Advances in Economics, Business and Management Research, volume 215
Proceedings of the 2022 7th International Conference on Social Sciences and Economic Development (ICSSED 2022)

The Impact of Cognitive and Affective Factors on Garbage Sorting—An Analysis Based on Technology Acceptance Model

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ABSTRACT
Based on the national survey data in China, this study aims to explore the impact of affective attitude, cognitive attitude and moral norms on behavioral intention of garbage sorting based on the theory of TAM, as well as the effect of moral norms. The results indicate that perceived ease of use, affective attitude, cognitive attitude and moral norms are significant predictive of garbage sorting behavioral intention. In addition, the current study found that people's age is significant correlated with the intention of garbage sorting behavior. Theoretical and practical implications are discussed.

Keywords: *TAM, Garbage sorting, Moral norm, Affective attitude and Cognitive attitude*

1.INTRODUCTION

With the rapid improvement of China's economy and living standards, there has also been a large increase in domestic waste emissions. According to the China Statistical Yearbook, China's annual household waste emissions increased from 204 million tons in 2016 to 242 million tons in 2019, an annual growth rate of more than 5%. In 2020, waste emissions decreased to 235 million tons, still a significant volume [1]. The huge amount of waste discharged has affected people's lives and may lead to soil and water pollution [2].

Garbage sorting is an effective way to contribute to sustainable development within the larger ecological environment. In the past three decades, China has tried to implement various policies on waste separation, such as mandatory waste separation pilot operations in Shanghai and Beijing. In 2020, a new solid waste law was passed to further regulate garbage sorting, which also includes the comprehensive implementation of a garbage sorting system across the country [3]. However, these garbage sorting policies have been met with low enthusiasm in major cities. Even in some cities with mandatory garbage sorting, many people just follow the policy collectively and unconsciously. Policies like this are much less effective if the government loosens regulations. Therefore, it is extremely important to determine the factors that affect people's intentions to sort household garbage and design policy improvements around those intentions.

As a new policy, people's acceptance of mandatory garbage sorting needs to be studied, and as a model to explain acceptance or adoption of new technologies or policies, the technology acceptance model can be used to analyze the acceptance of garbage classification by urban residents.

At the same time, previous studies have demonstrated the influence of social psychological factors on individuals' intentions to sort garbage and have emphasized the importance of environmental benefits [4].

In contrast, other studies have examined the influence of moral norms on garbage sorting of urban residents based on norm activation theory. The process of urban residents' garbage sorting decisions is a moral norm, and supportive moral norms generally lead to positive attitudes towards the formation of intentions and factual behavior [5].

Previous studies have explored the factors affecting behavioral intentions behind garbage sorting [4][5], but the influence of different construct attitudes—affective

attitude and cognitive attitude, for example—on behavioral intentions has not been deeply investigated.

Therefore, the technology acceptance model is adopted in this study. The overall garbage sorting and discarding behaviors at designated places are regarded as a system to study the impact of urban residents' cognitive and emotional attitudes on garbage sorting on their behavioral intentions. This paper takes garbage classification intention as a dependent variable to analyze the impact of perceived ease of use, moral norm, affective attitude, and cognitive attitude on garbage sorting.

2.LITERATURE REVIEW

2.1. Technology acceptance model (TAM)

The technology acceptance model (TAM) summarized by Davis is a well-known theoretical framework model, mainly used to explain the intentions driving people's acceptance or adoption of emerging technologies or systems [6]. The original TAM proposed that perceived ease of use (PEOU) plays an important role in explaining people's intentions to adopt new technologies. This model was further expanded and explained in subsequent papers. For example, TAM2 introduces the influence of social norms on usage intentions [7].

A variety of applications in different fields have confirmed the reliability of TAM [8]. For example, this model has been used in IT decision-making studies [9] as well as in the field of environmental protection. Melville developed a research agenda on environmental sustainability information system innovation. In that work, he proposed that TAM not only plays an important role in the modeling of traditional motivational factors, but also in other external factors such as beliefs and attitudes towards results [10]. In a later study, Akman and Mishra used TAM to study people's intentions to use green information technology as well as to study the influence of social norms and level of awareness on PEOU [11].

Inspired by previous studies, this study takes garbage sorting behavior as an overall system and introduces PEOU in TAM to explore people's acceptance of garbage sorting behavior—that is, whether there is a positive correlation between PEOU and intent to sort garbage. The following hypothesis is postulated:

H1: PEOU is positive correlated with garbage sorting behavior intentions.

2.2. Affective attitude and cognitive attitude

Attitudes are usually defined "expectancies or subjective probabilities concerning the outcomes of a given action and the perceived values or utilities attached to those outcomes"[12]. In previous studies, attitudes have been thought to go in two directions, one triggered by emotion and the other by rational evaluation [13][14]. Attitudes towards events or objects caused by positive or negative emotions are often referred to as affective attitudes, while attitudes based on rational evaluation of events or objects are referred to as cognitive attitudes [15][16]. For example, people may rationally think that garbage sorting is important but can still find it emotionally annoying or troublesome.

Recent studies have focused on the influencing factors of behavioral attitudes toward garbage sorting (e.g., [4][5]). However, there is still a gap to study which attitude has the greatest impact on the behavioral intention of garbage classification. Therefore, this study will analyze the intention of garbage classification behavior from two aspects: perceptual attitude and cognitive attitude. The following hypotheses are postulated:

H2: Cognitive attitude is positively correlated with garbage sorting intention.

