

Consumers' Adopt Intention for Contactless Delivery during COVID-19: An Extended Perspective on The Theory of Planned Behavior

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ABSTRACT. COVID-19 is a severe disease and has now spread around the world as a highly infectious pandemic. COVID-19 has rapidly and deeply affected our daily life, and most countries have taken measures to prevent the spread of this disease, such as restricting entry and centralized isolation. Contactless delivery is a non-face-to-face delivery method which help ensure sufficient distance between the rider and the customers, thus further reduces the pandemic transmission risk. While relatively few people know and adopt this service. This study used the theory of planned behaviour to investigate people's intention to adopt contactless home delivery services during COVID-19. Research results provide both contributions to academics and practitioners.

1 Introduction

The outbreak of the COVID-19 virus caused serious problems that influenced nearly everyone's life. The Chinese government has carried out many controls over various regions, such as restricting entry and centralized isolation. Under the severe epidemic situation, the distribution of food and daily necessities become a key issue. Many people are worried about the ways and the impacts of supplies delivery [1].

Traditional delivery method enables a face-to-face delivery way between the riders and consumers which has been adopted by many platforms and consumers. Given the severe pandemic situation, contactless delivery has become a promising delivery way to help reduce disease transmission risk. Contactless delivery means that when placing an order, users can negotiate with riders about the designated placement of goods, such as the company's front desk or at their home doorstep. Through "order notes," telephone calls, and app message systems, customers and riders can communicate with each other. After delivery, the rider will inform the user through a telephone call, an app message, or another channel to pick up the food or goods by himself. Contactless delivery can ensure sufficient distance is maintained between the rider/driver and the customer. With the development of technology, a variety of tools have been created to conduct contactless delivery, like the smart cabinet or an unmanned aerial vehicle (drone). Many platforms and stores have adopted contactless delivery technology, like

Meituan and Ele.me in China and Instacart and Postmates in the U.S.

Distribution is now a very important part of people's lives. However, due to the arrival of COVID-19, people's attitudes have been greatly affected. People began to carefully consider the convenience and risk of distribution services. If people can feel the convenience of using contactless delivery, their attitude toward using contactless delivery will be more positive. If people attach great importance to COVID-19 and think it is very harmful, this fear will also have a positive impact on their attitude toward using contactless delivery.

This paper aims to examine people's attitude toward using contactless delivery during COVID-19. Specifically, how do individuals consider the risk and the convenience during contactless delivery? To answer this question, the extended theory of planned behavior (TPB) model was adopted as the theoretical foundation. TPB consists of attitude, subjective norms, and perceived behavioral control.

We collected online survey data by using Wenjuanxing, a popular online survey platform in China. In all, 574 valid responses were collected. Based on TPB theory, this paper explores the influence of the perceived risk and perceived convenience on consumers' attitude. Research results could provide both contributions to academics and practitioners.

In the following parts, we first review the relevant literature and then build a research model and hypotheses. We then introduce the research methodology for research hypotheses testing. Finally, we discuss the research results,

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research implications, and limitations of the study.

2 Theoretical Foundation and Research Model

2.1 Theory of Planned Behavior

Ajzen (1991) developed the theory of planned behavior (TPB) to understand the psychological basis of volitional behavior. TPB includes three key antecedents of behavioral intention: attitude, subjective norms, and perceived behavioral control. It assumes that behavioral intent is a good proxy for actual behavior, as researchers have verified [2].

2.2 Attitude

Attitude refers to the numerous behavioral beliefs about the possible results of a certain behavior that individuals hold. Attitude is a factor that can easily affect people. This argument has been proved experimentally [3]. Attitude is the negative or positive psychological feeling of an individual toward a particular behavior.

H1: The attitude toward contactless delivery is positively associated with contactless delivery adopt intention.

2.3 Subjective Norms

Subjective norms are also a very important factor in influencing people's behavior. Subjective norms refer to the pressure perceived by individuals from others important to them, such as parents and friends to support or oppose a certain behavior. In most studies, subjective norms have the weakest influence on behavioral intention [4], but the influence of subjective norms on non-negative behavior is very significant.

H2: Subjective norms are positively associated with contactless delivery adoption intention.

2.4 Perceived Behavioral Control

Attitudes and subjective norms examine subjective factors, while perceived behavioral control (PBC) involves the evaluation of objective factors. Behavioral intention is affected not only by personal attitude and subjective norms but also by the difficulty of performing specific behaviors. The research of contactless delivery points out that PBC is an effective indicator to predict people's use of contactless delivery. If a person has the ability to choose the distribution method, they will be very willing to try this way.

