Research on Influencing Factors of Municipal Solid Waste Classification Behavior of Urban and Rural Residents-- A Case Study of Wenzhou City

Xingcheng Ge[1a], Lu Ji[2b*], Yiyang Li[1c]

[1.]School of Management, Wenzhou Business College, Wenzhou, China
[2.]College of Public Administration, Nanjing Agricultural University, Nanjing, China

Email: [a] cicigxcheng@163.com, [b] 2269098517@qq.com,
[c] 2533590353@qq.com

Abstract. Based on the theory of planned behavior and new public governance, and combined with the reality of Wenzhou city, this paper constructs a research theoretical model to explore the influencing factors of municipal solid waste classification behavior of urban and rural residents in Wenzhou city. The results show that due to the influence of their own behavior, surrounding garbage classification atmosphere, knowledge of garbage classification and personal work and life status, there are great differences between urban and rural residents'willingness and behavior of municipal solid waste classification in Wenzhou city. And the willingness is obviously higher than the behavior. In terms of behavior influencing factors, the residents'attitude, subjective norms and perceptual behavior control corresponding to the planned behavior theory have a positive impact on the implementation of municipal solid waste classification for urban and rural residents; in the aspect of new public governance, the implementation of government policies, publicity efforts, help residents to actively implement the classification of domestic waste.

Keywords: Urban and rural residents; Refuse classification; Influencing factors; Wenzhou city

1   Introduction

At present, the treatment of municipal solid waste has become the standard of urban governance. The environmental governance problem has developed so far, from the initial "human-centered" end treatment, to the "ecology-centered" governance, and then to the source governance advocated in recent years, trying to improve the environmental problems to a certain extent. The implementation of garbage classification is related to the living environment of the broad masses of the people and the economical use of resources, which is also an important embodiment of the level of social civilization. In recent years, governments in various parts of our country are also actively exploring and implementing various methods for the implementation of garbage classification. The report of the 20th CPC National Congress pointed out: "im-

plement the action of urban renewal, strengthen urban infrastructure construction, and build a livable, resilient and intelligent city." To deal with the classification of municipal solid waste is an important aspect of urban livability. Carrying out the classification of domestic waste can help reduce the amount of garbage to the maximum extent, realize the recycling of resources, turn waste into treasure, and improve the overall appearance of urban and rural areas.

Wenzhou, located in the south of Zhejiang Province, is one of the 27 cities in the central area of the Yangtze River Delta. In August 2020, Wenzhou issued the "implementation Plan for the Construction of Wenzhou Global waste-free City", which clearly pointed out that we should follow the concept of sustainable development, deal with the problem of municipal solid waste classification, and realize reduction and resource utilization from the source. Since 2023, Wenzhou Municipal Classification Office has paid close attention to the weak links, made up for the weak points, introduced leading enterprises such as "Brother Tiger Recycling" and other industry leading enterprises, promoted the precise release of "two withdrawals, two certainties and two places", "direct transport + transshipment + special transport", classified disposal of "recycling + incineration + biochemical + local treatment", achieved the city's domestic waste incineration and kitchen waste treatment facilities "county coverage".

So, on the basis of combing the literature and policy documents, and through the investigation and research on the garbage classification behavior of urban and rural residents in Wenzhou, this study comprehensively understands the current situation of cognition, attitude and behavior of urban and rural residents towards garbage classification in Wenzhou. analyze the factors that affect the garbage classification behavior of urban and rural residents, sum up experience, and optimize the garbage classification path of "Wenzhou model".

2   Literature review and research hypotheses

2.1   Literature review

Since the 1970s, foreign scholars have carried out the research on the treatment of residential waste. With the rapid development of foreign developed countries and the surge of domestic waste, a lot of research on garbage classification has been carried out in the 20th century. In the following study, the researchers gradually pay attention to the impact of the external environment on residents'participation behavior. Werner and Makela (1998) believe that individual classification behavior will be affected by others[1]. Callan,Thomas (2006) and Storey et al. (2015) further discussed the significant impact of economic reward and economic punishment on garbage classification[2-3]. After that, many scholars have developed various aspects of research, including community waste classification and management methods[4], the renewal, accessibility and convenience of related sanitation facilities[5], as well as the impact of policy factors such as the frequency of publicity of relevant classification knowledge and policies and activity paths on garbage classification and recycling[6].

