

# Research on Influencing Factors of Resident Garbage Classification

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## ABSTRACT

China had long put forward the policy suggestion of garbage classification, but the policy was not working. In recent years, with the national attention to environmental problems, garbage classification had once again attracted attention. According to previous scholars' research, using the method of literature analysis, the author divides the influencing factors of waste classification into two categories, namely external environment and behavioral intention, and puts forward the mechanism of influencing factors of waste classification. The external environment includes subjective norms, perceptual behavior control and value perception. The hardware construction includes law and regulations, economic policy, publicity and education policy and recycling facilities. In some countries with successful waste classification, their waste classification policies affect individual behavior from the external environment or behavior intention, which has reference significance for the implementation of waste classification policies in China.

**Keywords:** residents, garbage classification, influencing factors

## I. INTRODUCTION

According to expert Wang Weiping's investigation on Beijing's domestic waste, 42.9% of the total garbage can be directly recycled, and more than 33% can be directly recycled. The domestic waste has a high recycling rate. Xu Lin et al. (2017) proposed that source classification is the fundamental way to solve the problem of waste classification and recycling. Jiang Jiansheng et al. (2018) believed that source reduction is the root of waste reduction.

China has long been aware of the necessity of waste classification. Beijing began to classify garbage since 1953. However, from the perspective of the whole country, the effect of garbage classification is not good. In December 2016, at the fourteenth meeting of the central financial and economic leadership group, Xi Jinping put forward the significance of the general implementation of garbage classification system, and formed a garbage classification system based on rule of law, government promotion, full staff participation, urban and rural co-ordination and local conditions. In March 2017, the general office of the State Council transmitted the notice on the implementation plan of the domestic waste classification system of the Ministry of housing and urban rural development of the national development and Reform Commission, proposing to start the garbage classification work in 46 key cities, and the garbage classification has attracted attention again.

Waste classification is a complex process, which requires the participation of various subjects. The government provides support, and residents play an important role in garbage classification. For example, scholar Zhang Xiaohui et al. (2015) proposed that residents are the main body involved in waste classification. Zhang Liping et al. (2016) pointed out that the dilemma of waste source classification is the collective action of residents.

## II. INFLUENCING FACTORS

There are two main types of influencing factors of household garbage classification. One is from the relationship between intention and behavior, and behavioral intention affects behavior through subjective norms, perceived behavior control and value perception; the other is from the construction of garbage classification hardware. Hardware facilities include laws and regulations, economic policies, publicity and education policies, and recycling facilities. They all affect garbage. The impact mechanism of garbage classification behavior is shown in "Fig. 1".

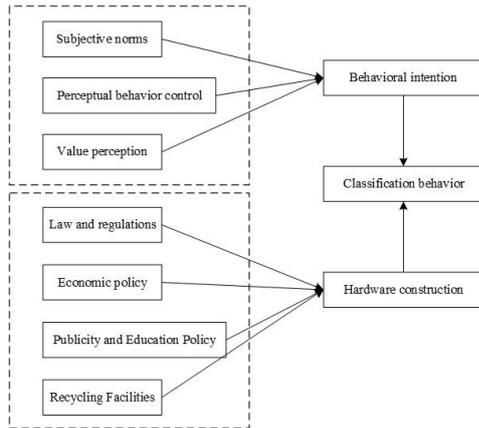


Fig. 1. Model of influencing factors for Chinese waste classification.

A. Behavioral intention

1) *Subjective norms*: Scholars such as Chu (2003) pointed out that subjective norms mainly refer to the influence of social pressure on individual behavior decisions, mainly including the individual's perception of "public opinion pressure" and whether they will meet the expectations of others. Scholars such as Rauwald (2002) believed that the important reference groups for household waste classification are individuals, organizations such as government, colleagues, neighbors, family members, and environmental protection associations. Their expectations and opinions can influence individual behavior choices, and their own behavior is also for residents with the experience path of learning and imitating. Chu (2003) and others believed that in real life, the stronger the individual's ability to perceive the expectations of the reference group, the more they tend to act according to the expectations of the reference group, and thus the more likely they are to participate in garbage classification.

