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RESEARCH ON THE INFLUENCING FACTORS OF THE WILLINGNESS TO USE INTELLIGENT CLASSIFICATION EQUIPMENT FOR MUNICIPAL WASTE

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Abstract

The emergence of intelligent waste classification and recycling equipment is a new method to improve China's waste classification and recycling. In this paper, the Unified Theory of Acceptance and Use of Technology (UTAUT) was established to deeply analyze the relevant factors affecting users' willingness to use intelligent waste sorting equipment, and corresponding strategies were proposed based on the empirical results. Good performance expectation, effort expectation, social influence and facilitation scenario have a significant positive effect on residents' use of Intelligent classification equipment for municipal waste. In addition, residents' age has a significant negative impact on the willingness to use intelligent waste sorting equipment. However, residents' experience of waste classification will improve their willingness to use intelligent waste classification equipment.

Key words: city municipal waste classification; intelligent waste sorting equipment; UTAUT model

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1. Introduction

China's economy is growing rapidly nowadays and make great achievements in construction. However, it has paid a huge price for the destruction of resources and the environment. The contradiction between the economy and the environment is becoming increasingly acute, and the amount of waste output is also rising sharply. According to the 2019 China Statistical Yearbook, the total amount of municipal waste in China in 2018 reached 2152.1 million tons, posing a huge environmental threat to the urban environment (China National Bureau of Statistics, 2019). Following the principles of reduction, recycling, harmlessness, waste classification and treatment can effectively improve the urban and rural environment, promote resource recycling, and contribute to the improvement of national quality and social progress (Geng, 2020). In China, waste classification and collection has been advocated for many years. Beijing, Shanghai and other big cities have successively implemented waste classification and recycling. But according to statistics, the efficiency of Waste classification in Beijing is only 16% ~ 34%, far from the expected effect (Wan, 2019). Artificial waste classification consumes both financial and material resources, so the country vigorously promotes "intelligent waste classification".

"Smart waste sorting" is becoming one of the words of the year. In April 2000, Beijing was selected as one of the pilot cities for waste classification and collection, 16 districts in the city carried out intelligent waste classification and recycling, put intelligent waste classification equipment. But after several years of practice, although some experience has been gained, the effect is still not ideal (Li et al., 2020a).

In the current research, scholars mostly believe

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that the incomplete law of waste classification is one of the main reasons affecting the promotion of intelligent waste classification equipment. Since the middle of last century, many countries have begun to pay attention to municipal solid waste and carried out various theoretical studies and social practices simultaneously. In China, like other environmental laws and regulations, the legislation of municipal solid waste classification management also started late. Due to the incomplete legislative system at the national level, local governments have great differences in legislative provisions on the same issue, which is not practicable and leads to the slow progress of urban household waste classification management (Wang et al., 2016; Takahashi et al., 2016; Yang et al., 2018).

However, the intelligent waste classification equipment is particularly special. The research of intelligent waste classification equipment is still in its infancy due to the reasons such as classification scene, cost and complexity of waste. Therefore, how to implement waste classification management with the help of smart technology and maximize the use of waste resources is one of the important issues facing the Chinese government (Wang and You, 2020).

From the point of view of existing studies, there are relatively few explorations on the construction of intelligent waste sorting equipment from the perspective of influencing factors. Scholars' research on the influencing factors of residents' waste classification behavior is mainly based on the theory of planned behavior. Periathamby et al. (2009) based on the theory of planned behavior, constructed a theoretical framework for the analysis of decisive factors of recycling behavior. 191 subjects were selected for the survey, and the results showed that recycling attitude had a decisive influence on their recycling behavior. In addition, it is also believed that citizens will be affected by political complexity and cultural differences, household environmental preferences on their waste sorting and recycling behavior (Kirakozian, 2015), and education level and age variables on residents' waste sorting and recycling behavior (Starr and Nicolson, 2015).

The goal of this article is to explore the residents' willingness to intelligent waste classification equipment, and put forward corresponding strategies based on empirical results.

