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Factors Enhancing Waste Sorting Behavior in Household: Case Study Klong Lad Pah Chi Community

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ABSTRACT

This study investigates the factors that enhance household waste sorting behavior, focusing on the Klong Lad Pah Chi community in Bangkok. It applies Ajzen's extended Theory of Planned Behavior as the research framework, examining both psychological and contextual influences. Based on field observations and interviews, the research identifies key drivers of waste sorting behavior and explores how these factors interact to support sustainable practices. Psychological elements, such as attitudes toward waste sorting and perceived behavioral control, along with contextual factors like access to waste sorting facilities, play a critical role. This study demonstrates that while both psychological and contextual factors play critical and interdependent roles in influencing household waste sorting behavior in Bangkok, contextual factors emerge as the more powerful drivers for long-term behavioral change. The findings aim to inform the development of sustainable waste management practices that are applicable and scalable in similar community and urban contexts in Bangkok, Thailand.

KEYWORDS: Household Waste Sorting, Theory of Planned Behavior, Sustainable Urban Practices

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1 INTRODUCTION

This chapter provides an overview of the rationale and purpose of the study, highlighting the urgency of addressing household waste management as a critical component in improving the overall waste system of the city. By applying behavioural insights and conducting field research, the study aims to generate practical recommendations for promoting sustainable waste practices from the upstream level. To contextualize this approach, the chapter also illustrates global waste management challenges by examining international data, best practices, and successful case studies of household waste sorting initiatives driven by community collaboration.

1.1 Rationale

Effective household waste management is a pressing global concern, particularly in urban settings where population growth and increased consumption significantly contribute to rising municipal solid waste (MSW). This research investigates the psychological and contextual factors that influence waste sorting behavior at the household level in Bangkok, Thailand. The study draws upon Ajzen's extended Theory of Planned Behavior (TPB) to understand how individual attitudes, perceived behavioral control, and subjective norms intersect with contextual elements such as infrastructure, knowledge, and trust in the waste management system. Field research was conducted in the Klong Lad Pah Chi community in Bangkok, combining observational and interview data to identify key behavioral drivers and barriers. Waste separation at the source is widely regarded as a cost-effective and low-impact strategy, reducing the burden on downstream waste systems and minimizing environmental harm. Globally, the World Bank projects MSW volumes could rise to 3.40 billion tons annually by 2050 if current trends continue (Kaza et al., 2018). Within Southeast Asia, Thailand ranks among the top three generators of MSW, and the situation is particularly critical in Bangkok where food waste constitutes nearly half of the daily waste stream (Public Relations Department, BMA, 2024). The Bangkok Metropolitan Administration (BMA) allocates 17% of its budget—over 13,000 million Baht—toward cleaning and waste management (Workpoint Today, 2022), underscoring the urgency of upstream waste interventions.

1.2 Behavioral Interventions and International Practices

In 2022, Bangkok introduced the "Do Not Mix" campaign as a behavioral intervention to promote the separation of food waste from general waste. This campaign utilized targeted outreach and separate food waste collection services to reduce contamination and increase participation. During its five-month pilot, 180 tons of food waste were diverted from the general waste stream, contributing to an annual reduction of 74,460 tons and cost savings of 141 million Baht in 2023 (Matichon Online, 2022; Nikorn, 2024). These outcomes align with international examples of successful household waste sorting. In Taipei, citizens are required to use designated garbage bags, and classical music signals the arrival of waste trucks, encouraging routine waste separation (Davidson & Lin, 2022). Venice, Italy, has implemented clear collection schedules and free bulky waste services, reducing incineration volumes (C40 Cities, 2018). Germany employs a color-coded bin system and a bottle deposit return scheme known as Pfand, achieving recycling rates exceeding 66% (Botham, 2022). In

Sweden, public guidance with detailed infographics supports residents in sorting waste into up to 12 categories (ÖGRAB, 2016). These global cases demonstrate that combining infrastructure, education, and community norms leads to more sustainable waste management behavior.

