Exploratory Analysis of Factors Affecting Levels of Online Shopping in the COVID-19

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Abstract: This study focuses on the factors influencing online shopping consumer behavior during the COVID-19 epidemic. We conducted an online survey of the population of the Huai'an metropolitan area in Jiangsu Province. Constructing a behavioral model of consumers' online shopping during the COVID-19 epidemic using the theory of planned behavior. The least squares statistical analysis shows that attitude has a positive effect on behavior intention. Subjective norms have a positive effect on perceived behavioral control. Behavioral intentions have a positive effect on behavior. From the survey results, the categories of commodities purchased by consumers are mostly daily necessities and epidemic prevention products. The survey found that people's willingness to change their shopping behavior from in-store shopping to online shopping has increased. Therefore, enterprises need to pay more attention to health and safety issues when operating online shopping, in order to reduce consumers' doubts and improve the reputation of enterprises.

1 INTRODUCTION

Since the outbreak of the COVID-19 in 2020, various industries have been affected. Person-to-person movement is restricted, and the transportation of goods is also affected. Scholars Unnikrishna and Figliozzi (Unnikrishna, Figliozzi 2021) surveyed Portland consumers in the Vancouver-hillsborough metro area of shopping behavior during the COVID-19 pandemic. The results of the survey found that the epidemic affected consumers' shopping behavior. Consumers' online shopping and home delivery behaviors have grown significantly during the pandemic.

Also, during the pandemic, in terms of ensuring customer satisfaction. E-commerce providers should pay attention to issues such as service quality, customer perceived value and trust, which affect consumers' choice of online shopping and home delivery (Uzir, Halbusi, Thurasamy, Hock, Aljaberi, Hasan, Hamid, 2021).

COVID-19 has also affected the operations of food suppliers. Some scholars have investigated the situation of food cold chain supply in Indonesia. They found features such as logistics monitoring equipment such as EDI, RFID and blockchain. The system can track food quality, build a traceability system, and ensure food quality and safety (Masudin, Ramadhani, Restuputri, 2021).

Based on the above research literature, people have increased their online shopping behaviors during the Covid-19 pandemic for their lives. The close integration of the express delivery industry and online shopping makes shopping more convenient and safer. Therefore, from the perspective of consumers, it is more in line with the interests of enterprises to explore the consumer behavior of the combination of express delivery and online shopping. Therefore, this study will use the theory of planned behavior to explore this point of view.

2 LITERATURE REVIEW

2.1 Theory of Planned Behavior

This study is an exploratory study that attempts to explore the impact of COVID-19 on online shopping

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intention behavior from a consumer perspective. This willingness also affects the frequency of home deliveries. Therefore, the planned behavior theory proposed by Ajzen (Ajzen 1985) was adopted. This theory was later extended by scholars such as Ajzen, Driver, and Fishbein (Driver 1991, Fishbein 2000). Their research found that human behavior is not entirely their own will, it will be influenced by the environment, this influence can be observed and changed. Therefore, he extended the theory of rational action (TRA), adding a new concept of "perceived behavioral control" of the self, and developed a new model of behavioral theory research: the project theory of planned behavior (TPB). The theory includes five elements: attitude, subjective norm, perceived behavioral control, behavioral intention, and behavior. Below, we try to combine this research with theory to explore.

2.2 Attitude

Attitude is the initiator of behavior. It refers to the positive or negative feelings an individual has when performing a behavior. When an individual's conceptual evaluation of this particular behavior forms an idea, the attitude component is often seen as the presentation of an individual's important beliefs about a certain behavior. Researcher Tsai (Tsai 2021) mentioned the following phenomenon in the findings of the COVID-19 consumer online purchasing motivation. (1) Consumers are afraid of contacting people, reduce going out, and increase their willingness to change their consumption patterns. (2) There has been an increase in the behavior of buying daily necessities near home rather than online. Therefore, the questionnaire design item of this research is: after the outbreak of COVID-19, consumers' attention to the following questions. (1) Afraid to go out and come into contact with people? (2) Change consumer behavior? (3) Change your lifestyle?