2) *Perceptual behavior control*: Ajzen (1991) and other scholars believed that perceptual behavior control refers to the effect of past experience and expected hindrance on individual behavior decision-making, which is composed of the cognition of the feasibility, convenience, and constraints of implementing the behavior. The research by Tonglet (2004) and others found that when the residents have a higher level of perception of resources and opportunities and are less constrained, residents are more likely to participate in garbage classification; That is, whether the residents have enough time and space, how convenient they are to participate in the garbage classification, and whether they have enough understanding of the garbage classification standards will affect the willingness of garbage classification. Ajzen (1991) pointed out that

residents' behavior is indirectly affected by factors such as perceptual behavior control, and perceptual behavior control not only affects behavior by influencing will, but may also directly affect behavior. Armitage and Conner (2001) believed that perceptual behavior control has a certain predictive effect on residents' behavioral wishes. Research by Wang Feng et al. (2008) found that environmental protection knowledge is significantly positively correlated with personal environmental protection habits. Zhao Qun et al. (2015) suggested that the more residents know about environmental protection knowledge, the more they will have the will to protect the environment, thus generating positive and conscious environmental protection behavior. Zhan Shaowen et al. (2012) believed that the respondents' knowledge of urban domestic waste classification and recycling management knowledge is positively related to the waste classification and recycling intention. However, He Aizhong et al. (2012) believed that environmental protection knowledge and environmental responsibility awareness have no significant impact on environmental protection behavior.

3) *Value perception*: Scholars such as Rauwald (2002) and other scholars believed that the value perception is the key factor affecting the garbage classification behavior of residents, including the perceived individual interests, social interests, moral responsibility and so on. After weighing these factors, residents make choices, which has a profound impact on the classification attitude and emotional awareness of individuals. Personal interests include not only economic interests, but also the satisfaction that individuals get from garbage sorting. Chu (2003) and other scholars believed that there is a conflict between the individual interests of residents and social interests, and when the social interests are satisfied, the personal interests of residents will be lost. McCarty (2001) believed that when the individual choices between personal interests and social interests, their behavior is uncertain. Studies by Brekke (2010) and others have shown that personal moral responsibility is an important reason for garbage collection, and the attribution of responsibility is affected by the actions of others. Kirakozian (2016) and other individuals who found that the value of collectivism is oriented. Under the constraints of public morals, residents often give up their personal interests and choose collective interests, so as to actively participate in garbage classification. Pakpour (2012) and others believed that the higher the residents' perception of garbage classification behavior, the more positive their attitude and the more likely they are to participate in garbage classification.

## B. Hardware construction

1) *Law*: Cohen's (1979) research showed that compulsory residents' participation in the classification of domestic waste at source is better than voluntary participation. Miafodzyeva et al. (2013) found that laws and regulations are important factors affecting recycling behaviors through investigation. A study by the US Environmental Protection Agency (1974) showed that there is no significant difference between the two. Miafodzyeva and Brandt et al. (2013) found that laws and regulations are important factors influencing recycling behavior through investigations of Gawa families. Qu Ying (2007) believed that at the beginning of the garbage classification, legal behavior should be used to regulate the behavior of residents. This mandatory measure is much more effective than a simple call. Wang Duming et al. (2016) believed that compared with allowing residents to choose garbage classification freely, forcing residents to perform garbage classification has a better effect, and can form a theoretical support for the laws, regulations and policies related to garbage classification management.

2) *Economic policies*: Wertz (1976) was the first to study the problem of residential garbage recycling. Jenkins et al. (1995) extended Wertz's research. They believed that incentives and punishment measures had a direct and significant effect on the effect of garbage classification. Iyer et al. (2007) believed that the necessary economic measures can improve the level of household waste classification, but the policy effect will disappear with the end of the policy, demonstrating the timeliness of incentives. Zhao Qun et al. (2015) suggested that the government can provide residents with corresponding system guarantees and encouraging policies, such as rewarding individuals and families who actively practice garbage classification in their lives, and timely feedback to the public on the results of garbage classification to enhance residents' sense of accomplishment in environmental protection.

