

Research on Consumer Behavioral Intention in Express Packaging Recycling

Shan YI¹, Wang Yi DUO²

Received: September 21, 2022. Revised: October 11, 2022. Accepted: October 15, 2022.

Abstract

Purpose: With the rapid development of China's e-commerce industry, the express delivery industry is also advancing by leaps and bounds. While express brings convenience to people's life, a large number of express packages are disposed of at will, which not only increases a large amount of domestic waste, but also causes environmental pollution and waste of resources. Therefore, express packaging recycling has become a consensus in all fields of society. **Research design, data and methodology:** According to the characteristics of express packaging recycling, other variables were introduced into the TPB model proposed by AJZEN, and based on previous literature research and research assumptions, a model of influencing factors of consumer behavior in express packaging recycling was constructed. **Results:** The results show that in addition to reward factors, other factors have a significant positive impact on the respondents' willingness to recycling. **Conclusions:** In order to enhance consumers' willingness to recycle express delivery and effectively carry out express packaging recycling, the following suggestions are put forward: the government should formulate a comprehensive express delivery recycling policy, strengthen policy publicity, and standardize consumers' express packaging recycling behavior. Improve consumers' awareness of express packaging recycling, and promote the increase in the scale of express packaging recycling.

Keywords : Express Packaging Recycling; Consumer Behavioral; Consumer Intention

JEL Classification Code : M10,M31,C12

1. Introduction

With the promotion and popularization of online shopping, China's express delivery industry is also developing rapidly, and during the epidemic period, the express delivery industry has become an important force in the fight against the epidemic. According to the data released by the State Post Bureau of China, from January to February 2022, the total business volume of express delivery service enterprises nationwide has completed 15.69 billion pieces, a year-on-year increase of 19.6%; business income

has reached 157.43 billion yuan, a year-on-year increase of 13.8%. Among them, the intra-city business volume has completed a total of 1.85 billion pieces, a year-on-year increase of 12.8%; the off-site business volume has completed a total of 13.54 billion pieces, a year-on-year increase of 21.5%. In February alone, the business volume of national express delivery service companies completed 6.91 billion pieces, a year-on-year increase of 49.7%; business income reached 65.71 billion yuan, a year-on-year increase of 27.4%. Under such a large volume of express business, express packaging is not in place due to the lack of timely recycling, and although people have some

- 1 First Author. Professor, Department of Economics and Management, Zao Zhuang University, China, Email: appleshan_001@163.com
- 2 Second Author, Undergraduate student, Department of Economics and Management, Zao Zhuang University, China, Email: 3358164369@qq.com

© Copyright: The Author(s)
 This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted noncommercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

understanding of express packaging recycling, but their willingness to act is not strong, they will inadvertently throw away express packaging in daily life. , which is not only a waste of resources, but also pollutes the environment. Therefore, it is urgent to carry out an investigation on the behavior of consumers in express packaging recycling.

From the perspective of consumers, this research explores and studies the willingness of express packaging recycling behavior of Chinese consumers, and analyzes the impact of various social and psychological factors on the willingness to recycling behavior, in order to effectively promote the recycling of express packaging, and to promote and develop Countries and companies that recycle express packaging put forward management suggestions to promote the green development of the express delivery industry and contribute to the construction of green logistics.

2. Literature Review

There are many theoretical studies on waste recycling behavior by domestic and foreign scholars, among which the main application is the Theory of Planned Behavior basis proposed by scholars such as Ajzen and Davis. These theories explore the specific behavior of consumers from the perspective of psychology.

Among them, it was initially based on the Theory of Planned Behavior (TPB) to study consumers' participation in waste recycling. In their view, the attitude of the subject, subjective norms, perceived behavior control and other factors can be used to analyze people's real behavior. Yushkova et al. used Structural Equation Modeling (SEM) to study the influencing factors of mobile phone recycling intentions, and found that social norms and awareness of recycling directly and indirectly affect mobile phone recycling behavior intentions. Attitude affects intent, and attitude has a direct impact on mobile phone recycling intent. Cui et al. used TPB combined with statistical analysis methods to study the willingness to recycle electronic waste, and found that attitude played the most important role, followed by subjective norms, and perceptual behavior control had little impact on the willingness to recycle.

Now, with the deepening of research, most scholars will revise the original model according to practical problems and add other factors, and continue to enrich the research on consumer recycling behavior. For example, Turaga et al. found that in addition to attitudes and norms, statistics of personal characteristics also have a certain role in promoting users' recycling behavior. Lee et al. used multiple regression analysis to empirically analyze the recycling behavior of residents' electronic waste, and the results showed that variables such as environmental awareness, moral concepts, and certain demographic

characteristics played a decisive role. Lu Yingying et al. also proved that residents' past recycling habits, attitudes, behavior control and other variables will positively affect their recycling behaviors, and at this time, subjective norms have no correlation with recycling behaviors.