2.3 Subjective Norm

Subjective norm refers to the social atmosphere or environmental pressure that an individual feels about whether to take a certain behavior. The culture or atmosphere formed by the collective consciousness and ideas of the society has the effect of restraint or pressure on the individual. Subjective norms are predicting the factors that influence individual behavioral decisions and measuring the degree of influence of whether an individual takes a particular behavior. Therefore, the questionnaire design item

of this research is: after the outbreak of COVID-19, consumers pay attention to the following factors. (1) Ability to deliver goods on time? (2) The ability to handle product delivery errors? (3) Standardized transportation capacity of goods? (4) The ability to avoid the quality assurance of goods from virus infection?

2.4 Perceived Behavioral Control

Perceived behavioral control refers to the amount of personal experience and the expected size of the barrier. Perceived behavior has more control over behavior when a person believes they have more resources and opportunities and fewer expected barriers. Forms an individual's confidence and willingness to do something. It affects in two ways. One is that it has a motivating meaning for behavioral intentions. Another is that it can also be directly used to predict the execution strength of an action. Therefore, the questionnaire design item of this research is: after the outbreak of COVID-19, consumers pay attention to the following factors. (1) Epidemic prevention management of express delivery workers? (2) Disinfection of goods delivery? (3) The ability to deliver the goods in good condition?

2.5 Behavior Intention

Behavioral intention refers to the subjective probability of an individual to take a specific behavior, which reflects the degree of willingness of an individual to take a specific behavior. We can infer behavioral intentions, such as preferences, interests, and hobbies, from observations of behaviors. Behavioral intent can also be detected through testing. Therefore, the questionnaire design item of this research is: consumers' intentions to the following factors after the outbreak of COVID-19. (1) After the outbreak, do you rely more on online shopping? (2) After the outbreak, reduce the number of times you go out? (3) After the outbreak, avoid shopping at brick-and-mortar stores?

2.6 Behavior

Scholar Ajzen believes that all factors that may affect behavior are the effects of behavioral intentions on behavioral performance. Behavioral intention is influenced by internal psychological and external environmental factors. Inner psychology comes from the individual's own attitude, that is, his attitude towards taking a particular action. The external environment is from external pressure.

From the perspective of theoretical framework, behavior is the construction of a series of internal psychological mechanisms, and finally transformed into explicit behavior. This is also the end result of the theory of planned behavior. Therefore, the questionnaire design item of this research is: behavioral performance of consumers after the outbreak of COVID-19. (1) The number or amount of consumption in online shopping has increased compared to the past? (2) The frequency or amount of consumption in physical stores has relatively decreased? (3) Will use the "official online store" of physical stores to meet the epidemic situation Demand during the period? (4) The number of purchases of such products increased in online shopping? (5) What kind of products are purchased online? (6) How often do you use express delivery?

As far as this study is concerned, consumers' fear of the spread of the virus (attitude) and the willingness to use online shopping (behavioral intention) are stronger. At the same time, the willingness to reduce going out during the epidemic has increased (subjective norm). Consumers reduce shopping behavior in brick-and-mortar stores and shift to online shopping behavior at home and increase the frequency of home delivery (perceived behavioral control). Therefore, we can observe and measure consumers' shopping behavior in the face of the epidemic from the above analysis.

3 RESEARCH METHODS

3.1 Sampling Design

The sampling method for this study will be convenience sampling. The sample objects are consumers in Huaian City, Jiangsu Province. Questionnaires are administered to them via the Internet. The survey will be released in June 2021. Pre-test questionnaires were collected, and 50 copies were collected. The revised formal questionnaire will be distributed between July 2021 and November 2020, with a valid collection of 350 copies. The recovery rate was 87%. Questions were measured using a five-point Likert scale ranging from 5 for "strongly agree", 4 for "agree", 3 for "normal", 2 for "disagree", and 1 for "strongly disagree" Express. We propose six hypotheses as the basis for model construction: H1 attitudes have a positive effect on subjective norms. H2 subjective norm has a positive effect on perceived behavioral control. H3 subjective norm has a positive effect on behavioral intention. H4 attitude has a positive effect on behavioral

intention. H5 Perceived behavioral control has a positive effect on behavioral intention. H6 Behavioral intentions have a positive effect on behavior.