1.3 Southeast Asia and Bangkok's Waste Landscape

Among Southeast Asian countries, Thailand generates approximately 26.77 million tons of MSW annually, second only to Indonesia (UNEP, 2017). Despite policy frameworks such as the 2018 national roadmap and circular economy targets for 2027, only 34% of waste is recycled (PCD, 2023). In Bangkok, over 9,000 tons of waste are produced daily, with organic waste making up around 50%. The BMA currently promotes four waste categories: recyclables, organics, hazardous waste, and general waste. However, mismanagement remains prevalent due to weak regulatory enforcement, limited incentives, and insufficient sorting infrastructure (ESCAP, 2019). The waste management flow is divided into upstream (household sorting), midstream (collection and transport), and downstream (disposal). Recent initiatives also include surplus food redistribution, composting programs, and energy recovery from general waste. Yet, informal actors such as waste pickers and junk shops remain critical to Bangkok's recycling ecosystem. While the city has implemented differentiated disposal methods—including for hazardous and infectious waste—operational costs still exceed revenue from collection fees. The lack of a robust "pay-as-you-throw" scheme further undermines efforts to align consumer behavior with waste generation.

1.4 Policy Frameworks and Community Engagement

Bangkok's waste collection fees are structured by volume, with discounts for households practicing proper sorting. However, penalties primarily apply to improper disposal of large items, leaving small household waste unregulated. The city's collaborative six-step waste reduction strategy includes baseline data collection, infrastructure development, community training, communication campaigns, and continuous evaluation. In 2022, the BMA launched a pilot program in three districts—Nong Khaem, Pathumwan, and Phaya Thai—advocating tiered sorting levels from basic food/general separation to advanced six-category models. Trust-building efforts include deploying new waste trucks with separate compartments and expanding drop-off points. These strategies have yielded significant waste reductions and cost savings, prompting expansion citywide in 2024. To maintain momentum, BMA partnered with the Environmental Research Institute at Chulalongkorn University to develop the "BKK Zero Waste" platform, which provides transparent data, operational tools, and incentive programs. Public participation is encouraged through mobile app reporting, reduced service fees, and NGO-supported collection networks. These efforts aim to transform waste sorting from an isolated action to a city-wide norm embedded in daily life.

1.5 Theoretical and Practical Insights

The research applies Ajzen's Theory of Planned Behavior (TPB) to analyze how psychological factors influence household waste sorting. Attitudes, subjective norms, and perceived behavioral control collectively shape behavioral intentions and, ultimately, actions.

However, research shows that intentions can fade over time without contextual support (Wang & Mangmeechai, 2021). Thus, the study incorporates contextual variables such as knowledge, facility conditions, and trust. Knowledge and skill development enhance self-efficacy and sorting accuracy (Ittiravivongs, 2011; Vassanadumrongdee & Kittipongvises, 2018). Accessible, clean, and well-labeled infrastructure reduces physical and cognitive barriers. Trust in municipal operations correlates strongly with sorting frequency (Leknoi et al., 2024). When residents believe their efforts yield meaningful results, participation increases.

Additionally, concepts from Nudge Theory support interventions like default options, signage, and incentives to reinforce behavior (Thaler & Sunstein, 2008; Lehner et al., 2016). These findings underscore the value of integrating psychological and contextual strategies. Ultimately, the research contributes both theoretical insight and practical guidance for scaling community-based waste management, offering a model for Bangkok and comparable urban contexts globally.

Table 1 Detail of Variables Used in the Study

Factor	Description	Positive Indicator	Negative Indicator
Psychological Factors			
Attitude	An individual's belief about and evaluation of the benefits of a behavior.	Positive: "Waste segregation helps improve the environment."	Negative: "Sorting waste is useless and unhygienic."
Subjective norms	An individual's perception of perceived social pressure to perform or not perform a behavior.	"Everyone in my community supports waste sorting."	"I mix all waste in one bag because my neighbor does too."
Perceived Behavioral Control	One's confidence in their ability to perform the behavior.	"Since I know how and where to sort, I do it at home."	"I don't know how to sort properly, so I don't do it or do it incorrectly."
Contextual Factors			
Knowledge and Skill	Knowledge involves awareness and understanding, such as benefits of sorting, correct methods, and eco-friendly practices. Skills refer to practical ability, like composting or consistent separation.	Informed residents make fewer mistakes, sort accurately, and develop better waste-sorting habits.	Lack of knowledge or inexperience leads to mixed or contaminated waste disposal.
Environment and Facility Condition	Encompasses the conditions of public waste infrastructure, including bins, drop-off areas, signage, and instructions.	Clean, accessible stations with clear instructions enable proper and prompt sorting.	Poorly maintained, distant, or confusing facilities discourage correct sorting and increase contamination.
Trust in Local Waste Management	Refers to confidence in the transparency and effectiveness of local waste policies, programs, and operations.	Transparent systems (clear policies, regulations, and programs) foster consistent household sorting.	Mistrust in community or authority systems discourages sorting behavior at home.

