ASI
Asia Social Issues

E-ISSN: 2774-0315

https://doi.org/10.48048/asi.2025.270886

Factors and Intention Toward Waste Separation Behavior: A Case Study of Khlong Lat Luang communities Phra Pradaeng District Samut Prakan Province

Chadalak Samritthinanta[1,*] and Unruan Leknoi[2]

[1]Human and Social Development Program, Graduate School, Chulalongkorn University, Bangkok 10330, Thailand
[2]Social Innovation and Sustainability for Vulnerable People Research Unit, Chulalongkorn University Social Research Institute, Chulalongkorn University, Bangkok 10330, Thailand

[*]Corresponding author's e-mail: 6382008820@student.chula.ac.th

Abstract The Sustainable Development Goals emphasize waste separation as a crucial tool for addressing the global waste problem. Studies conducted in different regions reveal a low prevalence of household waste separation. This research contributes to the overarching objective by examining the factors influencing individuals' waste separation behavior, specifically focusing on a community situated along the Chao Mueang Canal in Samut Prakan Province. The study employs the Theory of Planned Behavior (TPB) as its conceptual framework. It utilizes Structural Equation Modeling (SEM) to analyze the results, revealing that factors influencing waste separation behavior are connected to an individual's intention. This intention to separate waste is significantly influenced by two key factors: Attitude and Subjective Norm. When promoting public participation in waste separation, it is essential to prioritize initiatives that cultivate a positive attitude toward source-based waste separation. Additionally, efforts should focus on establishing subjective norms as a guiding framework for action.

Keywords Riverine communities; Waste separation; Waste management; Theory of Planned Behavior (TPB)

Received: *January 31, 2024*
Revised: *March 21, 2024*
Accepted: *June 13, 2024*

Introduction

Waste management becomes a challenging issue as the world experiences a continuous increase in the quantity of waste, primarily stemming from escalating consumption behaviors. This results from the growing population, urban expansion, improved living standards, and rapid industrial growth (Rathore & Sarmah, 2021; Shruti et al., 2023; Hu et al., 2024) is not solely a problem for specific cities or countries but a global crisis that every nation must confront. Addressing the crisis and seeking solutions leads to identifying waste management issues within various developmental frameworks and initiatives. One such initiative is reflected in the Sustainable Development Goals (SDGs), which emphasize ensuring sustainable consumption and production patterns (UN, 2023). Another approach involves promoting the concept of a circular economy, aiming to replace unsustainable waste management methods (such as landfills or incineration) with closed-loop systems that emphasize reducing litter and reusing, recycling, and recovering post-consumer products (Marks et al., 2023).

Additionally, regional agreements like the ASEAN Declaration (Bangkok Declaration) highlight cooperation among ASEAN countries in preventing and managing pollution, mainly marine pollution threatening the marine environment (The ASEAN Secretariat, 2019). The impact of waste is not limited to terrestrial ecosystems, as studies indicate its consequences on water bodies, such as marine pollution and microplastic pollution in aquatic environments (Hu et al., 2024). These concerns align with SDGs, explicitly addressing the prevention and significant reduction of marine pollution from all sources, especially land-based activities, including marine debris (SDG 14), and reducing pollution in water bodies from improper waste disposal (SDG 6) (United Nations, 2023).

For Thailand, waste management issues, particularly those related to plastic waste, remain a crisis that the government must confront. Thailand is designated as one of the top 10 countries with the highest marine pollution from plastic waste. It is also the country with the highest usage of single-use plastic products in Asia (Marks et al., 2023), which has prompted the nation to address the crisis through various initiatives, such as incorporating waste management into the national strategy, focusing on environmentally friendly quality of life growth (The Secretariat of the Cabinet, 2018). Additionally, national economic and social development plans emphasize the development of the economy under the concepts of a circular economy and green economy, addressing issues of pollution, waste, and litter into the seas (Office of the National Economic and Social Development Council, 2022). The Thai government's commitment is further evident in developing Thailand's roadmap on plastic waste management and the National Action Plan on Plastic Waste Management (Pollution Control Department, 2023). These initiatives highlight the importance of public participation at the individual and household levels. The efficient management and utilization of generated waste depend on proper separation at the source, involving the entire waste management chain (Nguyen, 2023; Kushwah et al., 2023). The effectiveness of these initiatives also depends on the proper separation of waste at the individual and household levels. Previous studies (Rathore & Sarmah, 2021) have shown that developed countries, as per World Bank data in 2012, had over 90% participation in waste separation, leading to recycling or conversion into other proper forms. However, developing countries, including Thailand, have less than 1% recycling rate. Despite emphasizing the importance of public involvement in waste separation, the willingness of individuals to participate remains low in various countries, including Thailand (Vassanadumrongdee & Kittipongvises, 2018).