H3: Perceived behavioral control is positively associated with contactless delivery adoption intention.

2.5 Perceived Convenience

Perceived convenience is the factor to measure people's perception toward convenience [5]. It is an important factor for testing people's satisfaction. This method was also used on our previous paper, investigating perceived convenience's impact on perceived value and adoption intention in predicting public bicycle adoption [6].

H4: Perceived convenience is positively associated with an attitude toward contactless delivery.

2.6 Perceived Risk

In the consumption context, perceived risk can be defined as a subjective perception regarding the uncertainty and negative consequences of the purchase of a product [7]. In the present study, the uncertainty was due to the perceived risk of the COVID-19 pandemic. In this paper, we measured people's awareness of the risk of COVID-19. Those who think that COVID-19 is a very serious concern tend to use contactless delivery.

H5: Perceived risk is positively associated with an attitude toward contactless delivery.

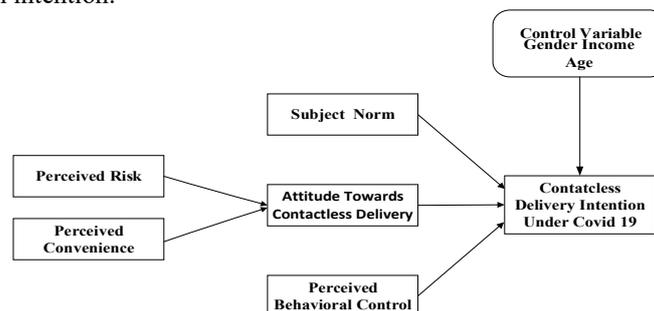


Fig. 1. Research Model (self-organized)

3 Research Methodology

We collected questionnaires through online channels via the widely used Wenjuanxing survey company. The data were collected from July 12 to July 16, 2022. A total of 607 questionnaires were collected. We deliberately conducted a check of the answers to ensure the authenticity and accuracy of the data, and finally 575 valid

responses were recorded.

3.1 Questionnaire Development

The items of attitude, subjective norms, perceived behavioral control, perceived convenience, and perceived risk were measured on a 5-point, Likert-type scale from "strongly disagree" to "strongly agree." The Likert scale

is the most widely used and most effective tool for scaling responses in survey-type studies. Measures of attitude (three items), subject norms (three), perceived behavioral control (three), behavioral intention (three), perceived convenience (four), and perceived risk (four) were adapted from the existing literature. To measure attitude, people were asked for their view regarding contactless delivery, as being “good,” “smart,” “interesting,” or not. For subjective norms, people were asked for the opinions of people near them on their use of contactless delivery. Perceived behavioral control focused on the ability of respondents to choose to use the contactless delivery by themselves or not. Behavioral intention inquired into the willingness of the respondents to use contactless delivery in the future. Perceived convenience measured respondents’ perception of the ease of using contactless delivery and the perceived risk measuring their awareness of the risk of COVID-19.

3.2 Sample Demographics

The participants were selected from a nationwide sample to participate in the survey. The questionnaire also asked respondents for basic information about their gender, age, education level, and income. Of the 575 respondents, 45.4% were male and 54.6% were female. The median age of the participants was 27 years (M = 30.17, SD = 10.39) and the median monthly household income was 10000¥ to 50000¥. In terms of education level, 64.3% of the participants had received a bachelor's degree, 18.1% held a master’s degree or a doctorate, and 17.6% had obtained a high school certificate or a junior school certificate. Among these qualifications, bachelor's degrees accounted for the highest proportion.

Table 1. Demographic Profile of Respondents (self- organized)

	Demographic Characteristic	Frequency	Percentage
Gender	Male	261	45.39%
	Female	314	54.61%
	0-20	75	13.04%
	21-30	282	49.04%
Age	31-40	123	21.39%
	41-50	63	10.95%
	above 60	32	5.58%
Education Level	high school	34	5.91 %
	junior college	67	11.65 %
	bachelor	370	64.35 %
	master	96	16.7 %
	doctor	8	1.39 %
Household Income	below 10000	137	23.83 %
	10000 to 50000	248	43.13 %
	50000 to 200000	123	21.39 %
	above 200000	67	11.65%

Before the regression analysis, we screened the missing data, conducted descriptive statistical analysis on

each variable after deleting it from the total sample, and calculated the reliability of each variable (Table 2).