1.6 Research Design

This study investigates the psychological and contextual determinants of household waste sorting behavior in Bangkok, with a focus on the Khlong Lad Pachi community. Drawing

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from past research and grounded in the extended Theory of Planned Behavior (TPB), the research aims to understand how internal factors, attitude, subjective norms, and perceived behavioral control, interact with external conditions such as knowledge, infrastructure, and trust in local systems to influence waste sorting practices. The central research question asks: How do psychological and contextual factors, both individually and interactively, influence household waste sorting behavior in Bangkok?

To explore this, the study is structured around three main hypotheses. The first posits that psychological factors positively affect behavior, with each TPB component influencing waste sorting either directly or through intention. The second hypothesis addresses contextual elements, knowledge and skill, environmental and facility conditions, and system trust, and their direct influence on behavior. The third proposes that contextual factors also enhance perceived behavioral control, thereby reinforcing behavioral intentions.

The research employs a qualitative approach using mixed methods. Data collection includes secondary research on community background, field observations of waste composition following BMA sorting guidelines, and semi-structured interviews to gather in-depth insights. The interview questions probe behavioral patterns, perceived ease or difficulty of sorting, and influences ranging from social pressure to system trust. Efforts are made to minimize bias by ensuring participant anonymity and employing indirect questioning techniques.

The study focuses on the Khlong Lad Pachi community, recognized as a model Zero Waste area by the BMA. The sampling strategy includes purposive and snowball methods, with seven participants selected to represent both community leaders and general households. Despite the small sample size, careful participant selection and validation against prior Thai studies enhance the reliability and relevance of the findings. Through this methodology, the research aims to generate practical recommendations to support sustainable waste sorting at the household level.

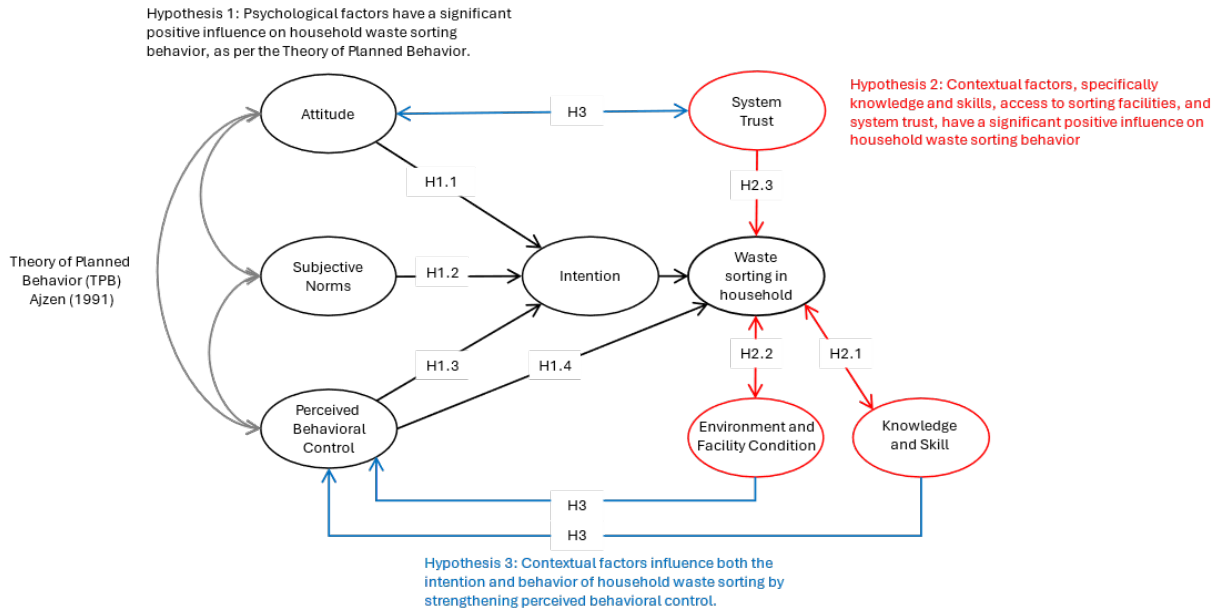

Figure 1 Research theorical framework, the extended TPB with knowledge and skill, environment and facility condition, and system trust. Diagrams illustrated by the author.