Understanding individual behaviors and promoting desirable behaviors related to waste separation can be achieved through the Theory of Planned Behavior (TPB) proposed by Ajzen (1991). This theory has been widely used in social psychology and applied in various waste management studies such as the following past study by Rathore and Sarmah (2021), Oehman et al. (2022), Nguyen (2023), and Hu et al. (2024). This study applies the TPB framework to a riverside community, which is considered the last gateway for waste before entering the sea. The findings of this study aim to

provide insights into factors influencing intention and behavior related to waste separation among community members.

The study also contributes to the broader understanding of waste management challenges in Thailand, providing valuable data for organizations involved in designing effective and efficient public participation strategies in waste separation.

Literature review

Theory of Planned Behavior (TPB)

The theory of planned behavior adapted from the Theory of Reasoned Action (TRA) by Fishbein and Ajzen (1975) (Figure 1) distinguishes between three types of beliefs- behavioral, normative, and control - alongside the related constructs of attitude, subjective norm, and perceived behavioral control. Although there have been occasional questions regarding the necessity of these distinctions, particularly between behavioral and normative beliefs, it remains reasonable to argue that all beliefs associate the behavior of interest with some attribute, whether it is an outcome, a normative expectation, or a resource required to perform the behavior.

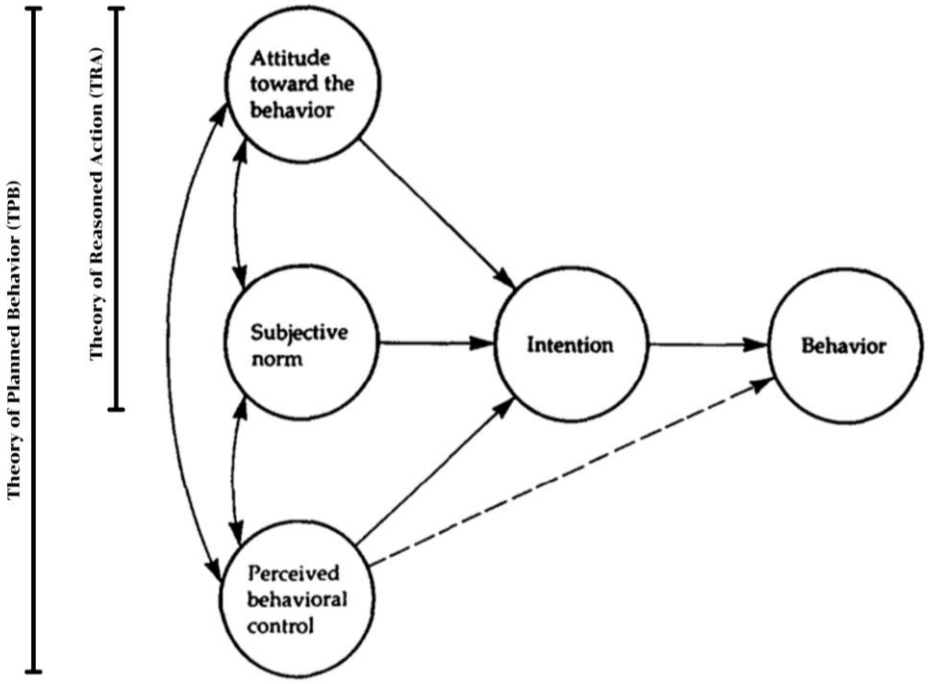

Figure 1 Theory of Planned and Behavior (TPB)
Source: Adapted from Ajzen's (1991) original theory