3.2 Questionnaire Design

In this study, a questionnaire on the impact of the epidemic on e-commerce and express delivery was compiled based on relevant domestic and foreign literatures. The planned behavior theory advocated by Ajzen is used as the questionnaire infrastructure. The content of the questionnaire is divided into 5 parts. The first part is attitude: it refers to the degree of participation of consumers in their willingness to choose online shopping for items purchased during the epidemic. The second part is the subjective norm: it refers to the psychological pressure of consumers who are afraid of contracting the virus during the epidemic, and reduce the environmental pressure of their willingness to change their shopping behavior in brick-and-mortar stores to online shopping behavior. The third part is perceived behavioral control: it refers to the perception that consumers are affected by the epidemic and change to online shopping instead of physical store purchases in order to reduce the virus infection of the crowd. The fourth part is behavioral intention: the continuation and spread of the epidemic, and the intention to adopt online shopping behavior. The fifth part of behavior refers to the replacement of individual purchases in brick-and-mortar stores by online shopping.

4 DATA ANALYSIS

4.1 Pre-Test Questionnaire Design

The questionnaire of this study conducted a reliability analysis on the questionnaire items of consumers' attitude towards online shopping during the epidemic. Scholars believe that a Cronbach's alpha of 0.5 or above is acceptable, with a high confidence value between 0.6 and 0.9. The standardized reliability coefficients of each scale in this study were Cronbach's α of attitude 0.802, Cronbach's α of subjective norm 0.907, Cronbach's α of perceived behavioral control 0.799, Cronbach's α of behavioral intention 0.800, and Cronbach's α of behavior 0.837. The reliability test shows that the data is between 0.800 and 0.910, indicating that each part of the questionnaire has a good reliability value.

4.2 Analysis of Sampling Data

4.2.1 Consumer's Socioeconomic Background

This study randomly selected consumers' attitudes towards the service quality of the express delivery industry during the epidemic. The distribution of the interviewees in the socio-economic background analysis in this study and the relevant narrative statistical analysis results are as follows: the gender ratio of the sample data in this survey is 46% males and 54% females. The age distribution is 3% under 18 years old, 75% between 18 and 26 years old, 10% between 26 and 30 years old, 6% between 31 and 40 years old, 4% between 41 and 50 years old, and over 50 years old. Accounted for 2%. The marital status is 78% unmarried and 22% married. The education level is 3% for the following junior colleges, 85% for undergraduates, and 12% for masters and above. The monthly income is approximately 55% below 4,000 RMB, 25% from 4,000 to 5999 RMB, 8% from 6,000 to 7,999 RMB, 7% to 8,000 to 10,000 RMB, and 5% above 10,000 RMB. The average monthly consumption amount spent on online shopping is approximately 84% of RMB 1,000 or less, 13% of RMB 1,000 to 2,999, 2% of RMB 3,000 to 4,999, and 1% of RMB 5,000 to 6,999. Occupation types are 75% of students, 5% of civil servants, 15% of office workers, 3% of self-employed persons, and 2% of retirees.

4.2.2 Analysis of Consumers' Purchase of Goods

After the outbreak of the epidemic in COVID-19, the categories of online shopping products that increased in purchase quantity or amount were: food and beverages, clothing and footwear products, and household items, accounting for 50%. Disinfection supplies, masks and sanitary supplies accounted for 33%. Purchases of newspapers, magazines and books, audio-visual entertainment products, 3C electronics, beauty and maintenance products, home appliances, online courses, and health foods accounted for 17%. The frequency of consumers using express delivery is: 59% once a week, 20% once every two weeks, 11% once every three weeks, and 10% once a month.