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2 RESULT

The field observation and interview data from Klong Lad Phachi community reveal that effective household waste sorting is shaped by an interplay of psychological and contextual factors. Observations confirmed that the community's well-structured facilities, seven waste drop-off stations within close proximity, enable consistent sorting behavior. Households routinely cleaned, dried, and separated waste before disposal, with food waste being processed on-site into compost or bio-fermented products, reducing municipal waste output by 50%.

Interviews with residents further underscored these findings. Attitude and perceived behavioral control emerged as key psychological enablers, while subjective norms played a minimal direct role but showed signs of evolving into shared community values. Participants described initial challenges in sorting behavior that diminished with experience, suggesting that perceived behavioral control improves over time. Contextual factors such as knowledge, facility accessibility, and trust in the local system were repeatedly cited as critical. Trust in the community's transparent and incentivized waste management model, rather than city regulations, proved essential in sustaining engagement. Together, these findings support a model of integrated behavioral and contextual influences in fostering sustainable household waste sorting.

2.1 Community Waste System

The Klong Lad Phachi community, founded in 2005, is a model of self-managed development under Thailand's Community Organizations Development Institute (CODI). The community was relocated to a donated 2,000 square meter area and built a collaborative residential plan anchored in mutual support through a daily savings program, welfare funds, and a revolving debt-relief scheme. Guided by four pillars—secure housing, health, society, and local economy—the community embedded environmental stewardship into its vision from the beginning. Since its inception, the community has advanced its waste management through the establishment of waste banks, organic farms, composting programs, and BSF (black soldier fly) larvae facilities. By 2023, it had been officially recognized by Bangkok Metropolitan Administration (BMA) as a model zero-waste community.

The community's waste management objectives are clear: to improve cleanliness, promote household-level sorting, and foster multi-stakeholder collaboration. Seven waste facilities serve the area, including recycling banks, drop-off centers, composting units, and general waste bins—all within 150 meters of residents' homes. Waste is cleaned, sorted, and brought to designated locations by households, then collected weekly by the BMA and private partners. Community-level food waste is processed into compost or bio-fermented liquids on site. These efforts have halved the volume of waste sent to municipal facilities. A volunteer committee oversees the operation, from daily drop-off maintenance to organizing awareness training and managing incentive-based savings through the waste bank program. Success is rooted in consistent engagement, shared accountability, and internal leadership.

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Figure 2 The community map: extracted from Google Maps and illustrated by the author, shows the location of waste management facilities, all within 150 meters of households.

Figure 3 Waste drop-off station with signage and clear instructions for waste sorting

Figure 4 A junk buyer rides their bicycle through the community daily to collect recyclable waste at the Waste Bank Center and Recycling bank savings record book.

Table 2 Waste Category and Instructions in Klong Lad Pachi Community

	Type of waste generated from household	Source separation method in household
1	1.1a) Recyclables those sellable with junk buyers 1.1 b) Recycle waste those unable to sell with junk buyer	1. clean the contaminated part with water 2. ensure that waste is dry before being brought out to dispose 3. drop off at Recyclable Waste Bank & Unsellable recycle waste drop-off point
	1.2 a) used clothes, bags, and shoes 1.2 b) used papers and books	1. ensure that items are clean and dry before being brought out to dispose of items 2. drop off at Waste drop-off station
2	2.1 Leftover cooked food	1. segregated solid food waste out from liquid. 2. bring solid food waste to drop off at Green Cone or at Worm house
	2.2a) Vegetables and fruits 2.2 b) Organic waste that is not food waste i.e., leaves	Bring leftover vegetables and fruits to drop off at Bio-fermented liquid jar or at Green Cone or at Worm house
	2.3 Used cooking oil	segregate only used liquid cooking oil and filled in the bottle. Bring out to drop at Recycle Waste Bank
3	Hazardous waste	drop off at Waste drop-off station
4	General waste	To collect all general waste in the bag, ensure no leaking, and drop off at the General waste bin on the main road.