Table 2. Item Descriptive (self- organized)

	Min	Max	Mean	SD	Cronbach’s α
Attitudes towards contactless delivery	1	5	4.338	0.743	0.883
Subjective norms	1	5	4.193	0.766	0.867
Perceived behavioral control	1	5	4.009	0.918	0.875
Behavioral intention	1	5	4.266	0.722	0.855
Perceived convenience	1	5	3.905	0.875	0.856
Perceived risk	1	5	3.989	0.878	0.861

4 Results

These data analyses were conducted using SPSS and AMOS. And in terms of the hypothesized relationships between perceived convenience and attitude, the results showed that perceived convenience was positively related to attitude ($\beta=0.285$, $p<0.001$), which supports H4. It also meant that contactless delivery is more convenient, so people will be more willing to adopt contactless delivery. In addition, the results showed that perceived risk was positively related to the attitude ($\beta=0.293$, $p<0.001$),

which further supports H4. If a person considers COVID-19 as a serious problem, they will probably choose contactless delivery.

Regarding the TPB variables, attitude ($\beta=0.249$, $p<0.001$) was positively associated with contactless delivery adopt intention, which positively supports H1. It might be easier for those individuals who have a high level of attitude to adopt this behavior. Similarly, the coefficients of PBC are $\beta=0.260$ and $p<0.001$ —similar to the results for attitude—and have a significant positive effect on the behavioral intention of using contactless delivery, with a greater impact than the attitude. Overall,

subjective norms have a higher relationship to the behavioral intention. If the people who are critical of your behavior suggest you use contactless delivery during COVID-19, your personal willingness will be reduced.

Finally, for the controlled variables, age, gender, and educational level all had a significant influence on the attitude and behavioral intention— $\beta=0.061$, $\beta=0.048$, $\beta=0.09$ —respectively.

Table 3. Test Results (self- organized)

Hypothesis	Path	Coefficient	T value	Supported
H1	ATT \Rightarrow BI	0.249***	6.363	Yes
H2	SN \Rightarrow BI	0.292***	7.361	Yes
H3	PBC \Rightarrow BI	0.260***	4.524	Yes
H4	PC \Rightarrow ATT	0.285***	7.182	Yes
H5	PR \Rightarrow ATT	0.293***	4.752	Yes

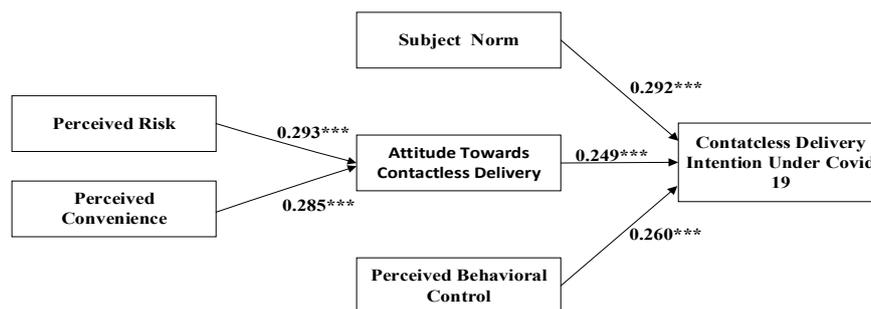


Fig. 2. Model Results (self- organized)

5 Conclusion

With the spread of COVID-19, contactless delivery is becoming ever more popular. In the contactless delivery process, residents can receive their purchased goods more conveniently and reduce the risk of contracting COVID-19. This research is based on TPB theory and enriches the literature on contactless distribution adoption.

Firstly, attitudes toward contactless delivery play an important role in people’s contactless delivery adopt intention. Through our research, we found that attitude has a positive impact on contactless delivery intention under COVID-19, and that two of the antecedents—perceived risk and perceived convenience—have a positive impact on attitude consent, with perceived risk having a larger impact. No research study has explored this aspect before. Secondly, we also found that subjective norms and perceived behavioral control also have a positive effect on people's behavior. Therefore, it is recommended that policymakers should pay attention to perceived risk and perceived convenience to improve people's behavioral willingness and pay more attention to people's psychology and in practical applications to formulate better plans.

This study makes certain theoretical contributions and has practical significance. For the theoretical contributions, the research results provide good suggestions for the application of TPB and the exploration of people's adoption intention and the influence of two antecedents, perceived convenience and perceived risk, on attitude. For the practical contributions, this research has provided many suggestions for the non-basic distribution businesses and the government to formulate policies, analyzed the factors that easily affect people's attitudes, and showed how to make this technology more convenient and bring more help to people in trying times.

This study also has some limitations. Firstly, our samples are all from areas with very strict control of COVID-19. Subsequent papers can sample and analyze some areas with less strict control measures. Secondly, this paper also does not consider that in some remote areas, the transportation industry is relatively less developed than other areas, and the perceptions and attitudes of people there may be different from those who participated in this research.

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