3) *Publicity and education policies*: The empirical evidence of Robert (1987) showed that there is a positive correlation between recycling utilization rate and publicity efforts, and recycling utilization rate increases with the promotion of publicity efforts. Iyer et al. (2007) believed that in the short term, publicity and education policies have no obvious role as economic incentive policies, but they have high sustainability that other policies cannot match. Starr et al. (2015) The government's transmission of classification information and the organization and development of related community publicity and education activities can effectively increase residents' awareness of garbage classification knowledge and influence their choice of

final behavior. Chen Shaojun et al. (2015) suggested that the community's publicity activities on household waste classification can increase residents' willingness to classify waste. Wu Shuchao et al. (2011) found that the knowledge and willingness of residents' household waste classification is an important factor that affects their classification behavior, and the public media can be used to promote the benefits of household waste classification through different publicity channels. Han Hongyun et al. (2016) improve residents' awareness of environmental protection through education, and acquire environmental protection knowledge, so that they can master the skills required to understand and master the garbage classification. Zhang Xuyin et al. (2014) suggested that environmental training and policy publicity could be used to strengthen residents' awareness of environmental protection and promote their habit of domestic waste classification. Song Jinbo et al. (2012) found that residents' environmental awareness and environmental responsibility had a significant impact on their willingness to classify domestic waste. They believed that environmental education and other means could be used to improve residents' environmental awareness, enhance their sense of environmental responsibility, and ultimately achieve environmental protection.

4) *Recycling facilities*: The findings of McCarty et al. (1994) on students showed that due to the lack of recycling facilities, most students who are willing to recycle garbage are affected. Taylor et al. (1995) believed that contextual factors such as time, cost, and facility conditions are important factors affecting recycling behavior. Barr's (1998) research indicated that factors such as the availability of garbage classification bins and the distance from residential buildings significantly affect residential garbage classification behavior. Chen et al. (2010) pointed out that the lack of waste sorting facilities hindered individual recycling intentions. Jiang Yan et al. (2008) found that the reason why 30% of residents do not conduct garbage classification is the lack of corresponding facilities. Wang Duming et al. (2016) believed that the convenience and perfection of waste sorting facilities are related to people's sorting behavior. The research by Qin Jinshang et al. (2019) showed that creating convenient conditions for sorting and recycling garbage, such as the setting of sorting garbage bins, has a positive effect on people's behavior of sorting garbage.

### III. SUCCESSFUL EXPERIENCE

#### A. Japan's experience

1) *Strict laws*: According to the development needs of different periods, Japan has formulated different laws, which pay attention to details and have strong operability. The classification standards are very strict in all parts of Japan. The garbage classification standards in Kamikatsu and Tokorozawa are as high as dozens of categories. In the law, the responsibilities and obligations of the state, local governments, enterprises and individuals are clearly stipulated, and the punishment measures for violation of the garbage classification regulations are very strict. In 2000, those who violate the regulations will be fined less than 10 million yen or be sentenced to imprisonment for less than 5 years or both. In 2003, two major crimes were added, namely, attempted illegal incineration and attempted illegal abandonment. The real name system of garbage classification is implemented in many places in Japan. Under the regulations of real name system and strict punishment measures, the garbage classification behavior of residents is effectively restricted.

2) *Diversified publicity and education*: In terms of publicity, the government issued brochures, used municipal websites, public service advertisements, posters, etc. to carry out publicity, held large-scale public welfare activities, and actively promoted waste reduction activities with the theme of residents. Different places in Japan have different publicity periods of garbage classification, and each October is designated as "recycling Promotion Month" to carry out garbage classification popularization and education activities. In terms of education, family education plays an important role in environmental protection education in Japan. Parents set an example to teach their children to classify garbage from childhood. The school is also an important part of garbage classification education. The school organizes students to visit the garbage incineration plant, writes the garbage classification into the teaching materials, and organizes 3R lectures, living environment study rooms and other methods to carry out garbage classification education for students.

3) *Citizen participation*: According to the regulations of the government and the community, citizens can accurately classify and put garbage; participate in the work related to garbage collection, such as ensuring the cleanliness of the garbage accumulation area; supervising whether others put garbage correctly; participating in local residents' groups and environmental protection organizations. The local self-government Association regularly distributes brochures to residents and cooperates with the

government to hold explanation meetings; residents also participate in recycling through petitions and legal rights protection.