2.2 Interview Findings – Psychological Factors

Semi-structured interviews were conducted with seven residents aged 48–75, comprising homemakers, retirees, and self-employed individuals. Key psychological enablers identified include positive attitudes, strong perceived behavioral control, and a nuanced role for subjective norms. Many residents expressed a moral obligation to sort waste, citing environmental and public health benefits. Respondents frequently emphasized that waste sorting improves hygiene, reduces health risks, and generates economic value through the waste bank exchange system.

Interestingly, social pressure (subjective norms) had limited impact. Residents consistently noted that their waste sorting behaviors stemmed from internal values rather than community expectations. However, deeper reflection revealed a latent social dimension—many interviewees hoped others would adopt similar practices and were willing to help neighbors sort waste. This reflects the formation of emergent social norms, even if they’re not overtly enforced.

Perceived behavioral control emerged as a major determinant. Although waste sorting was initially perceived as challenging, most participants adapted through hands-on learning and problem-solving. Even in small or shared homes, residents found creative solutions to separate, clean, and store waste. Confidence in one’s ability to manage sorting practices ultimately shaped whether and how consistently sorted.

2.3 Interview Findings – Contextual Factors

Three contextual elements—knowledge and skill, facility conditions, and trust in systems—strongly influenced waste sorting behaviors. Knowledge was both informational (understanding what and why to sort) and practical (how to sort). Residents reported increased confidence and frequency of sorting after understanding health impacts and

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learning specific techniques. This supports prior literature emphasizing knowledge as a prerequisite to environmental behavior.

Environmental and facility conditions had a nuanced role. While limited space at home was not a major barrier, poorly managed drop-off points discouraged participation. Conversely, clean, well-organized community sorting stations with clear signage enabled better compliance and reduced confusion. This highlights the importance of external “choice architecture” in promoting sustainable behavior.

Trust in the local waste management system proved critical. Although municipal policies had little influence, trust in the community’s cooperative system—including waste bank savings, composting, and visible results—reinforced participation. Respondents noted that clear benefits (e.g., savings, cleaner surroundings) made their efforts feel meaningful and worthwhile. In contrast, skepticism about municipal follow-through could demotivate sorting behavior. Overall, the findings affirm that transparent, accountable community systems can substitute for weaker formal regulations, promoting voluntary and sustained behavior change.

3 DISCUSSION

This section interprets the findings in relation to the extended Theory of Planned Behavior, highlighting how psychological and contextual factors jointly shape household waste sorting behavior. It explores how positive attitudes, perceived behavioral control, and enabling community systems reinforce sustainable practices, and discusses the implications for behavior change strategies and policy design in urban waste management.

3.1 Key Findings and Theoretical Insights

This study analyzes how psychological and contextual factors influence household waste sorting behavior in Bangkok, with data collected from the Klong Lad Phachi community. The findings affirm that both dimensions work in tandem—psychological drivers like attitude and perceived behavioral control interact with contextual conditions such as practical knowledge, accessible infrastructure, and system trust. Importantly, contextual elements not only have a direct influence on sorting behavior but also enhance perceived behavioral control, indirectly reinforcing intention and behavior.

All three hypotheses were validated. Attitude and subjective norms influenced behavior indirectly through intention, while perceived behavioral control affected both intention and behavior directly. Contextual variables—knowledge and skills, accessible facilities, and trust—also exerted significant direct effects. Moreover, these contextual factors strengthened perceived behavioral control, indirectly shaping behavioral outcomes. These results support the extended Theory of Planned Behavior (TPB), demonstrating that contextual support plays a vital role in sustaining waste sorting behaviors.

3.2 Psychological and Contextual Drivers

Psychological factors, especially perceived behavioral control and attitude—emerged as the most influential internal determinants of waste sorting behavior. Residents reported that a positive outlook toward waste sorting, viewing it as a socially responsible and

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environmentally beneficial practice, encouraged their participation. Confidence in one's ability to sort waste, developed over time through repetition and familiarity, further embedded the behavior into household routines. While subjective norms were less directly influential, the interviews revealed that a sense of shared responsibility and communal aspiration is taking root, signaling the emergence of social norms in support of waste sorting.