In the theory of planned behavior, the determinants of attempting a behavior encompass beliefs, perceived probabilities, normative beliefs, and motivations to comply with influencers. A comprehensive understanding involves considering beliefs, attitudes, social norms, and motivations. High accuracy in predicting intentions to perform various behaviors stems from attitudes toward the behavior, subjective norms, and perceived behavioral control. These intentions and perceptions of behavioral control account for a considerable variance in actual behavior.

Intentions are assumed to encapsulate the motivational factors influencing behavior, indicating the level of effort and willingness to perform a behavior. The theory of planned behavior places the

construct of self- efficacy belief or perceived behavioral control within a broader framework of relations among beliefs, attitudes, intentions, and behavior. It postulates three conceptually independent determinants of intention: Attitude toward behavior, subjective norm, and perceived behavioral control. Ajzen stated that the attitudes of individuals and the affective feeling towards behaviors (e.g., recycling is considered good behavior), but when attitude to an individual's evaluation of the outcome of behaviors (e.g., recycling could help reduce the waste in the landfilled) the pro-recycling attitudes found to be the strongest motivator towards recycling behaviors. Subjective norms represent the expectations (social pressure) that reflect an individual's perception of social pressures to perform or not to perform the behavior. Perceived behavioral control refers to an individual's perception of the ease or difficulty of performing the behavior of interest (Ajzen, 1991).

Psychology acknowledges the inherent difficulty in explaining the intricacies of human behavior. Such behavior can be approached at various levels, from physiological processes to social institutions. Social and personality psychologists often focus on an intermediate level, examining fully functioning individuals whose information processing mediates the influence of biological and environmental factors on behavior. Concepts such as social attitudes and personality traits play pivotal roles in attempts to predict and explain human behavior (Ajzen, 1985). Ajzen challenges the conventional belief that behavioral intention is the ultimate predictor of behavior and proposes that behavioral expectation formed after the intention is more reliable. Research on Fishbein and Ajzen's (1975) theory of planned behavior demonstrates successful applications in understanding intention-behavior relations. Attitudes toward behavior and subjective norms, influenced by beliefs about consequences, shape intentions.

The more favorable the attitude, the stronger the subjective norm, and the higher the perceived behavioral control, the more likely the intention to engage in a behavior, thereby increasing the likelihood of its performance. However, it is essential to note that a behavioral intention can translate into behavior only if the behavior is under volitional control and the individual can decide whether to perform or not.