In recent years, the research on garbage classification mainly focuses on macro policy, psychology and external situation[7-8]. Wang (2018), through the multivariate analysis of the data of social survey, thinks that the classification behavior of individuals is restricted by environmental knowledge, and the more individuals know about environmental knowledge, the more they will choose to classify garbage disposal and recycling[9]. Through the results of community survey, Chen and Hu (2018) confirmed that there are special individual differences in attitude and effective perception of garbage classification behavior, and the estimation of expected obstacles is also a factor affecting their participation in garbage classification[10].

Although previous studies have discussed and analyzed the influencing factors of residents'participation in garbage classification from the macro and micro levels, the analysis of macro environment is too biased towards the impact of policy factors on residents' participation in garbage classification. it ignores the specific situational factors in different regions, and fails to pay more detailed attention to the adaptive behavior of individual residents in specific situations. Examining the psychological consciousness of individual residents from the micro level, and examining the specific environment of individual residents, we can study this phenomenon and problem in the field of mutual adjustment of behavior and situation, which will expand the analytical dimension of the existing research. and enhance the practical significance of the research.

2.2   Research hypothesis

Planned behavior theory.

The planned behavior theory was put forward by Ajzen (1985), which includes five elements, namely, attitude, subjective norm, perceptual behavior control, behavior intention and behavior. Among them, attitude, subjective norms and perceptual behavior control play a decisive role, which affect individual behavior will and ultimately determine individual behavior.

Combined with the reality of this paper, through the study of residents'attitude, we can analyze the psychological tendency and external performance of urban and rural residents in their surrounding environment. At present, most of the existing studies show that the relationship between residents'attitude and behavior is positively correlated. If residents think that the classification of domestic waste is of positive significance and can play an important role in protecting the environment or maintaining the ecology, then the more positive the residents will be to implement the classification of domestic waste, on the contrary, they will treat the classification of domestic waste passively. Subjective norm refers to the pressure that individuals feel from the external environment mainly refers to the social environment when they take a specific behavior, reflecting the impact of the external environment on individual behavior. Especially for the classification behavior of household waste, the requirements of relatives, friends, neighbors and community management around the individual, there is an obvious impact on the individual implementation of domestic waste classification, stimulate their conformity psychology, to a certain extent, drive the human body to follow to carry out the classification of domestic waste. Behavioral

perceptual control refers to the ability of individuals to control their own behavior based on personal ability or experience, and also includes the subjective feelings of the external environment on the implementation of domestic waste classification behavior. For example, in the process of implementing the classification of domestic waste, the individual is affected by such conditions as whether the individual has enough energy in the process of classifying domestic waste and whether there is sufficient space for the classification of domestic waste in the household. At the same time, it also includes the construction of government municipal solid waste classification infrastructure, the degree of knowledge of municipal solid waste classification received and other factors, and then produce the emotion of resistance or acceptance to the classification of domestic waste.

Based on the elements of planned behavior theory, the classification of municipal solid waste of urban and rural residents in Wenzhou is influenced by residents'attitude, subjective norms and perceptual behavior control, and the corresponding research hypotheses are put forward.

H1: There is a positive correlation between residents'attitude and household waste classification behavior.

H2: There is a positive correlation between subjective norms and residents'classification behavior of municipal solid waste.

H3: There is a positive correlation between perceptual behavior control and household waste classification behavior.

New public governance theory.

