There is no right or wrong answer. It is only hoped that you can express your true opinions and thoughts. It takes about 3 to 5 minutes to fill out this questionnaire. Your enthusiastic participation will help the smooth completion of this study. I would like to thank you first and foremost!

　　Thank you very much for your cooperation and support!

　　Best wishes！

　　Questionnaire filling instructions：

　　1. Each of the following questions needs to be answered, without special instructions, each question can only choose 1 answer;

　　2. Please read the answers carefully to avoid missing questions.

## Part II

Please read the item description carefully according to the actual situation of using the mobile food delivery apps, and indicate your degree of agreement with the following descriptions (Draw "√" in "□" before the appropriate option). There is no right or wrong in all options. All measurement items use a 7-point Likert scale to measure (1=Strongly Disagree,2=Disagree,3= Basically Disagree,4= Uncertain,5= Basically Agree,6=Agree,7=Strongly Agree)

**The following items are the perception of perceived risk.**

6. I am worried that using the mobile food delivery app to place an order online may result in the disclosure of bank card and other payment account information; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

7. I am worried that the personal registration information on the mobile food delivery app will be stolen by others; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

8. I'm worried that the mobile food delivery purchased with the mobile food delivery app does not match the description on the platform; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

9. I am worried that the mobile food delivery food purchased using the mobile food delivery app will cause potential harm to the body; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

10. I'm worried that the time from purchase to delivery using the mobile food delivery app is beyond the tolerable range; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

11. I am worried that ordering food using the mobile food delivery app will cause people around me to have a bad evaluation of me. [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

**The following items are the perception of perceived ease of use.**

12. Using the mobile food delivery app, I can easily search for the mobile food delivery information I need [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

13. It is easy for me to learn to use the mobile food delivery app to buy food .[Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

14. The operation process of using the mobile food delivery app shopping process is simple and easy to understand; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

15. I can easily use the various functions of the mobile food delivery app. [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

**The following items are the perception of perceived usefulness.**

16. I can find a lot of useful information on this mobile food delivery app I currently use; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

17. Using the mobile food delivery app can save me time and improve my work efficiency; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

18. Using the mobile food delivery app can improve my quality of life; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

19. Using the mobile food delivery app has brought a lot of convenience to my life. [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

**The following items are the perception of system quality.**

20. The operation process of the mobile food delivery app is clear .[Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

21. The mobile food delivery app is well designed; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

22. The mobile food delivery app has a fast response speed; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

23. The search classification of the mobile food delivery app is clear, and you can quickly find the catering you need; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

24. The mobile food delivery app has good stability, you can log in at any time. [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

**The following items are the perception of information quality.**

25. The mobile food delivery app information is updated on time; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

26. The mobile food delivery app provides relatively complete information; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

27. The mobile food delivery app can provide accurate search results; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

28. The information on this mobile food delivery app is reliable. [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

**The following items are the perception of service quality.**

29. The service attitude of the mobile food delivery app customer service is very good; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

30. The mobile food delivery app dealt with the problem promptly; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

31. The portable food delivery app has a very good effect on the remedy of the problem; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

32. The customer service of the mobile food delivery app can meet the additional needs of customers; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

33. The customer appraisal system of the mobile food delivery app is very good; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

34. The delivery of the mobile food delivery app is timely; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

35. The mobile food delivery and delivery staff have a good service attitude; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

**The following items are the perception of switching costs.**

36. I need to spend some time to find other mobile food delivery app to replace the ones I am using; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

37. I need to lose a certain discount and choose another mobile food delivery app to replace the one I am using; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

38. If I uninstall the mobile takeaway app, I need to spend some time to register and become familiar with other mobile food delivery apps; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

39. I am not sure that other mobile food delivery apps can bring me better products and services. [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

**The following items are the perception of satisfaction.**

40. I am satisfied with the online ordering process of mobile food delivery; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

41. I am satisfied with the offline food delivery of mobile food delivery; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

42. I am satisfied with the processing of mobile food delivery change orders; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

43. I am satisfied with the consumer experience of mobile food delivery; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

44. Compared with other consumption methods, I am satisfied with mobile consumption. [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

**The following items are the perception of continuous use intention.**

45. If I want to order a meal in the future, I will continue to consider using the mobile food delivery app I currently use; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

46. Even if there are other ways to order food, I will still prefer the mobile food delivery app I currently use; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

47. In the future, I will use the mobile food delivery app I currently use often; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

48. I will recommend this mobile food delivery app I currently use to my family and friends to use. [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

**The following items are the perception of herd behavior**

49. I use this mobile food delivery app for everyone around; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

50. I chose this mobile food delivery app because it has become a popular discussion topic; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

51. The mobile food delivery app I chose is at the top of the ranking; [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

52. I will pay attention to the discounts of others using mobile food delivery apps. [Matrix Questions] [Required Questions]

Strongly Disagree □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 Strongly Agree

## Part III

**Basic personal information. Please mark "√" in front of "□" according to your actual situation.**

53. Your gender is:  [Single Choice Question] [Required Answer]

○ A Female                 ○ B Male

56. Your age is：  [Single Choice Question] [Required Answer]

○ A Less than 18 years old ○ B 18-30 years old ○ C 31-50 years old ○ D More than 51 years old

57. Your education level is:  [Single Choice Question] [Required Answer]

○ A Below Junior College   ○ B Bachelor    ○ C Above master

58. Your occupation is：  [Single Choice Question] [Required Answer]

○ A Student in university     ○ B Employee or enterprise      ○ C Others

59. Your marital status：  [Single Choice Question] [Required Answer]

○ A Unmarried              ○ B Married

60. Your city tiers：  Single Choice Question] [Required Answer]

○ A The first-tier city  ○ B The second-tier city  ○ C The third-tier city

○ D Below and the fourth-tier city

**This concludes the questionnaire, thank you for your cooperation!**

# BIOGRAPHY

| | |
|---|---|
| **NAME** | Miss Limin Ran |
| **ACADEMIC BACKGROUND** | Bachelor degree with a major in Information Management and Information Systems from Henan University of Finance and Law, Zhengzhou, China in 2004; Master degree with a major in Computer Application from Jiangsu University, Zhenjiang, China in 2008. |
| **EXPERIENCES** | Assistant lecturer at College of Economics and Management at Anyang Institute of Technology, China from 2004-2009; Lecturer at College of Flight at Anyang Institute of Technology, China from 2009-present. |