2. Methods and data

2.1. Model establishment and research hypothesis

Unified Theory of Acceptance and Use of Technology (UTAUT) was mainly used to reveal the reasons why individuals accepted or were willing to use a new technology. UTAUT draws on the innovation diffusion theory (IDT), rational behavior theory (RAT), planning behavior theory (PBT), motivation model (MM), composite TAM and TPB model (C-TAM) -TPB), and social cognitive theory (SCT), based on the eight main technology acceptance theories and behavioral willingness theories, a more comprehensive and complete model is proposed (Badra et al., 2020; Wissal et al., 2020). According to this theory, users' willingness and behavior of using new technology products are mainly composed of four aspects: (1) performance expectancy; (2) effort expectancy; (3) social influence; (4) facilitating condition. Among them, the expectation of performance refers to the individual's feeling that the use of new technology is conducive to improving work performance; Expectation of effort refers to the effort required for an individual to use the new technology; Social influence refers to the degree to which an individual is affected by the surrounding groups. Enabling context refers to the extent to which individuals feel that the organization supports the use of new technologies in terms of related technologies and equipment. In view of the use characteristics of intelligent waste sorting equipment and the availability of survey data, this paper constructs an analysis framework of factors influencing the use behavior of intelligent waste sorting equipment based on the integrated technology acceptance model (as shown in Fig. 1 below).

Based on the Unified Theory of Acceptance and Use of Technology (UTAUT) model and previous studies, this paper USES the method in the table below to measure the above four factors, and adopts likert scale of 5, with 1 indicating "strongly disagree" and 5 indicating "strongly agree". The measurement scale is shown in Appendix a.1.

Based on existing studies and the above analysis, this paper proposes the following research hypothesis:

Hypothesis 1: Performance expectations have a positive impact on the willingness to use intelligent waste sorting equipment.

Hypothesis 2: Effort expectation will positively affect the willingness to use intelligent waste sorting devices.

Hypothesis 3: Community influence has a positive impact on the willingness to use intelligent waste sorting devices.

Hypothesis 4: Enabling scenario has a positive impact on the willingness to use intelligent waste sorting devices.

Hypothesis 5: Residents' willingness to use intelligent waste sorting equipment will positively influence the use behavior of intelligent waste sorting equipment.

In order to improve the explanatory power of the empirical model, this paper also controls the gender, age, education, occupation and other individual characteristics of the interviewees in the empirical model. The descriptive statistical characteristics of variables in the empirical model are shown in Appendix a.2.

2.2. Data sources

The data sources of this paper are mainly based on field research. The research area and object include online and offline parts.

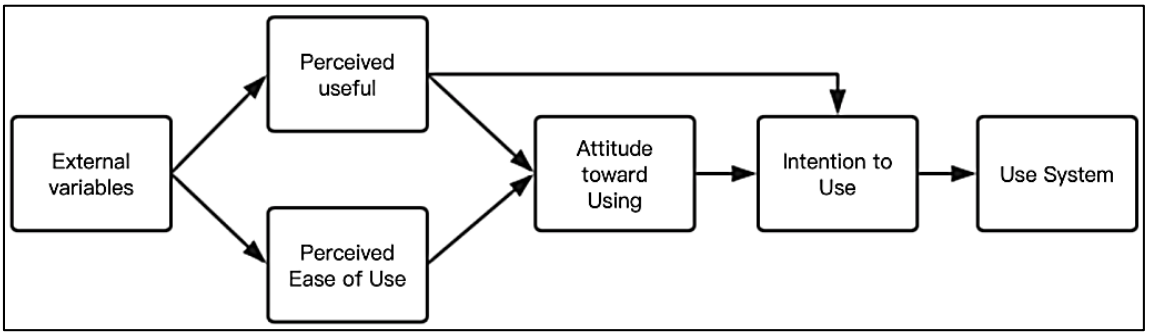

Fig. 1. Analysis framework of factors influencing the use behavior of intelligent waste sorting equipment

The online part uses the questionnaire star APP to conduct surveys without setting scope and requirements, and 350 pieces of data are collected. It covers five smart communities, including Xiaojiahe Community in Haidian District, Fangcaodi Community in Chaoyang District and Sweet Water Garden Community, 103 samples were collected. Through interviews with community service volunteers and residents near the smart waste collection site, field research was carried out. Finally, integrated analysis was conducted on the survey results to find the key factors affecting the "willingness to use smart waste sorting equipment" from the qualitative perspective as accurately as possible.