The new public governance theory was put forward by Erik Lane, an economist and public management theorist, based on economics in the 1980s. The aim is to establish a government administrative management system with high efficiency, coordinated operation and standard behavior. Its core part is to realize the relative "liberalization", "enterprising" and "marketization" of government management. The new public governance theory advocates that the government should highlight the role of service functions, take the masses as the main object in social management, and improve the efficiency of government behavior in the form of cooperation, negotiation or granting management or rights, instead of rallying mass awareness, managing work and achieving goals in a compulsory way.

In terms of government involvement, the government plays a crucial role as the authority responsible for formulating and implementing policies on garbage classification for both urban and rural residents. The level of familiarity that residents have with these policies directly influences their behavior towards garbage classification. Therefore, government policies and governance are considered as key variables in measuring behavioral factors. On the other hand, social subjects encompass various entities such as voluntary organizations, village self-governing bodies, community management committees, and overall societal attitudes towards garbage classification which collectively exert subjective cognitive pressure on individual residents.

Based on the analysis of the above new public governance theory in the aspects of government, society and market, the following hypotheses are put forward:

H4: There is a positive correlation between government policy and management behavior and household waste classification behavior.

H5: There is a positive correlation between residents' familiarity with the policy and the implementation of household waste classification behavior.

H6: There is a positive correlation between the propaganda of municipal solid waste classification and the implementation of domestic waste classification behavior by residents.

3   Questionnaire Design and Statistical Analysis

Based on the analysis of the influencing factors of planned behavior theory and new public governance theory, by referring to the relevant research at home and abroad, a questionnaire is designed, the items are controlled at 20, and the completion time is expected to be 5 minutes. The option part is in the form of Likot five-level scale. In addition, the introduction of gender, age, cultural process, marriage, political outlook, occupation, income and other demographic characteristics information. This questionnaire survey adopts the mixed survey method of online and offline, and the questionnaire is distributed to the residents at any time, and the subjects basically cover people with different characteristics. In order to ensure that enough valid questionnaires can be collected, a total of 200 questionnaires were sent out, 16 incorrect or invalid questionnaires were eliminated, and a total of 184 valid questionnaires were recovered, with a recovery rate of 92%, which basically meets the sample size requirements.

From the perspective of gender, men account for 42.4% and women account for 57.6%. In terms of age, the highest proportion is 44.6%, the number is 82, and the number of people over 60 is 51, accounting for 27.7%. In terms of academic qualifications, they are basically concentrated in junior high school and senior high school, accounting for 35.9% and 25.3% respectively, with 36 people at university or above, accounting for 19.6%; in marital status, 152 are married, accounting for 82.6%, and 32 are unmarried, accounting for 17.4%; in the political outlook, the largest number of people is 117, accounting for 63.6%, and the number of party members is 67, accounting for 36.4%. In terms of occupation, there are 36 students, accounting for 19.6%, 22 farmers, 12.0%, 63 self-employed, 34.2%, 45 enterprises, 24.5%, 18 government organs and institutions, accounting for 9.8%. In terms of income, the number of people with 3000-5000 yuan is the largest, 81, and 44.0% is the least, 14, accounting for 7.6%.

Then, the reliability test is carried out on the statistical data of garbage classification intention, classification behavior, planned behavior theory, government and policy, informal recycling market and other dimensions in the questionnaire data. The Cronbach coefficients are 0.765, 0.805, 0.838, 0.734 and 0.826 respectively, all of which are more than 0.7. The results show that the questionnaire has good reliability, high stability and internal consistency.

Finally, for the structural equation model analysis, confirmatory factor analysis should be carried out on the data to test whether the variables fit with the model. One

is to test the convergence validity, that is, the degree of correlation between variables in one dimension; the other is to test the discrimination validity, that is, the degree of difference between variables in different dimensions. The Ave values of garbage classification willingness, classification behavior, planned behavior theory, government and policy, informal recycling market and other dimensions are 0.775, 0.694, 0.725, 0.571 and 0.551 respectively, all more than 0.551, indicating that the explanatory ability of the item is better in this dimension. the convergence validity is high. The CR values were 0.911, 0.898, 0.971, 0.777 and 0.784 respectively, which indicated that each item had high internal consistency and stability.