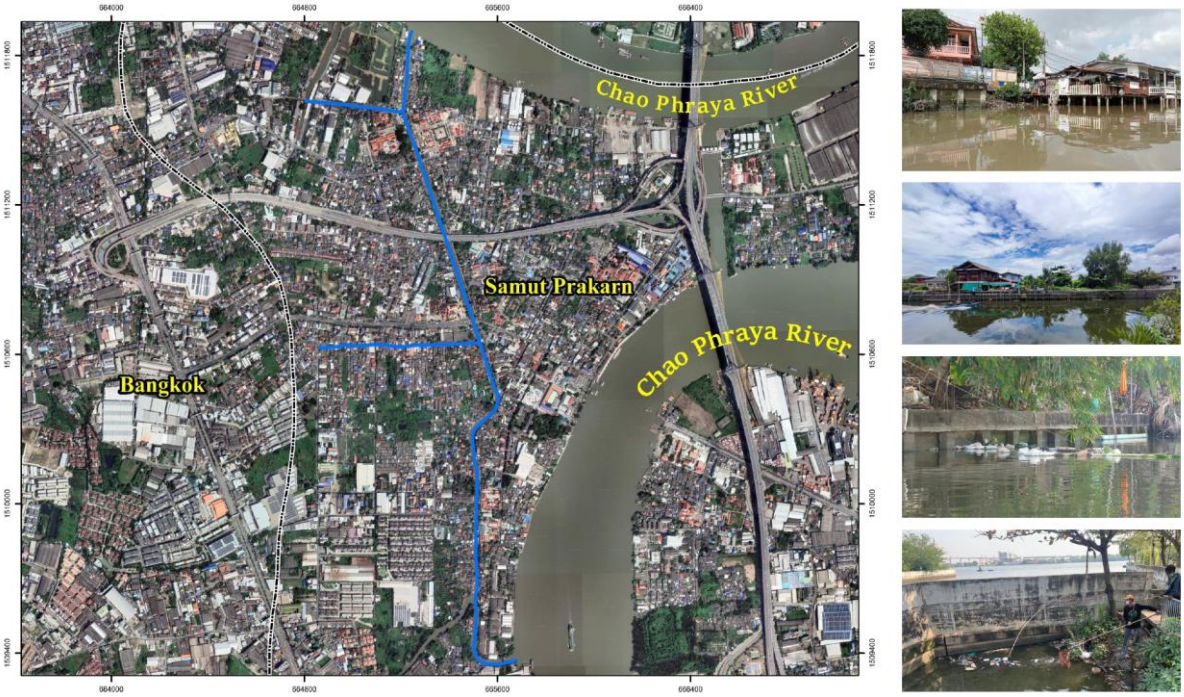

Figure 2 Map of Chao Muang Canal (Blue Line) and Area Scope of the two communities

Research method

This study employs a quantitative research approach, which is particularly suitable for investigating factors influencing the plastic waste separation behavior of the community residing along the Lat Luang Canal Municipality and Song Khanong Subdistrict Administrative Organization in Phra Pradaeng District, Samut Prakan Province. The sample size for this study, calculated using the G*Power computer program, was determined based on a predefined effect size of 0.35 according to Cohen's (1997) guidelines, with a 5% error and 95% power level. The final sample consists of 114 households. The sampling method utilized was convenience sampling. The sampling was selected conveniently from households located along the Lat Luang canals in the two selected communities. The picture below shows the area scope of the selected household. The timeframe of the research occurred in October and continued until February.

Data were collected using close-ended questions with a 5-point Likert scale (1= strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). The questions were designed based on variables derived from Ajzen's (2012) widely accepted Theory of Planned Behavior (TPB), including attitude (AT), subjective norm (SN), perceived behavioral control (PBC), intention to waste separating (IN), and the behavior of waste separating (BE). The following includes the number of questionnaires from each independent factor. For the first factor, attitudes, there are a total of 10 questionnaire items showing an internal consistency with a Cronbach's alpha of 0.836; for subjective Norm, there are two items with internal consistency with a Cronbach's alpha of 0.750, Perceived behavioral control total of 4 items level of internal consistency with a Cronbach's alpha of 0.700. The dependent variables include intention and behavior, and a total of one item of questions were asked. For this set of questionnaires, a total of 18 questions were asked. In Table 1, the questionnaire was translated from Thai and approved by the thesis committee and the advisor, 3 approvals. The data were evaluated against specified criteria, yielding the following results: Chi-square/DF = 4.043 (Hair et al., 2009), CFI = 0.904 (Hatcher, 1994), IFI = 0.906, PNFI = 0.586, PCFI = 0.603, and RMSEA = 0.164 (Meyers et al., 2005). Structural Equation Modeling (SEM) was employed for the data analysis using the AMOS program. This analysis aims to identify influential factors affecting the plastic waste separation behavior of the community.

Results

Significant findings: Factors influencing waste separation behavior

Based on the study results and the opinions of the sample group regarding waste separation behavior, having a positive attitude towards waste separation is considered a good practice. The actions mentioned are part of helping to reduce the amount going into the landfill. Both attitudes, considering waste separation a good behavior and believing that it contributes to waste reduction significantly, are crucial factors influencing waste separation behavior at a high level. The average values are 3.57 and 3.43, respectively. Other attitudinal factors such as ethical beliefs, participation in projects/activities promoting waste separation, and attitudes towards the waste management practices of relevant organizations have a moderate impact on behavior, with average values of 3.36, 3.11, and 3.08, respectively.