3. Results and analysis

3.1. Data reliability and validity analysis

Before the sample is used, the reliability and validity of the sample data are analyzed. Cronbach's α coefficient was used to detect the reliability of the questionnaire. The Cronbach value was 0.803, the Cronbach value based on the standardized item was 0.801, both of which were greater than the standard value of 0.7, indicating good internal consistency of the data and meeting the reliability requirements of sample data analysis.

The method of structural validity analysis was adopted to analyze the validity of the sample data. The KMO value was 0.907, a standard value greater than 0.7, indicating that the questionnaire had a good structural validity and met the validity requirements of the sample data analysis.

3.2. Empirical analysis

Before empirical analysis, this paper firstly conducts correlation coefficient test on the four influencing factors in the integrated technology acceptance model. The test results show that there is a strong correlation between the same type of influencing factors, so collinearity problem needs to be solved in the empirical analysis.

To analyze the four influencing factors of the use of intelligent waste classification facilities under the integrated technology acceptance model, this paper first USES the structural equation model for testing. The analysis of model fitting is shown in Table 1. It can be seen from Table 1 that all the fitting indexes are within a reasonable range and the P value is still 0 after three decimal places, indicating that the overall fitting of the model is better.

The fitting results of the structural equation model are shown in Table 2 and Fig. 1. It can be seen from Table 2 that performance expectation (Q1) has a standardized path coefficient of 0.158 to the use intention of intelligent waste sorting equipment and it passes the significance test at the level of 5%, indicating that performance expectation has a significant positive impact on intelligent waste sorting equipment. Hypothesis 1 is verified. The standardized path coefficient of effort expectation (Q2) on the willingness to use intelligent waste sorting equipment is 0.223, and it passes the significance test at the level of 10%, indicating that effort expectation has a significant positive impact on intelligent waste sorting equipment. Hypothesis 2 is verified.

The standardized path coefficient of facilitation scenario (Q4) on the willingness to use intelligent waste sorting equipment is 0.344, and through the significance test at the level of 5%, it indicates that facilitation scenario has a significant positive impact on intelligent waste sorting equipment. Hypothesis 4 is verified.

The standardized path coefficient of willingness to use intelligent waste sorting devices on the use behavior of intelligent waste sorting devices is 0.209, and the significance test at 1% level indicates that the enabling situation has a significant positive impact on intelligent waste sorting devices. Verification of Hypothesis 5.

Table 1. Model fitting indexes

Commonly used indicators	***χ^2***	***df***	***p***	***Chi-square degree of freedom ratio χ^2/df***	***GFI***	***RMSEA***	***RMR***	***CFI***	***NFI***	***NNFI***
Value	169.030	66	0.000	2.561	0.933	0.069	0.035	0.962	0.939	0.947

It can be seen from Table 2 and Fig. 2 that among the three factors that significantly affect the willingness to use intelligent waste sorting equipment, the enabling situation has the greatest impact on the willingness to use, followed by effort expectation and performance expectation. This means that when considering whether to use intelligent waste sorting equipment, residents pay more attention to the situational feelings during use. If the level of support for residents to use intelligent waste sorting equipment can be improved, residents' willingness to use it will be more easily improved. However, the influence of community did not pass the significance test. The reason may be that the current pace of urban life is speeding up, residents have a strong sense of self, and there are generally fewer connections among residents within the community (Li et al., 2020b). Therefore, residents' willingness to use intelligent waste sorting equipment is less affected by the community.

Although residents' willingness to use intelligent waste sorting equipment has a significant positive impact on their use behavior, the coefficient is only 0.209, indicating that after residents' willingness to use intelligent waste sorting equipment, there are other factors that determine whether residents will use intelligent waste sorting equipment in the end. Therefore, this paper further uses Probit model to analyze the sample data and uses Logit model to conduct robustness test.

Table 3 shows the regression results of factors influencing the willingness to use smart waste classification devices by using Probit model. Different from the regression results in Table 1, after other control variables are fixed, the four factors in Table 3 have a significant positive impact on the willingness to use intelligent waste sorting equipment. First, empirical results show that the regression coefficients of age are all negative and pass the significance test, indicating that age has a significant negative impact on the willingness to use intelligent waste sorting equipment. It shows that as a new thing, the receptivity of intelligent waste sorting device is obviously affected by age.