On the contextual side, three primary factors—knowledge and skill, facility accessibility, and trust—were identified. Practical knowledge enhanced sorting accuracy, while informational awareness increased understanding of environmental benefits, thereby reinforcing attitudes. Clean, accessible, and well-labeled community drop-off points significantly reduced friction in the sorting process. Finally, trust in the local system, including waste bank benefits, transparency, and cooperative incentives—proved vital. Conversely, skepticism toward municipal regulations or concerns about post-collection mismanagement discouraged engagement.

3.3 Interconnection and Behavioral Reinforcement

One of the study's key findings is the synergistic effect of contextual factors in reinforcing psychological drivers. Workshops and ongoing education improved knowledge and skills, enhancing perceived behavioral control. Well-maintained and clearly organized waste facilities facilitated user compliance, reducing the physical and cognitive burden of sorting. Most importantly, trust in the community-led waste system amplifies the psychological sense of efficacy and meaning, motivating sustained behavior over time. These findings confirm Hypothesis 3, underscoring that external support systems not only directly foster behavior but also strengthen internal intention and confidence.

Additionally, the role of internalization was evident residents independently adopted behaviors they initially learned through community engagement, which in turn spread organically to others. Voluntary actions, such as helping neighbors or encouraging proper sorting, suggest that behavioral norms are evolving toward a more sustainable community-wide practice. This interconnectedness highlights the feedback loop between psychological and contextual mechanisms.

3.4 Community Systems and Broader Implications

The site visit and interviews further emphasize that community-led initiatives and localized infrastructure are powerful catalysts for behavior change. Waste banks, trade-off programs, compost stations, edible gardens, and organized drop-off points not only improve convenience but also build a sense of collective responsibility. These features foster a deeper connection to environmental stewardship and create opportunities for residents to actively engage with sustainable living. The cumulative result is a durable shift in daily behavior aligned with broader sustainability goals.

Klong Lad Phachi's recognition by the BMA as a zero-waste model underscores the effectiveness of grassroots innovation, particularly when supported by visionary leadership and trust-based systems. Leadership has proven essential in mobilizing participation and maintaining behavioral continuity. Combined with incentives, household training programs, and multi-stakeholder collaboration, the community offers a scalable and replicable

framework for waste management and sustainable living. These findings contribute to both academic theory and practical strategy, offering a pathway for municipalities to enable resident-led sustainability transitions through empowered community design.