Some scholars have introduced environmental knowledge, situational factors, economic motivation and other factors into the theoretical model of planned behavior to carry out specific research to explore the relationship between it and consumer recycling behavior. When Jean-Daniel et al. used a logistic model to study the behavioral willingness of American residents to participate in e-waste recycling, they not only found that environmental protection concepts and personal subjective norms play an important role, but also found that the convenience of recycling, knowledge about the environment, as well as the gender, Age will affect residents' willingness to recycle to varying degrees. When Lizin et al. used PLS-SEM to analyze and study residents' battery recycling intentions, they added variables such as ethics and external policy influences to the theoretical model of planned behavior. They found that ethics would directly affect recycling intentions, while external policies would directly affect recycling intentions. Promoting the effect of subjective norms on residents' recycling intentions. Yu Fumao and others found that environmental awareness, convenience, government guidance and other situational factors strongly affected users' participation in the recycling of waste electronic products when investigating the recycling behavior of 350 residents. Sander et al. changed their previous research thinking and conducted relevant research on the waste disposal habits of participating users. It was found that consumers prefer to recycle at a place that is easy to operate and close to the recycling outlets. Hu Li Mei and others believed that the situational factors affecting consumer electronic waste recycling included recycling channels, policies, regulations and publicity, and verified that situational factors effectively regulate the role of behavioral intentions on behavior, without studying whether situational factors have an impact on recycling intentions. While Wan and others pointed out that residents' willingness to recycle will be affected by policies and measures when studying the recycling behavior of Hong Kong residents.

At present, the research on express packaging recycling mainly covers two aspects, one is the research on the construction of express packaging recycling mode and recycling mechanism, and the other is the discussion on express packaging recycling strategy from the perspective of enterprises, ignoring that consumers are the express packaging recycling process There is a lack of relevant research on express packaging recycling behavior from the perspective of consumers. Therefore, this paper decided to study the behavioral intention of consumers in express

packaging recycling from the perspective of consumers based on the theoretical model of planned behavior, combined with other theories and the unique characteristics of express packaging recycling.

3. Construction of Consumer Express Packaging Recycling Behavior Intention Model

3.1 Variable Design and Research Assumptions

This paper assumes that cognitive level, policy publicity, convenience, and reward mechanism have a positive impact on recycling intention. Therefore, the following assumptions are made:

H1: Cognitive level has a positive impact on consumers' willingness to recycle express packaging

H2: Policy publicity has a positive impact on consumers' willingness to recycle express packaging

H3: Convenience has a positive impact on consumers' willingness to recycle express packaging

H4: The incentive mechanism has a positive impact on consumers' willingness to recycle express packaging

In the field of planned behavior research, AJZEN's TPB model points out that user behavior will be affected by behavior intention. Therefore, the following assumptions are made:

H5: Consumers' express packaging recycling behavior has a positive impact on recycling intention

To sum up, according to the characteristics of express packaging recycling, this paper introduces other variables into the TPB model proposed by AJZEN, and builds a model of influencing factors of consumer behavior willingness in express packaging recycling based on previous literature research and research assumptions as the picture shows:

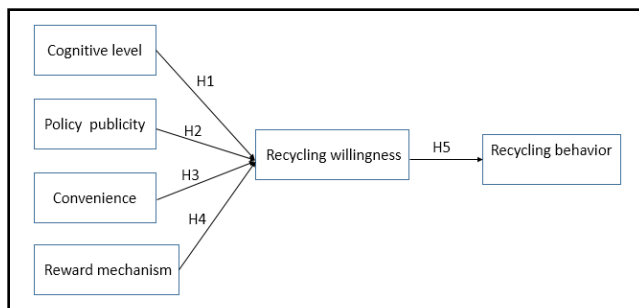


Figure 1: Model of influencing factors of consumer behavior willingness in express packaging recycling

4. An Empirical Study on Consumer Express Packaging Recycling Behavior

After the analysis of the results of the pre-test questionnaire and the further revision of the questionnaire, the final questionnaire to investigate the consumers' willingness to recycle express packaging was determined (see appendix), and then the formal questionnaire was distributed on a large scale, mainly in the form of online questionnaires Links or QR codes to distribute questionnaires. A total of 250 questionnaires were distributed in this survey, and 210 were returned.