Older residents may have impaired mobility or impaired vision, which will lead to certain difficulties in using intelligent waste sorting equipment, thus affecting their willingness to use intelligent waste sorting equipment. Secondly, the regression coefficient of waste classification experience is positive, and all of them pass the significance test at 1% level, indicating that residents' experience of waste classification will improve their willingness to use intelligent waste classification equipment. The reason is that the understanding of waste classification may improve residents' environmental awareness, thus significantly improving residents' willingness to use intelligent waste classification equipment. Third, gender, occupation and education did not pass the significance test, indicating that such factors as gender, occupation and education have little impact on the willingness to use intelligent waste sorting equipment.

Table 4 shows the regression results using Logit model.

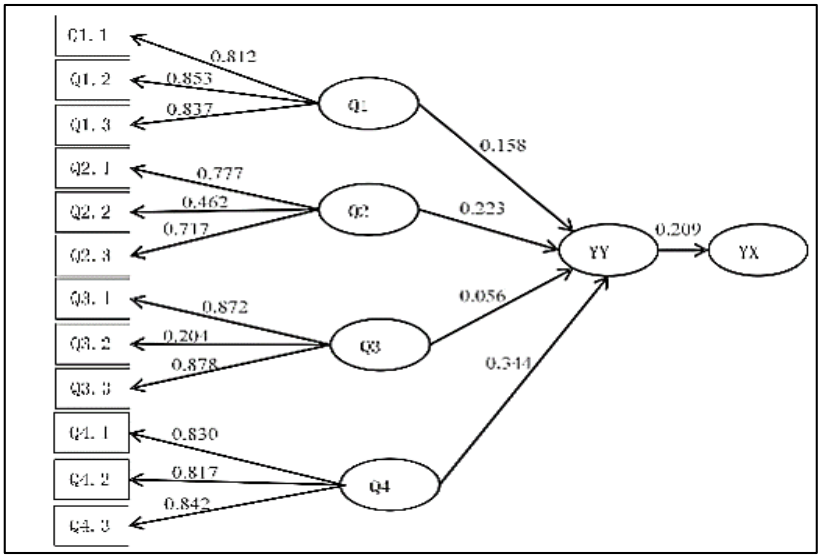

Fig. 2. Path diagram of intelligent waste classification facility usage model

Table 2. Model regression coefficient summary table

X	->	*Y*	*Nonstandardized path coefficient*	*SE*	*z*	*Normalized path coefficient*
Q1	->	**YY**	0.099	0.050	1.975	0.158**
Q2	->	**YY**	0.135	0.082	1.642	0.223*
Q3	->	**YY**	0.030	0.103	0.287	0.056
Q4	->	**YY**	0.210	0.100	2.100	0.344**
YY	->	**YX**	0.246	0.063	3.872	0.209***

*Note: -> represents the path influence relationship; The *, **, and *** in the table represent significance levels of 10%, 5%, and 1%, respectively*

Table 3. Analysis of factors influencing the willingness to use smart waste classification devices (Probit Model)

	(1)	(2)	(3)	(4)	(5)
Q1	0.982***				0.757***
	(0.121)				(0.187)
Q2		1.030***			0.832***
		(0.183)			(0.178)
Q3			1.180***		0.342*
			(0.116)		(0.190)
Q4				1.329***	0.810***
				(0.159)	(0.248)
Gender	0.050	-0.105	0.068	0.166	0.183
	(0.197)	(0.203)	(0.214)	(0.215)	(0.271)
Age	-0.653**	-0.662*	-0.721**	-0.604*	-0.629*
	(0.280)	(0.362)	(0.326)	(0.325)	(0.379)
Professional	-0.179	0.064	0.005	-0.243	-0.240
	(0.232)	(0.235)	(0.234)	(0.241)	(0.307)
Education level (with reference to primary school)					
Junior high school	-0.261	0.437	0.124	-0.069	-0.178
	(0.872)	(0.859)	(1.031)	(0.940)	(1.015)
High school	-0.231	-0.222	-0.445	-0.619	-0.753
	(0.858)	(0.705)	(0.984)	(0.918)	(0.986)
Undergraduate course	-0.048	0.248	-0.227	-0.320	-0.344
	(0.847)	(0.695)	(0.978)	(0.907)	(0.972)
Bachelor degree or above	0.112	-0.005	-0.111	-0.669	-0.649
	(0.879)	(0.731)	(1.014)	(0.943)	(1.007)
Experience	1.119***	1.257***	0.851***	0.808***	1.089***
	(0.266)	(0.241)	(0.310)	(0.286)	(0.295)
Constant	0.221	0.025	0.656	1.040	1.258
	(0.881)	(0.751)	(1.008)	(0.954)	(1.018)