Regarding subjective norm (SN) factors, it was found that the waste separation behavior of others in society has a moderate impact on the sample group's waste separation behavior, with an average value of 3.40. Factors related to Perceived Behavioral Control (PBC), such as confidence in being a recycler, ease of acting, and willingness to learn about the waste separation process, have a moderate impact on waste separation behavior, with average values of 3.26 and 2.75, respectively.

When studying the intentions and current waste separation behavior of the sample group, it was found that both aspects are at a moderate level, with average values of 2.89 and 2.80, respectively. Details are provided in Table 1.

Table 1 Key factors influencing waste separation behavior

Questionnaire items	Code	Mean	S.D.	Translation Meaning
Attitude towards waste separation at the source				
Separate waste at source is a moral responsibility to do	e1	3.36	1.220	Neutral
Waste separation before disposing of is necessary	e2	2.79	1.133	Neutral
The negative impact that will occur from the waste problem	e3	2.86	1.049	Neutral
Self-behavior has a significant impact on the waste problem	e4	2.83	1.012	Neutral
Waste separation at source is good behavior	e5	3.57	1.105	Agree
Waste separation at the source can reduce the waste volume in the landfill	e6	3.43	1.004	Agree
Waste separation at source is time-consuming and costly	e7	2.80	0.933	Neutral
Waste separation at the source is useless	e8	2.73	0.971	Neutral
Separated waste will be collected in one bin	e9	3.08	0.970	Neutral
Willing to participate if there is a waste separation project	e10	3.11	1.203	Neutral
Following the reference groups that impact the subjective norm of waste separation at the source				
Expect others to separate waste at the source	e11	2.48	0.961	Disagree
Unnecessary to waste separation while others do not	e12	2.64	1.065	Neutral
Perceived Behavioral Control in Waste Sorting (PBC)				
Known for action in the specific local recycling	e13	2.12	1.168	Disagree
Perceived that waste separation at source is easy	e14	3.26	1.220	Neutral
Willing to identify as a recycler	e15	3.40	1.019	Neutral
Willing to learn more about waste separation	e16	2.75	1.020	Neutral
Intention to Waste Separating (IN)	e17	2.89	1.051	Neutral
Behavior of Waste Separating (BE)	e18	2.80	1.049	Neutral

Factors influencing waste separation: An SEM model analysis

The analysis of Structural Equation Modeling (SEM) using the AMOS program, which will only include the factors that have a direct effect based on the significance level of the dependent variables, revealed that the factors influencing waste separation behavior stem solely from the intention to separate waste—perceived behavioral control (PBC) as a determinant of both behavioral intention and the behavior itself. This finding is particularly significant as it underscores the crucial role of intention and perceived behavioral control in waste separation behavior. On a conceptual basis, perceived behavioral control refers to the person's belief that the behavior in question is under control (Ajzen, 1988). The intention, in turn, is linked to attitudinal factors and personal norms. Both factors support each other in strengthening the intention to engage in waste separation, as detailed in Figure 3 and Table 2.

Concerning attitudinal factors, an analysis of the questions reveals that these beliefs stem from the conviction that waste separation is a good behavior (e5), should be performed (e2), and includes beliefs about the consequences of these actions, such as not separating waste before disposal leading

to future waste problems (e3). It's important to note that these problems result from individual behavior (e4), highlighting the significant role each individual plays in waste management. Cultivating good waste separation habits can reduce the amount entering disposal or landfill processes (e6) empowering individuals to make a positive impact.

On the other hand, factors stemming from subjective norms are influenced by the perception of other people's behavior in society. For instance, the optimistic view that others engage in waste separation (positive perspective) and the perception that others in society do not separate waste make it unnecessary to do so (negative perspective). Both perspectives influence the subjective norm, leading to the intention of waste separation for individuals within the sample group.