4.1 Descriptive Statistical Analysis

In terms of gender, there are 85 male respondents, accounting for 40.50% of the total respondents, and 125 female respondents, accounting for 59.50% of the total respondents. The ratio of males and females is basically the same. From the perspective of age structure, the respondents aged 18-30 are the most, with a total of 72 people, accounting for 34.30% of the total sample, followed by those aged over 40, accounting for 31.90%, of which the population under the age of 18 is the least. Judging from the educational background of the surveyed groups, the number of undergraduates is the largest, accounting for 56.00% of the total number, followed by masters and above, accounting for 20.80%, and the least number of respondents are high school and below. In terms of education distribution, college education has the most respondents, with a total of 88 people, accounting for 41.90% of the total sample, followed by high school, accounting for 33.30%, and primary school education accounting for the least.

Table 1: Basic Information Descriptive Statistics

	Group	Frequency	Percentage
Gender	Male	85	40.5%
	Female	125	59.5%
Age	under 18 years old	27	12.9%
	18 - 30	72	34.3%
	30 - 40	44	21%
	over 40 years old	67	31.9%
Education	Primary school	1	0.5%
	Middle school	43	20.5%
	High school	70	33.3%
	University	88	41.9%
	Graduate and above	8	3.8%
Profession	Professional	9	4.3%
	Service workers	21	10%
	Freelancers	27	12.9%
	Worker	45	21.4%
	Staff	26	12.4%
	Enterprises and institutions	3	1.4%

Student	70	33.3%
Housewife	2	1%
Other	7	3.3%

4.2 Reliability Analysis

Reliability is generally used to describe the stability and consistency of questionnaire results, and it reflects the consistency level of the results obtained when researchers use differential measurements for the same or similar phenomena. All measured values cover the actual value and the error value. The higher the reliability of the measurement result, the lower the error value of the result, and the better the stability of the measurement value. The results of the overall reliability analysis of this questionnaire are shown in the table below.

Table 2: Reliability Statistics

Cronbach's Alpha	Number of items
.928	30

The Cronbach Alpha coefficient of the scale is 0.928, and the reliability is generally greater than 0.9, indicating that the overall consistency of the questionnaire items is relatively good, and the questionnaire design is relatively scientific and reliable, so the design reliability of this questionnaire is very high.

Table 4 Correlation Analysis

Pearson correlation	Disposal method	Express recycling	Meaningful or not	Worth advocating	Participate in express recycling	Policy advocacy	Experience express recycling	Convenient or not	Recycling method	Recycling mechanism	Recycling Rewards
Disposal method	1	-.002	.069	.089	.137*	.164*	.125	.206**	.103	.208**	.181**
Express recycling	-.002	1	.067	.126	.061	-.042	.024	-.045	-.089	-.025	-.028
Meaningful or not	.069	.067	1	.714**	.327**	.400**	.485**	.420**	.281**	.427**	.579**
Worth advocating	.089	.126	.714**	1	.345**	.332**	.564**	.384**	.172*	.372**	.528**
Participate in express recycling	.137*	.061	.327**	.345**	1	.195**	.222**	.249**	.030	.171*	.212**
Policy advocacy	.164*	-.042	.400**	.332**	.195**	1	.362**	.528**	.314**	.706**	.526**
Experience express recycling	.125	.024	.485**	.564**	.222**	.362**	1	.502**	.224**	.437**	.520**
Convenient or not	.206**	-.045	.420**	.384**	.249**	.528**	.502**	1	.296**	.465**	.437**
Recycling method	.103	-.089	.281**	.172*	.030	.314**	.224**	.296**	1	.312**	.209**
Recycling mechanism	.208**	-.025	.427**	.372**	.171*	.706**	.437**	.465**	.312**	1	.621**
Recycling Rewards	.181**	-.028	.579**	.528**	.212**	.526**	.520**	.437**	.209**	.621**	1

*. Correlation is significant at the 0.05 level(2-tailed).

** Correlation is significant at the 0.01 level(2-tailed).

4.3 Validity Analysis

Validity refers to the level of agreement between the true value of the survey and the measured value. It can measure the degree to which the psychological or behavioral characteristics of the questionnaire are expected to be measured. It is an overall evaluation of the error of the measurement system. The closer the true value is to the measured value, the higher the validity level of the survey.