*Note: *, **, and *** in the table represent significance levels of 10%, 5%, and 1%, respectively*

Table 4. Influencing factor analysis of willingness to use smart waste sorting equipment (Logit model)

	(1)	(2)	(3)	(4)	(5)
Q1	1.814***				1.419***
	(0.250)				(0.369)
Q2		2.036***			1.454***
		(0.273)			(0.328)
Q3			2.068***		0.538
			(0.231)		(0.340)
Q4				2.442***	1.593***
				(0.308)	(0.505)
Gender	0.111	-0.153	0.103	0.240	0.331
	(0.372)	(0.378)	(0.407)	(0.412)	(0.508)
Age	-1.210**	-1.458***	-1.392**	-1.130*	-1.240*
	(0.516)	(0.561)	(0.597)	(0.630)	(0.697)
Professional	-0.418	0.078	-0.072	-0.446	-0.505
	(0.432)	(0.439)	(0.438)	(0.436)	(0.565)
Education level (with reference to primary school)					
Junior high school	-0.571	0.208	0.296	-0.167	-0.482
	(1.535)	(1.515)	(2.031)	(1.854)	(1.789)
High school	-0.474	-0.503	-0.817	-1.161	-1.475
	(1.477)	(1.428)	(1.949)	(1.819)	(1.732)
Undergraduate course	-0.018	0.385	-0.456	-0.549	-0.653
	(1.466)	(1.402)	(1.935)	(1.799)	(1.696)
Bachelor degree or above	0.135	-0.059	-0.267	-1.100	-1.238
	(1.498)	(1.427)	(2.006)	(1.877)	(1.789)
Experience	2.023***	2.270***	1.657***	1.466***	2.005***
	(0.479)	(0.496)	(0.583)	(0.525)	(0.533)
Constant	0.423	0.203	1.103	1.907	2.412
	(1.515)	(1.463)	(1.980)	(1.877)	(1.796)

*Note: *, **, and *** in the Table represent significance levels of 10%, 5%, and 1%, respectively*

It can be seen that the regression coefficients of all variables in Table 4 are basically the same as those in Table 3, indicating that the regression results are relatively robust.

4. Countermeasures and suggestions

4.1. Change the publicity strategy and cultivate the awareness of waste classification accurately.

The awareness of household waste classification is the fundamental basis for the promotion of intelligent waste equipment. Only by cultivating residents' awareness of waste classification can the follow-up work be carried out effectively. The traditional cultivation of waste classification awareness is mainly focused on publicity. The government and the community promote the cultivation of residents' waste classification awareness by Posting notices and increasing waste classification advertisements. However, since most residents receive the information of waste classification when they go out or go home and they put waste in the process from home to the waste disposal point, the above-mentioned consciousness cultivation method often stays in a relatively shallow form.

The empirical results show that age plays an important role in the use and promotion of intelligent waste equipment. The factors influencing the formation of waste classification consciousness in different age groups are different. Compared with young and middle-aged residents, young and elderly residents are more susceptible to the influence of education and interests. Children are easy to be influenced by external education and have higher executive ability after the change of relevant behaviors. Older people are more profit-seeking, and they are often willing to comply with regulations for small benefits.

Therefore, the cultivation of residents' waste classification awareness can start with children and the elderly, then further influence other family members through children and the elderly. Not like the mature adults, children and old people tend to focus more on side of things. Community education and school publicity can be used to cultivate the awareness of waste classification among children and the elderly. By guiding children to participate in waste classification competitions or carrying out themed activities in schools to popularize the importance of waste classification and the impact of environmental sanitation on life. More people can learn about the convenience of intelligent waste classification, and then realize the precise cultivation of their waste classification consciousness. The optimized waste classification awareness training scheme is more targeted and effective.