4.2.3 Regression Empirical Results and Analysis

a) Measurement model analysis

This study adopts partial least squares (PLS) path model calculus, which is a nonparametric method. Its requirements for the sample size are relatively loose, and the sample size does not need to be completely normal distribution. And it is convenient for sample research and investigation. According to the judgment criteria, the reliability of a single variable, the composite reliability (CR), the Cronbach's α of the latent variable, and the average extraction variance (AVE) and other observed values can be used as indicators for judging reliability and convergence. And Bootstraping is used to solve the problem of small samples and non-multivariate normality data to obtain the stability of estimates between various variables (Hair, Ringle, Sarstedt, 2011, Chin, 2010).

The reliability of a single measured variable depends primarily on how well each measured variable can be explained by the latent variable. Therefore, scholars suggest that the recommended factor loading value should be higher than 0.7 (Barclay, Higgins, Thompson, 1995). After analyzing attitude, subjective norm, perceived behavior control, behavior intention, behavior and other factors, most of the factor load values were greater than 0.8. This study used the Smart PLS 3.0 tool for PLS analysis. The relevant verification criteria are described below.

The first part is the factor load value of attitude: after the outbreak of COVID-19, the factor load value of fear of going out and contacting people was 0.826. The factor load value that changes consumption behavior is 0.872. The load value of changing lifestyle factors is 0.837.

The second part is the factor load value of subjective norm: the factor load value of the importance of the delivery punctual ability of goods to the express industry is 0.865. The load value of the factor of importance of commodity error handling capacity for the express delivery industry is 0.880. The factor load value of standardized transportation of goods to the express industry is 0.909. The factor load value of service attitude level to the importance of express industry is 0.885.

The third part is the factor load value of perceived behavior control: the factor load value of the importance of the epidemic prevention management of the express delivery personnel to the express delivery industry is 0.777. The load value of the important factor load value of the disinfection operation for the delivery of goods to the express industry is 0.899. The undamaged delivery capacity of the goods has a factor load value of 0.849 for the importance of the express delivery industry.

The fourth part is the factor load value of behavior intention: After the COVID-19 outbreak, the factor load value of relying more on online shopping is 0.826. The factor load value for reducing the number of trips is 0.850. The factor load value for avoiding consumption in physical stores is 0.859.

The fifth part is the factor load value of behavior: after the outbreak of the COVID-19 epidemic, the quantity or amount of online shopping consumption increased compared to the previous factor load value of 0.899. Compared with the past, the factor load value of the number or amount of consumption in the physical store is 0.886. The official online store in the physical store will be used for consumption, and the factor load value to meet demand during the epidemic period is 0.818.

b) Composite reliability (CR)

CR refers to the consistency of variables within the studied dimensions. The latent variable can be tested when the CR value of the latent variable and Cronbach'α is high. Scholars suggest that Cronbach'α must be greater than 0.7 (0.60-0.70 for exploratory studies), which is sufficient to indicate that the latent variables have good internal consistency. After analyzing the combined validity of each factor, the combined reliability of attitude is 0.882, the combined reliability of subjective norm is 0.935, the combined reliability of perceived behavior control is 0.880, the combined reliability of behavior intention is 0.882, and the combined reliability of behavior is 0.882. The value is 0.902, and the combined reliability and validity of each factor are mostly greater than 0.8.

c) Average extracted variance (AVE)

Average variance extraction (AVE) indicates how many latent variables a variable can test. It can be used as judgment reliability, or it can represent discriminant validity. The AVE value must be greater than 0.5 to indicate a convergent effect on the observed variables. Also, check for problems with collinearity for each set of predictors. The predicted variance inflation factor (VIF) is less than 0.20, indicating that there is a collinearity problem (Fornell & Larcker.1981). It has been verified that the values obtained by the questionnaire items in this study are all greater than 0.20, and there is no collinearity. After the analysis, the average variance of each factor is as those. Attitude (AVE) value was 0.715, subjective norm (AVE) value was 0.783, perceived behavioral control (AVE) value was 0.711, behavioral intention (AVE) value was 0.714, and behavioral (AVE) value was 0.754. All The average variance extraction for factors (AVE) were all greater than 0.7.