Table 3: Validity Analysis

KMO Sampling Suitability Quantity		.938
Bartlett's sphericity test	approximate chi-square	3459.896
	degrees of freedom	435
	salience	.000

It can be seen from the above table that the KMO value is 0.938, which is greater than 0.7, which means that the adequacy of the questionnaire data is relatively high, and it is suitable for factor analysis; There is a strong correlation between the variables. Therefore, SPSS 26.0 can be used to perform principal component analysis on the questionnaire data to test the validity of the questionnaire. The cumulative contribution rate, common factor variance and factor loading are the key parameters for evaluating the construct validity in factor analysis. After the principal component analysis of the 30 indicators in the questionnaire, the detailed analysis results are shown in the table.

4.4 Correlation Analysis

In this study, Pearson correlation analysis was used to analyze the relationship between the research variables and the factors in this paper. The correlation coefficient is shown in the table 4.

According to the correlation analysis between variables, the overall correlation between variables is obvious and significant, but the correlation coefficient is generally not high, about 0.0-0.2, indicating that the degree of correlation between variables is not high, but basically all is positively correlated. Therefore, it is proved that the variables are very weakly correlated or irrelevant. If the degree of correlation between variables is high, multicollinearity is easy to occur

in the regression, so the regression analysis can be continued.

4.5 Regression Analysis

Taking the willingness of the investigators to recycle as the dependent variable, the independent variables are whether express recycling is meaningful, participating in express recycling, policy publicity, whether the method is convenient, recycling method, recycling mechanism, the importance of convenience, and express recycling reward. Using SPSS26.0 software, multinomial logistic regression analysis was used to explore the main influencing factors affecting express delivery willingness. The available model results are as follows:

Table 5: Model Fit Information

Model	Model Fitting Conditions	Likelihood Ratio Test		
	-2LL	Chi-square	df	Sig.
intercept only	710.556			
result	454.262	256.294	192	.001

Table 6: Pseudo R-square

Cox-Snell R-square	.705
Nagorko R square	.727
McFadden R Square	.349

The model fitting information indicates that the significance of the model is 0.001, which is less than 0.05, so the model has passed the significance test, indicating that the model is effective. According to the Cox-Sneier R square = 0.705, it shows that the model fitting effect is good.

From the perspective of the regression coefficient and its significance, participation in express delivery recycling and the recycling mechanism is significant at the 5% significance level and the regression coefficient is > 0, and the policy publicity and recycling methods have a significant impact at the 10% significance level and the regression coefficient > 0. Therefore, whether Kawada participates in express recycling, understanding the recycling mechanism, policy publicity, and recycling methods have a significant positive impact on the willingness of respondents to recycling, and whether express recycling is meaningful, whether the method is convenient, the importance of convenience, express recycling Rewards had no significant effect on investigators' willingness to recycle.

4.6 Hypothetical Test

By analyzing the relationship between cognitive level of independent variables, policy publicity, convenience, reward mechanism, recycling behavior and dependent

variable recycling willingness, the hypothesis test results obtained in this survey are shown in the table.

Table 7: Hypothesis Test Results

	Hypothesis	Result
H1	Cognitive level has a positive impact on consumers' willingness to recycle express packaging	Accept
H2	Policy publicity has a positive impact on consumers' willingness to recycle express packaging	Accept
H3	Convenience has a positive impact on consumers' willingness to recycle express packaging	Reject
H4	The incentive mechanism has a positive impact on consumers' willingness to recycle express packaging	Reject
H5	Consumers' express packaging recycling behavior has a positive impact on recycling intention	Accept

According to this hypothesis test, the level of cognition, policy publicity, portability, consumer reward mechanism, and consumers' express packaging recycling behavior were tested from the perspectives. Through the influence of these factors on consumers' express packaging recycling willingness, the conclusion is drawn. The degree of influence of consumers' willingness to recycle, so as to draw the conclusion that a better express recycling system is carried out. The analysis of policies in daily life has the greatest impact on consumers, the highest correlation coefficient, and plays an important role in the implementation of the express delivery recycling mechanism; cognitive level is also one of the major factors. With the popularization of culture, the concept of protecting the environment has deepened. People's hearts, more and more policies are being implemented, and the express recycling system will also be supported and promoted. Consumer incentives have less of an impact on it, and it will only be a icing on the cake, not a major factor.

5. Results and Discussion

It can be concluded from the previous article that the cognitive level and policy publicity have an impact on consumers' willingness to recycle express packaging. In view of the above research results, this paper puts forward the following suggestions in order to enhance consumers' willingness to recycle express delivery and effectively carry out express packaging recycling:

[1] The government has formulated a sound express delivery recycling policy, strengthened policy publicity, and standardized consumers' express packaging recycling behavior. Increase the promulgation of administrative regulations on packaging recycling and reuse, standardize

the rights and obligations of the subjects involved in packaging, clarify the supervisory responsibilities of administrative departments, and provide a legal basis for the production, use, recycling and reuse of express packaging. There are laws to follow when it comes to recycling. At the same time, relevant policies will be publicized to make the public aware of them.