4.2. Develop reasonable incentive measures to improve the enthusiasm of intelligent waste classification

Effective incentive measures can greatly improve residents' enthusiasm for waste sorting and recycling, which help promote the effective waste sorting and recycling. At present, the incentive measures for smart waste sorting and recycling are mainly material rewards such as cash back and points back. For example, the APP on the mobile phone can be used to reward residents for the correct use of smart waste sorting equipment and residents can exchange points for corresponding articles of daily use. However, due to the small value of rebates and points, it is less attractive to residents. Therefore, this paper suggests to further improve the incentive measures for residents' waste sorting and recycling by means of additional spiritual rewards.

Based on the total amount and correct recycling rate of waste classification, residents with good waste classification and recycling behavior will be rewarded by issuing environmental family award and community publicity and praise, to promote the use of smart waste classification equipment. In addition, the community can cooperate with the surrounding shopping malls, supermarkets, and other places to regularly hold waste classification knowledge competition activities, which can improve the residents' enthusiasm in participating in intelligent waste classification by formulating reasonable incentives.

4.3. Realize big data empowerment and analyze the distribution and use of intelligent waste cans

Based on the distribution of intelligent waste equipment and residential distribution of community personnel as reflected by big data from the Internet, waste sorting and recycling points can be divided into more detailed parts, such as waste stationery recycling buckets set up in schools, aluminum packaging recycling buckets set up in shopping malls, flexible packaging recycling buckets. This is done to ensure that the resource is recycled and not disposed of as unrecyclable household waste in landfills if the waste is not recycled at the recycling station. What is more, for the problem that people are unwilling to use in the survey "no one repairs the equipment in time when it breaks down", manufacturers or communities can always pay attention to the use of the equipment through the Internet. If long-term data of the equipment is found unchanged, maintenance management personnel should be sent to the site in time.

4.4. Increase the amount of intelligent waste classification equipment and increase the participation experience of residents in waste classification

The empirical results show that the residents have the experience of waste classification can raise the use of intelligent waste sorting equipment will and most of the respondents are very willing to use intelligent waste sorting equipment. But because of too little quantity, many respondents are not used, which can't feel smart waste sorting equipment for convenient. Therefore, under the premise of full coordination of all parties, the government can increase the investment amount of the equipment through planning so that the residents can experience the performance of the smart equipment, then transform and upgrade the smart equipment according to the feedback. In this way, the promotion of intelligent waste sorting equipment will be more effective.

5. Conclusions

With the economic development and material consumption level greatly improved, the rapid growth of China's waste production, not only cause the waste of resources, but also increase the environmental hazards, which become a constraint of economic and social. Peoples also show their strong concern about these problems. Since 2000, China began to promote the waste classification system, the emergence of intelligent waste classification and recycling equipment not only connect with the Internet, but also a new method to improve China's waste classification and recycling. Once a new thing is derived, it will be influenced by many factors in the initial promotion and user acceptance. Therefore, it is particularly important to study the user intention for the promotion of intelligent waste sorting equipment. This paper conducts factor analysis based on UTAUT, and uses Logit model and Probit model to empirically test the influencing factors that affect users' willingness to use smart waste sorting equipment.

The analysis results show that performance expectations, effort expectations, community influence, empowerment scenarios, and residents' willingness to use smart waste sorting equipment have a positive impact on the use of smart waste sorting equipment. Effective incentive measures can greatly increase residents' enthusiasm for waste classification and recycling, and help promote the effective utilization of waste classification and recycling.

Appendix 1 - Questionnaire on willingness and Behavior of intelligent waste sorting Equipment

The variable name	*Measurement problem item*	*Code*
Performance expectations Q1	Intelligent waste separation can improve the community environment	q1.1
	Intelligent waste classification can improve my waste classification ability	q1.2
	Intelligent waste classification can help me learn more knowledge	q1.3
To expect Q2	Intelligent waste classification makes me feel more convenient	q2.1
	Intelligent waste sorting doesn't take a lot of time to use	q2.2
	I can easily master the use of intelligent waste sorting equipment	q2.3
Social influence Q3	If the community promotes the use of intelligent waste sorting, it will make me more willing to participate	q3.1
	A good promotion of intelligent waste classification will make me more willing to participate in it	q3.2
	Good and stable intelligent waste sorting equipment will make me more willing to participate in it	q3.3
Facilitate the situation Q4	The use of the surrounding residents will affect my attitude towards intelligent waste classification	q4.1
	The community manager will help with the use of smart waste sorting equipment	q4.2
	In the use of intelligent waste sorting equipment encountered obstacles can be solved in a timely manner	q4.3