H3: Affective attitude is positively correlated with garbage sorting intention.

2.3. Moral norms

In the normative activation theory proposed by Schwartz, people behave altruistically in everyday life [17]. Studies have shown that an individual's intentions and actions can be influenced by supporting moral norms [18][19][20]. Garbage classification is a kind of altruistic behavior and a kind of social moral norm [21]. Therefore, there may be a positive correlation between people's compliance with moral codes and their behavioral intention of garbage classification. The following hypothesis is postulated:

H4: Moral norms are positive correlated to the intention of garbage sorting.

3.METHODS

In this study, web questionnaires were used to collect data (2022.1.27~2022.2.9). A total of 788 pieces of data were collected using Credamo. Some control variables were collected, such as age (M=30.891, SD=8.332), gender (1=male, 2=female; 63.3% female), education level (1=Primary school degree or above, 7=doctor's degree, M=4.791, SD=.781), household income (1=less than 1000¥, 7=more than 20000¥, M=3.560, SD=.851), and whether the respondent was the main garbage collector for their household (1 = yes, 2 = no, M = 1.174, SD =.378).

3.1. Measures

3.1.1. Garbage sorting intentions

Two items measured respondents' intentions to engage in garbage sorting behavior. Respondents indicated their agreement with statements (1=strongly disagree, 7=strongly agree) about their intention to classify the garbage generated in daily life and to sort garbage into a corresponding category (M=5.804, SD=0.897, Cronbach'sα=.730).

3.1.2. Affective attitude

Three items were used to measure respondents' affective attitudes towards garbage sorting. Respondents indicated their agreement (1=strongly disagree, 7=strongly agree) as to whether garbage sorting would make them feel happy, is indispensable to them, and would make them feel satisfied (M=5.768, SD=0.814, Cronbach'sα=.770).

3.1.3. Cognitive attitude

Three items measured the cognitive attitudes of respondents towards garbage sorting. Respondent indicated their agreement (1=strongly disagree, 7=strongly agree) as to whether household garbage sorting is useful, valuable, and important to them (M=6.058，SD=0.774，Cronbach'sα=0.780).

3.1.4. Perceive ease of use

This study used two items to measure respondents' degree of perceived ease of use of garbage sorting. Respondents indicated their agreement (1=strongly disagree, 7=strongly agree) as to whether it is easy for them to classify household garbage in daily life and whether there will be no difficulty in sorting household garbage (M=4.861, SD=1.362, Cronbach'sα=0.854)

3.1.5. Moral norm

This study adapted four items from a study (Wang, 2021) to measure respondents' ethics about garbage sorting. Respondents indicated their agreement (1=strongly disagree, 7=strongly agree) as to whether they are willing to sort garbage because of environmental pollution, whether they feel guilty if they do not sort garbage in their daily life, if it is a moral obligation to sort garbage in their daily life, and if it is an indispensable activity in their life (M=5.718, SD=.833, Cronbach'sα=.775)

3.2. Analytical Approach

SPSS was used to perform a multiple linear regression analysis, and OLS was used for data analysis. The results are as follows:

Table 1. regression results

Variable	Household garbage sorting behavior intention	
	B	P value
Age	.009	.001
Gender	.035	.426
Education level	.024	.414
Household income	.001	.962
Main garbage collector	-.117	.062
Affective attitude	.148	.001
Cognitive attitude	.196	.000
Perceive ease of use	.169	.000
Moral norm	.319	.000

4. RESULTS

The influence coefficient of perceived ease of use on garbage classification behavior intention was 0.148, which is positively correlated and significant. This supports H1 that perceived ease of use is correlated with garbage sorting behavior intentions. In other words, the more that people think garbage sorting is easy, the more likely they are to do it. This may be because the perception of low effort increases people's adoption of behaviors, which has been confirmed by past research (Akman & Mishra, 2015). H2 was also supported. The influence coefficient of cognitive attitude on garbage classification behavior intention was 0.196, which is also positive and significant. In other words, cognitive attitude has a positive correlation with garbage sorting behavior intention. People who think garbage sorting makes them feel good are more likely to engage in the activity because it likely gives them perceived pleasure. Concerning H3, the influence coefficient of cognitive attitude on garbage classification behavior intention was 0.148, which is positive and significant. This proves that H3 is valid, and cognitive attitude has a positive correlation with garbage sorting behavior intention. If a person thinks that garbage sorting is very important to him or may have an impact on his life, he will have a higher acceptance of garbage sorting and is more likely to carry it out. This suggests that the higher a person's social morality, the more likely he or she is to sort garbage.

As for the control variables, age was found to have a positive and significant correlation with garbage classification intention. This may be due to the increased awareness of environmental protection as people age, such that older people may be more concerned about environmental protection behaviors than younger people. Education level, household income, gender, and whether the respondent was the main garbage collector for their household were not significant.

5.CONCLUSION

This paper theoretically adopts the technology acceptance model to analyze people's acceptance of garbage classification behavior as a whole system. Based on the original model, this paper added additional variables of moral norms, affective attitudes, and cognitive attitudes in the research environment of garbage sorting behavior. At the same time, attitudes towards garbage sorting are divided into two categories, affective attitude and cognitive attitude, and the influencing factors of garbage classification intention are studied. Through the analysis, it can be concluded that both affective attitude and cognitive attitude towards garbage classification will affect people's garbage sorting behavior. Finally, the correlation between moral code and garbage classification intention is discussed; it has a positive influence on people's intentions regarding garbage classification.

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