[2] Improve consumers' awareness of express packaging recycling, and promote the increase in the scale of express packaging recycling. Encourage consumers to actively participate in express packaging recycling.

[3] Strengthen supervision and guide the green packaging. Promote the implementation of the green product certification system for express packaging, promote express delivery companies to increase the supply of green express packaging products, improve the quality and efficiency of supply, and promote the green transformation and upgrading of the express packaging industry.

This paper makes a report by reading relevant literature at home and abroad and conducting a questionnaire survey, analyzes the influencing factors that affect consumers' willingness to recycle express packaging, and puts forward suggestions for the influencing factors, so as to provide sufficient theoretical basis for better development of express packaging recycling. However, the collection of paper sample data has some limitations: First, due to the limitation of the information sources of the investigators, the respondents cannot represent all, so the results of this study are not broadly representative. Second, the selection of influencing factors is relatively limited. The research variables in this paper are proposed after reading the literature and combining the development status of express packaging recycling. However, due to the one-sided reading of the literature, the relevant knowledge may not be clearly understood, and the express packaging recycling is in the development stage, which will lead to the failure to take into account some factors that affect consumer behavior intentions in the research process.

In the face of the deficiencies in the research process, the following aspects can be improved in future research. When selecting samples, we should consider various factors to increase the universal applicability of the analysis results of sample data, so as to make the accuracy of the research results of the paper higher. On the other hand, with the development of express packaging recycling, new factors can be appropriately added in the next research, comprehensively analyze the factors that affect consumers' participation in express packaging recycling, and continuously improve the influencing factor model of express packaging recycling willingness. Thereby increasing the credibility of the results of the study, and better reflect the real situation.

References

- Alwaeli M. (2010). The impact of product charges and EU directives on the level of packaging waste recycling in Poland. *Resources Conservation & Recycling*, 54(10), 609-614.
- Botetzagias I, Dima A F, Malesios C. (2015). Extending the Theory of Planned Behavior in the context of recycling: The role of moral norms and of demographic predictors. *Resources Conservation and Recycling*, 95(3), 58-67.
- Chen F, Chen H, Yang J. (2019). Impact of regulatory focus on express packaging waste recycling behavior: moderating role of psychological empowerment perception. *Environmental Science and Pollution Research*, 26(9), 8862-8874.
- Cui J. R, Forsberg E. (2003). Mechanical recycling of waste electric and electronic equipment: a review. *Journal of Hazardous Materials*, 99(3):243-263.
- Cruz N, Simoes P, Rui C M. (2012). Economic cost recovery in the recycling of packaging waste-the case of Portugal. *Journal of Cleaner Production*, 37(4), 8-18.
- Dong Qiyue, Pan Junchang. (2020). Analysis on the influencing factors of consumers' willingness and behavior of express packaging classification and recycling. *Green Packaging*, 5(6), 50-58.
- Echegaray, F, Hansstein F V. (2017). Assessing the intention-behavior gap in electronic waste recycling: the case of Brazil. *Journal of Cleaner Production*, 142(6), 180-190.
- Jean-Daniel M. Saphores, Oladele A. Ogunseitan, Andrew A. Shapiro. (2012). Willingness to engage in a pro-environmental behavior: An analysis of e-waste recycling based on a national survey of U.S. households. *Resources, Conservation & Recycling*, 60(3), 49-63.
- Nasrollahi M, Beynaghi A, Mohamady F M. (2020). *Responsible consumption and production*. Germany: Springer.
- Turaga R. M, Howarth R. B, Borsuk M. E. (2010). Pro-environmental behavior: rational choice meets moral motivation. *Annals of the New York Academy of Sciences*, 1185:211-224.
- The State Post Bureau of the People's Republic of China. The State Post Bureau announced the operation of the postal industry in February 2022. <http://www.spb.gov.cn/Posted June 14, 2022>
- Wang Ruobing. (2021). Research on the recycling of express packaging in college campuses. *Chinese Market*, 28(35), 183-184.
- Yu Fumao, Duan Xianming, Liang Huijuan. (2011) Empirical study on the influencing factors of residents' e-waste recycling behavior. *China Environmental Science*, 31(12): 2083-2090
- Zhang Hao, Wan Han, Ji Yinlian. (2019). Research on consumers' willingness to recycle express packaging and its influencing factors. *Logistics Technology*, 38(5), 88-92