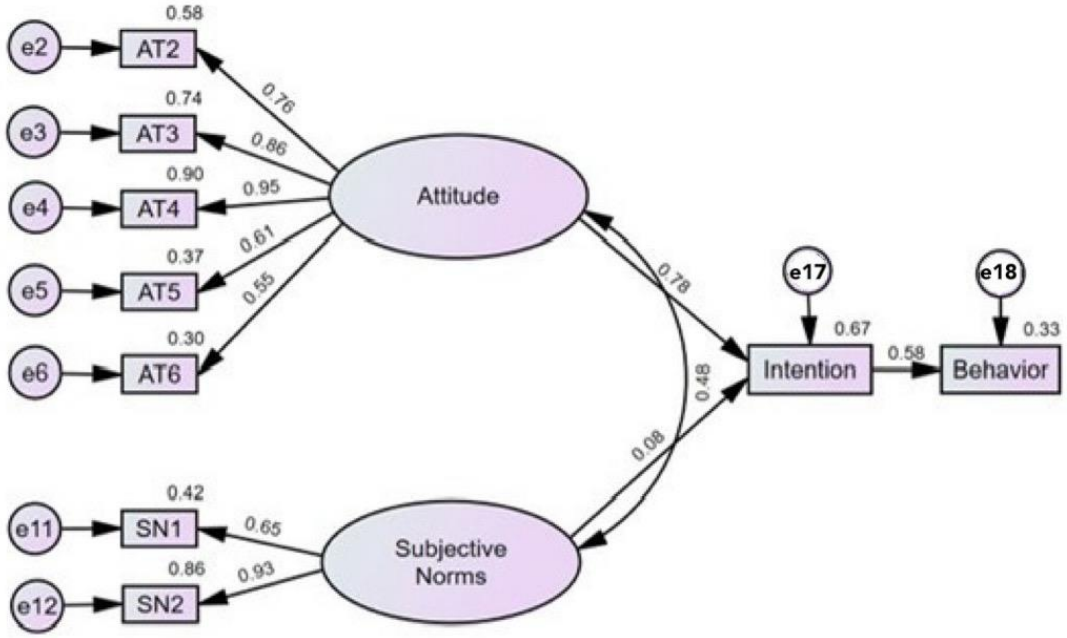

Figure 3 The hypothetical structural equation model of waste separation behavior

Table 2 The standardized regression weight of the path analysis

Relationship			Standardized	P
SN1	←	SN	0.652	
SN2	←	SN	0.926	***
AT3	←	AT	0.860	***
AT2	←	AT	0.759	
AT4	←	AT	0.948	***
AT5	←	AT	0.609	***
AT6	←	AT	0.549	***
IN	←	SN	0.085	0.221
IN	←	AT	0.776	
BE	←	IN	0.576	***

Note: *p < 0.05, **p < 0.01, ***p < 0.001

Discussion

In this study, an investigation was conducted into the influential factors affecting waste separation behavior among the residents of the communities along the Chao Phraya River in Samut Prakan Province, Thailand. The findings reveal that the issues related to intention and behavior in waste separation among the general public are still relatively low, evident from the average levels of intention and behavior in waste separation, which are only at a moderate level, suggests a significant challenge that urgently needs to be addressed, especially considering the diverging trend with the Thai government's emphasis on waste management as outlined in the Country's Waste Management Plan Version 2 (2022-2027) (Pollution Control Department, 2023) and the sustainable development goals promoting public awareness and participation in waste reduction and prevention, recycling, and sustainable reuse under the Reduce, Recycle, and Reuse framework (United Nations, 2023).

This study's results underscore the significant influence of attitudinal factors in promoting waste separation intention and actual behavior of waste separation among the public. The study suggests that interventions should focus on shaping the public's attitude toward waste separation as a positive behavior that should be practiced. This perspective linked to cultural considerations, emphasizes the urgent need to build an awareness of waste separation and address these issues aligns with the trend observed in the research conducted by Razali et al. (2020) in Malaysia, which moral variables into the Theory of Planned Behavior (TPB) and found that moral factors strongly influenced waste separation behavior among the Malaysian population compared to attitude and subjective norm factors.