#### B. The experience of Taipei city

1) *Compulsory intervention of law*: In 1974, the "waste disposal law" was promulgated. After nine revisions, the law had been basically improved by 2006. According to the law, environmental protection bureaus in urban areas are responsible for recycling, cleaning up and treating domestic garbage. Irresponsible institutions will face a fine of more than 6000 Taiwan dollars. Residents must use special garbage bags and charge residents according to the capacity of garbage bags. The law imposes a fine of 1-2 times on those who fail to pay the garbage treatment fee according to the regulations, and the person who causes pollution is sentenced to 1-5 years of fixed-term imprisonment and a fine of less than 3 million Taiwan dollars; businesses with classified recycling marks and excessive packaging of products are fined 30000-150000 Taiwan dollars, and those who are seriously in serious situations are facing the punishment of shutdown for one month to one year. There is a cleaning team to supervise the individual garbage sorting behavior. If the garbage is not classified according to the regulations, it will face the situation of sorting on the spot or putting the garbage back after separation. Otherwise, a fine of 1200-6000 Taiwan dollars will be paid. In addition, other people in the society can also supervise your behavior and give a heavy reward to the informants.

2) *The implementation of publicity and education policies*: In terms of publicity, it is mainly through broadcasting short films of garbage classification on TV and public places and distributing free special garbage bags to the community; in terms of education, it is mainly to make environmental protection manuals to publicize and educate new residents, and integrate the garbage classification into the national education system, so that students can participate in garbage classification.

3) *Giving full play to the role of the community*: We encourage the community to set up environmental protection volunteer teams and promote environmental awareness among residents and we monitor the behaviors of residents of garbage classification. Community organizations are encouraged to apply for funding subsidies from the government through independent proposals. The government awards communities that perform well in waste sorting and recycling.

### C. Experience of other countries and regions

1) *Shanghai experience*: Shanghai community residents play an irreplaceable role in garbage classification. The reconstruction of garbage sorting sites in the community should fully absorb public opinions and invite residents to actively participate in the formulation of the scheme. At the beginning of the promotion of garbage classification, the women's Federation and Party members took the lead to mobilize and publicize from door to door, so that residents could participate in the garbage classification. Establish interest groups around waste recycling, garbage sorting and vegetable planting activities to promote the improvement of community environmental protection concept and behavior.

2) *The experience of the United Kingdom*: Britain's garbage tax has changed from collection by family to collection by weight. Chips are installed on the garbage cans to monitor the amount of garbage generated by residents. If the amount of garbage dumped by residents exceeds the limit, they will pay extra fees. If the circumstances are serious, they will face a huge fine, and the government with small amount of garbage dumping will be rewarded.

3) *The experience of Germany*: German residents classify the garbage according to the regulations, and put them into the garbage in different periods. Plastic and metal are placed in yellow garbage bags or garbage cans, which are transported by the transportation department every other month; waste paper is discarded in the blue garbage can and collected and transported by garbage disposal vehicles every other month; glass is discarded in the main glass collection points; large pieces of garbage, such as waste furniture, are transported away at a fixed time or by way of advance appointment; hazardous waste Separate collection and transportation; kitchen waste is specially placed in the biological waste bin, cleaned up once a week or two weeks, and sold as fertilizer after special treatment.

## IV. CONCLUSION

The success of garbage classification needs the cooperation of various subjects. First of all, the government should formulate relevant laws, clarify the responsibilities of each subject, and take severe punishment measures for those who violate the relevant provisions. At the same time, the government should also strengthen publicity and education to popularize the knowledge of garbage classification. Residents are the main body to participate in garbage classification. Residents mainly participate in garbage classification through autonomous activities in the community. Community autonomy can effectively improve residents' sense of participation, and residents can feel

the changes brought about by garbage classification. These third-party enterprises provide garbage sorting facilities to form a positive interaction with the community in terms of waste recycling. Only when the three subjects cooperate and supervise each other can the goal of waste reduction be achieved.

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