4   Analysis of influencing factors

4.1   Influencing factors and hypothesis Verification based on Planned behavior Theory

Through the structural equation model, this paper explores the relationship between the potential factors of municipal solid waste classification behavior of urban and rural residents in Wenzhou, and constructs a model of influencing factors of municipal solid waste classification behavior of urban and rural residents in Wenzhou.

The path analysis and test results of planned behavior theory for the classification of municipal solid waste of urban and rural residents in Wenzhou are shown in Table 1. The overall fitness index, Chi-square/df=2.856, less than 3; RMSEA=0.076, less than 0.08, GFI=0.918, IFI=0.913, CFI=0.925, NFI=0.947, all greater than 0.9, the fitting index is ideal. It is proved that residents'attitude, subjective norm and perceptual behavior have significant influence on municipal solid waste classification behavior of urban and rural residents in Wenzhou under planned behavior. The hypothesis of H1, H2, H3 is confirmed.

Table 1. Analysis and Test results of the influence of each Dimension of Planned behavior Theory on the Classification path of domestic waste

X	➡	Y	Standardized path coefficient	Significance
Residents'attitude	→	Garbage sorting behavior	0.636	***
Subjective norm	→	Garbage sorting behavior	0.235	**
Perceptual behavior control	→	Garbage sorting behavior	0.108	*
Chi-square/df=2.856，RMSEA=0.076，GFI=0.918，IFI=0.913，CFI=0.925, NFI=0.947				

Remarks: indicate regression influence relationship or measurement relationship

4.2   Influencing factors and hypothesis Verification based on New Public Governance Theory

The path analysis and test results of the impact of government policies on household waste classification behavior are shown in Table 2, all the fit indicators are in line with the ideal requirements, it can be seen that the more urban and rural residents understand the government's municipal solid waste classification policy, the more positive the classification behavior of domestic waste. And by increasing the investment in supporting facilities for the classification of domestic waste and doing a good job in the classification and publicity of household waste, it can also effectively improve the actual development of household waste classification. It is proved that the hypothesis of H4, H5, H6 is true.

Table 2. Analysis and Test results of garbage Classification path affected by Government and Policy

X		Y	Standardized path coefficient	Significance
Government and policy	→	Garbage sorting behavior	0.285	**
Chi-square/df=2.605，RMSEA=0.073，GFI=0.965，IFI=0.913，CFI=0.934，NFI=0.932				

Remarks: indicate regression influence relationship or measurement relationship

5   Conclusions

Based on the theories of planned behavior theory and new public governance theory, this paper constructs a model of influencing factors of municipal solid waste classification of urban and rural residents. Through residents' attitude, subjective norms, perceptual behavior control, government policy and other multi-dimensional design questionnaire, and empirical analysis, the conclusions are as follows:

(1) The urban and rural residents in Wenzhou have different willingness to classify domestic waste under different genders and marriages, and the educational level, political outlook and occupation have significant influence on the classification behavior of domestic waste. the higher the level of education, the stronger the exemplary role of political outlook, and the more administrative the nature of occupation, the more positive the behavior of household waste classification.

(2) Through the analysis of structural model, the research hypotheses from the perspectives of planned behavior theory and new public governance theory are verified. It is concluded that the attitude, subjective norms and perceptual behavior control of municipal solid waste classification of urban and rural residents in Wenzhou have a positive impact on residents' willingness and behavior to classify domestic waste. In the aspect of new public governance, the more perfect the government policy is, the more the publicity is in place, which has a positive impact on the classification of domestic waste.

On this basis, this paper proposes to improve the classification behavior guarantee by improving the implementation of municipal solid waste classification; improve the accuracy of municipal solid waste classification publicity, enhance the probability of classification behavior; strengthen the cultivation of private capital and improve the degree of participation in classification behavior; introduce market-oriented operation mode, strengthen market rectification and other four measures to improve the classification behavior of urban and rural residents in Wenzhou.

ACKNOWLEGEMENTS

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