Concerning subjective norm (SN) issues, the study indicates that the behavior of others in society regarding waste separation has a more significant impact on individual waste separation behavior than expectations from one's community. It highlights the importance of social norms, emphasizing the behavioral patterns of the majority in the community as a behavioral framework for individuals. Therefore, promoting campaigns should focus on creating a shared behavioral factor, there are more intention factors. This finding is consistent with Nguyen's study (2023) in Vietnam, where community attitudes such as "Waste separation saves the cost of urban waste disposal and treatment" were significant determinants of waste separation intention.

Perceived Behavioral Control (PBC), this study highlights three key factors that significantly influence waste separation behavior: confidence in recycling, ease of waste separation, and access to information about the separation process. These findings echo those of a study conducted in Bangkok, Thailand, by Vassanadumrongdee and Kittipongvises (2018), emphasizing the importance of both knowledge about waste separation and the perceived inconvenience as drivers of public waste separation intentions. Furthermore, Hu et al.'s (2024) research in Japan delves into additional factors within the PBC framework, such as time availability, operational space, and access to tools or equipment— these all impact intentions and behaviors toward waste separation. However, upon analyzing these factors using Structural Equation Modeling (SEM), it was found that the standardized regression coefficients did not significantly affect individuals' intentions and behaviors. Drawing from the study by Zhang et al. (2015), which applies the Theory of Planned Behavior (TPB), noted that PBC alone does not directly influence behavior, despite the previous assumption within Ajzen's (1985) framework. The Theory of Planned Behavior, stemming from Fishbein and Ajzen's (1975) Theory of Reasoned Action, initially presumed that most social behaviors could be predicted solely from intentions, assuming volitional control. When analyzing the influential factors on waste separation behavior using structural equation modeling, the study finds that waste separation behavior is influenced by the intention to separate waste. This intention, in turn, is influenced by attitude and subjective norms. Attitude is shaped by beliefs that waste separation is an excellent/should-be-done behavior. Beliefs about waste separation's positive and negative outcomes align with Kushwah et al.'s (2023) study, indicating that awareness of consequences positively influences waste separation

intention. Similarly, Rathore and Sarmah's (2021) study in India found that perceived benefits and social awareness were significant determinants of waste separation intention.

The study concludes that both attitude and subjective norm significantly contribute to shaping waste separation intention, which, in turn, influences waste separation behavior based on the theory conducted by Ajzen under the framework of the theory of planned behaviors linking back to the previous theory used by Ajzen and Fishbein (1975) the theory of Reasoned Action (TRA) which stated that human behaviors are from attitudes and subjective norm which reflected intention and to the behaviors of individuals. At the same time, the perceived behavioral control factors are a factor that extended from the TRA to explain whether one self-knows and understands one's own attitudes and subjective norms. However, due to the emerging TPB that adapted the PBC factors, there are more factors to consider when understanding an individual's action. Based on the research study, which can confirm that TRA is valid and used to study the behaviors of individuals, adapting the TPB to include other tested factors, such as PBC, leads to a better overall understanding of individuals' behavior. These findings provide valuable insights for designing effective interventions and campaigns to promote waste separation behavior among the public.

Conclusion

The study results for this session indicate that the intention and behavior trends regarding waste separation among residents in the riverside community in the study area remain at a low proportion, evident from the study findings, which reveal that the intention and behavior of waste separation among the population is only moderate. On the educational front, factors leading to effective waste separation behavior must promote the development of intention within the community. Two main factors influence this intention: attitude towards waste separation at the source and following the reference groups that impact the subjective norm to promote this intention, it is essential to cultivate an attitude among the public that considers waste separation as a positive behavior that should be practiced, emphasizing its moral importance. Additionally, creating a positive perception of the outcomes that occur when individuals engage in waste separation is crucial. Simultaneously, relying on social norms and collaborative practices is necessary to generate a subjective norm.

References

Ajzen, I. (1985). *From intentions to actions: A theory of planned behavior*. Berlin, Germany: Springer.