d) PLS module path results

This study uses the least squares method to analyze the causal relationship between the latent variables of the structural model. The validation is set to 300 bootstrap parameters to perform the validation procedure to obtain the stability of each variable estimate. Secondly, the analysis effect value f^2 can be used to evaluate the influence of external variables on the internal dependent variables of explanatory variables. In general, the influence of external variables on internal latent variables is 0.02 for small, 0.15 for medium, and 0.35 for large. After the analysis, the f^2 effect value of each factor was analyzed: the influence of attitude on subjective norm was small, and the f^2 effect value was 0.072. The f^2 effect value of attitude on behavior intention is 0.573, the effect should be significant. The effect of perceived behavioral control on behavioral intention was 0.043 and the effect was not significant. The f^2 effect value of behavioral intention is 0.225, which is significant. The f^2 effect of subjective norm on perceived behavioral control is 0.134, which is significant.

R-Square is a judging path significance test, which can be used as the explanatory power of the research model. The coefficient of determination of R2 represents the size of the potential internal variables in the structural formula to be explained. The R2 value can be roughly divided into 0.75 for large, 0.50 for medium, and 0.25 for small. The R2 determination coefficients of this study are: subjective norm R2 determination coefficient is 0.067, perceived behavioral control R2 determination coefficient is 0.566, behavioral intention R2 determination coefficient is 0.445, and behavioral R2 determination coefficient is 0.692. Except that the R2 determination coefficient of subjective norm is less than 0.4, which is not significant, the R2 determination coefficients of all other factor dimensions are mostly greater than 0.4.

The predictive power of the study model was expressed as R-squared value. It represents the percentage of variance explained by exogenous versus endogenous variables. Its value is between 0 and 1. The larger the value, the better the explanatory power of the model. According to the six research hypotheses proposed in this study, the results of the overall model relational path validation show that: attitude, subjective norm, perceived behavioral control, behavioral intention, and behavior. Each factor has a positive effect. The

results of the research hypothesis testing of this study are shown in Table 1, as shown in Figure 1.

Table 1: hypothesis verification of structural model.

Item	Hypothesis	Path Coefficients	Validation results
H1	Attitude has a positive impact on subjective norms	0.259**	support
H2	Subjective norms have a positive influence on perceptual behavior control	0.752***	support
H3	Subjective norms have a positive influence on behavior intentions	0.017*	support
H4	Attitude has a positive effect on behavioral intention	0.585**	support
H5	Perceived behavior control has a positive effect on behavior intention	0.234*	support
H6	Behavioral intention has a positive effect on behavior	0.832***	support

*P<0.05,** p<0.01,*** p<0.001

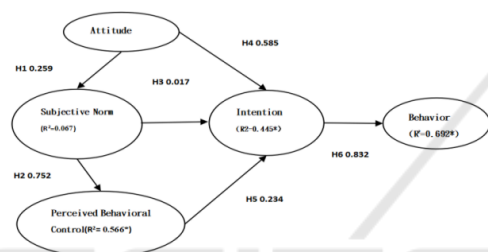
Figure 1: TPB of home deliveries in COVID-19.

5 CONCLUSIONS

The COVID-19 pandemic has affected every aspect of our lives. Through this actual survey, it is found that from the perspective of consumers' attitudes and behaviors in online shopping. Due to the impact of the epidemic environment, consumers are turning to online shopping behaviors from physical shopping behaviors, and the trend of home delivery is increasing. We conducted an online survey of the population of the Huai'an metropolitan area in Jiangsu province. Survey items include the number of home delivery orders, household and demographic characteristics, e-commerce and product preferences, and relevant sociodemographic variables for survey and data collection. According to the data, people are afraid of being infected by the epidemic, so they should reduce the habit of going out to physical stores to buy goods to avoid being infected by the virus. This phenomenon has increased the willingness of consumers to change their shopping behavior from physical store shopping to online shopping. Consumers buy products online, with daily necessities and epidemic

prevention products as the main products. The number of home deliveries increased significantly before the COVID-19 period compared to the post-COVID-19 period. From the perspective of planned behavior theory, it is explored that the increase of express delivery business and the increase of online shopping behavior during the COVID-19 period have a significant positive correlation with the impact of the epidemic on consumers.

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