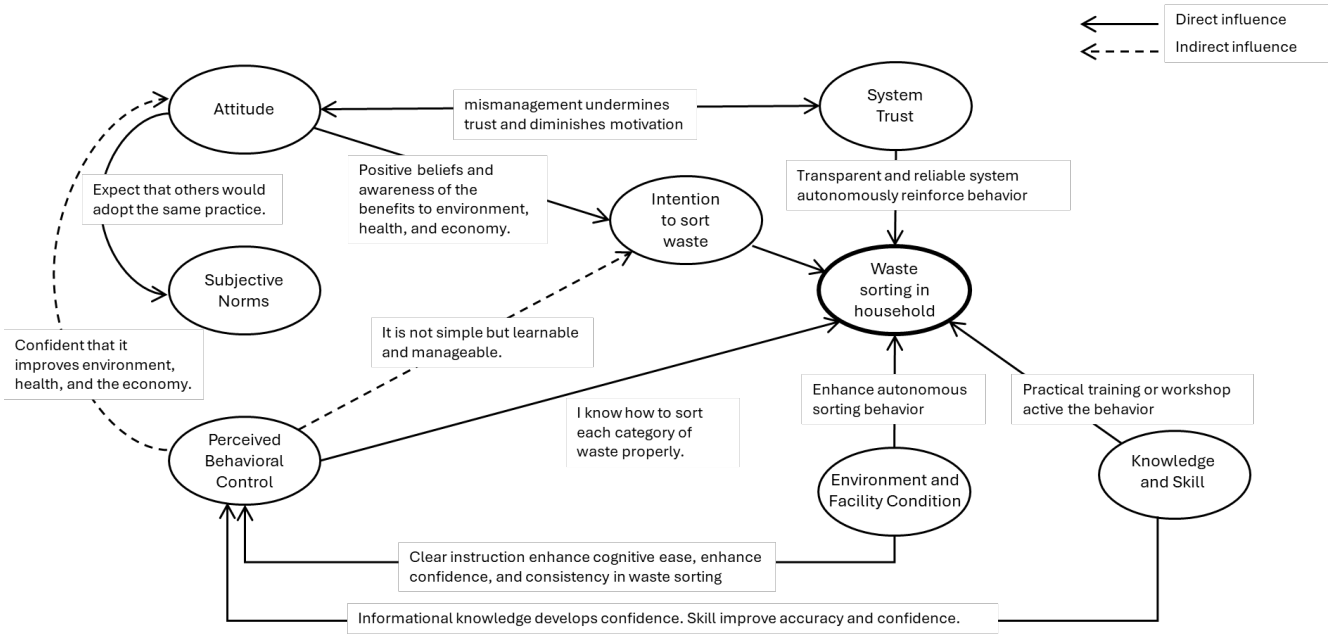

Figure 5 Factors influences waste sorting behavior in household in Klong Lad Phachi Community (author, 2024)

4 CONCLUSION

This final section synthesizes the study's key findings, offering a comprehensive interpretation of how household waste sorting behavior in Bangkok is shaped by both internal and external factors. It outlines practical recommendations for policy and community design, acknowledges the study's limitations, and proposes directions for future research to enhance sustainable waste management across diverse urban contexts.

4.1 Conclusion and Strategic Insights

This study concludes that while both psychological and contextual factors significantly shape household waste sorting behavior, contextual influences play a more dominant and enduring role. Elements such as knowledge and skills, accessible facilities, and trust in transparent systems not only foster independent behavioral change but also reinforce internal drivers like confidence and perceived ease. The community of Khlong Lad Phachi demonstrates how robust contextual support systems can reinforce perceived behavioral control, which in turn strengthens attitude and intention—resulting in more consistent sorting behavior. These findings extend the Theory of Planned Behavior by emphasizing the structural enablers necessary to sustain psychological engagement and long-term behavior change. The practical implication is clear: campaigns alone are insufficient; sustained behavior change depends on embedded infrastructure, community participation, and a feedback loop of incentives and trust.

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4.2 Strategic Recommendations for Bangkok

Based on these findings, four key recommendations are proposed to support effective household waste sorting across Bangkok:

1. Enhance Knowledge and Skills Through Hands-On Education: Implement interactive workshops and coaching sessions that build practical sorting skills and deepen awareness of environmental and health impacts. This improves confidence, corrects sorting errors, and sustains motivation.

2. Co-create Accessible Facilities with Community Involvement: Collaborate with residents to design convenient, clearly labeled, and well-maintained waste management infrastructure. This participatory approach ensures that systems reflect local needs, cultivating shared ownership and long-term engagement.

3. Build Trust in Municipal Systems Through Transparency and Incentives: Establish public-facing reporting systems that showcase how sorted waste is processed. Ensure consistency in collection and support community waste exchange programs. These measures counter skepticism and build credibility.

4. Strengthen Policy with Proven Behavior-Change Models: Adopt international best practices, such as Taipei's "pay-as-you-throw" model, Venice's segmented pick-up schedule, Germany's deposit-return system, and Sweden's user education strategies. Tailor these to Bangkok's local context to align infrastructure with behavioral science.

Such integrated strategies—combining enforcement, incentives, scheduling, and education—can help Bangkok evolve toward a sustainable urban waste management model aligned with circular economy principles.

4.3 Study Limitations and Future Research Directions

While the study provides valuable insights, two limitations should be noted. First, reliance on self-reported behavior may introduce bias due to social desirability or memory lapses. Future research should incorporate diary studies or digital tracking to validate reported practices over time. Second, the scope was limited to a single community under the Community Organization Development Institute (CODI), which benefits from strong internal organization and resident participation. These structural supports may not exist in other settings, limiting the generalizability of results.

Future research should explore a broader range of communities across Bangkok with varying population densities, organizational structures, and demographic profiles. Comparative studies will help identify context-specific and scalable interventions. Expanding the evidence base will further clarify the conditions under which sustainable waste behaviors can be most effectively promoted, providing a roadmap for urban sustainability at scale.

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