Ajzen, I. (1988). *Attitudes, personality, and behavior*. Chicago, USA: Dorsey Press.

Ajzen, I. (1991). The theory of planned behavior. *Organizational and Behavior and Humans Decisions Processes Journal, 20*(2), 179-211.

Cohen, J. (1977). *Statistical power analysis for behavioral sciences.* New York: Academic Press.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.

Hair Jr., J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate data analysis*. New Jersey, USA: Prentice Hall.

Hatcher, L. (1994). *A step-by-step approach to using the SAS system for factor analysis and structural equation modeling*. Assam, India: SAS Institute.

Hu, J., Miao, L., Han, J., Zhou, W., & Qian, X. (2024). Waste separation behavior with a new plastic category for the plastic resource circulation: Survey in Kansai, Japan. *Journal of Environmental Management, 349*, 119370.

Kushwah, S., Gokarn, S., Ahmad, E., & Pant, K. K. (2023). An empirical investigation of household's waste separation intention: A dual-factor theory perspective. *Journal of Environmental Management, 329*, 117109.

Marks, D., Miller, M. A., & Vassanadumrongdee, S. (2023). Closing the loop or widening the gap? The unequal politics of Thailand's circular economy in addressing marine plastic pollution. *Journal of Cleaner Production, 391*, 136218.

Meyers, L. S., Gamst, G., & Guarino, A. J. (2005). *Applied multivariate research: Design and interpretation*. Thousand Oaks, USA: SAGE.

Nguyen, T. K. N. (2023). The determinants of individuals' waste separation intention in an urbanizing city: A case study of Hanoi, Vietnam. *Habitat International, 137*, 102835.

Oehman, J. M., Babbitt, C. W., & Flynn, C. (2022). What predicts and prevents source separation of household food waste? An application of the theory of planned behavior. *Resources, Conservation and Recycling, 186*, 106492.

Office of the National Economic and Social Development Council. (2022). *The 13th national economic and social development plan (2023-2027)*. Retrieved from https://www.nesdc.go.th/download/Plan13/Doc/Plan13_Final.pdf

Pollution Control Department. (2023). *Action plan on plastic waste management phase II (2023-2027).* Retrieved from https://www.pcd.go.th/publication/28484

Rathore, P., & Sarmah, S. P. (2021). Investigation of factors influencing source separation intention towards municipal solid waste among urban residents of India. *Resources, Conservation and Recycling, 164*, 105164.

Razali, F., Daud, D., Weng-Wai, C., & Jiram, W. R. A. (2020). Waste separation at source behaviour among Malaysian households: The theory of planned behaviour with moral norm. *Journal of Cleaner Production, 271*, 122025.

Shruti, V. C., Kutralam-Muniasamy, G., Pérez-Guevara, F., & Roy, P. D. (2023). An assessment of higher-value recyclable wastes in Mexico City households using a novel waste collector citizen science approach. *Science of The Total Environment, 863*, 161024.

The ASEAN Secretariat. (2019). *Bangkok declaration on combating marine debris in ASEAN region*. Retrieved from https://asean.org/asean2020/wp-content/uploads/2021/01/2.-Bangkok-Declaration-on-Combating-Marine-Debris-in-ASEAN-Region-FINAL-1.pdf

The Secretariat of the Cabinet. (2018). *National strategy*. Retrieved from https://drive.google.com/file/d/1XSBMp8OCsauJqECOB-XZLB91-cRrNsEV/view

United Nations. (2023). *SDG indicators.* Retrieved from https://unstats.un.org/sdgs/indicators/indicators-list/

Vassanadumrongdee, S., & Kittipongvises, S. (2018). Factors influencing source separation intention and willingness to pay for improving waste management in Bangkok, Thailand. *Sustainable Environment Research, 28*(2), 90-99.

Zhang, D., Huang, G., Yin, X., & Gong, Q. (2015). Residents' Waste separation behaviors at the source: Using SEM with the theory of planned behavior in Guangzhou, China. *International Journal of Environmental Research and Public Health, 12*(8), 9475-9491.