Appendix 2-Explains the definition and description of variables

The variable name	*Code*	*Measurement problem item*	*The mean*	*The variance*
Performance expectations Q1	q1.1	Intelligent waste classification can improve community environment (Likert 5 scale)	4.50	0.80
	q1.2	Intelligent waste classification can improve my waste classification ability (Likert 5-degree Scale)	4.43	0.82
	q1.3	Intelligent waste classification can help me learn more knowledge (Likert 5-degree Scale)	4.48	0.82
To expect Q2	q2.1	Intelligent waste classification makes me feel more convenient (Likert 5-degree Scale)	4.40	0.87
	q2.2	Intelligent waste classification can be used without a lot of time (Likert 5-degree Scale)	3.91	0.99
	q2.3	I can easily master the use of intelligent waste sorting equipment (Likert 5-degree Scale)	4.04	0.95
Social influence Q3	q3.1	If smart waste classification is promoted in the community, I will be more willing to participate (Likert 5-degree Scale)	4.30	0.89

	q3.2	Good publicity of intelligent waste classification will make me more willing to participate in it (Likert 5-degree Scale)	4.35	0.85
	q3.3	Good and stable intelligent waste sorting equipment makes me more willing to participate in it (Likert 5-degree Scale)	4.43	0.79
Facilitate the situation Q4	q4.1	The use of surrounding residents will affect my attitude towards intelligent waste classification (Likert 5-degree Scale)	3.72	1.07
	q4.2	Community managers will help with the use of smart waste sorting devices (Likert 5 scale)	4.17	0.88
	q4.3	Obstacles encountered in the use of intelligent waste sorting equipment can be solved in time (Likert 5-degree Scale)	4.00	0.97
Gender	FM	What's your gender? （Man=1; Woman=0）	0.44	0.50
Age	AG	How old are you? (Under 18 =1; 18 to 30 = 2; 30 to 55 = 3; Above 55 =4)	2.49	0.75
Education	ED	What is your educational background? (Primary =1; Junior high school = 2; High school = 3; Undergraduate = 4; Bachelor degree or above =5)	3.82	0.82
Professional	JO	What's your occupation? (Student =1; Employees of public institutions =2; Employee =3; Government personnel =4; Self-employed person =5; Other = 6)	2.82	1.73
Experience	HS	Do you know the classification of municipal solid waste? (Yes= 1; No = 2)	0.90	0.30

Appendix 3 - Correlation coefficient matrix

	q1.1	***q1.2***	***q1.3***	***q2.1***	***q2.2***	***q2.3***	***q3.1***	***q3.2***	***q3.3***	***q4.1***	***q4.2***	***q4.3***
q1.1	1	0.666	0.689	0.592	0.232	0.388	0.533	0.504	0.528	0.169	0.545	0.443
q1.2	0.666	1	0.727	0.539	0.11	0.379	0.531	0.508	0.485	0.102	0.588	0.448
q1.3	0.689	0.727	1	0.567	0.147	0.38	0.553	0.487	0.484	0.113	0.569	0.441
q2.1	0.592	0.539	0.567	1	0.272	0.506	0.538	0.582	0.603	0.136	0.542	0.535
q2.2	0.232	0.11	0.147	0.272	1	0.578	0.299	0.302	0.272	0.472	0.256	0.284
q2.3	0.388	0.379	0.38	0.506	0.578	1	0.539	0.523	0.496	0.273	0.514	0.468
q3.1	0.533	0.531	0.553	0.538	0.299	0.539	1	0.765	0.738	0.094	0.668	0.598
q3.2	0.504	0.508	0.487	0.582	0.302	0.523	0.765	1	0.727	0.155	0.674	0.646
q3.3	0.528	0.485	0.484	0.603	0.272	0.496	0.738	0.727	1	0.146	0.653	0.651
q4.1	0.169	0.102	0.113	0.136	0.472	0.273	0.094	0.155	0.146	1	0.202	0.255
q4.2	0.545	0.588	0.569	0.542	0.256	0.514	0.668	0.674	0.653	0.202	1	0.729
q4.3	0.443	0.448	0.441	0.535	0.284	0.468	0.598	0.646	0.651	0.255	0.729	1

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