Pro-Environmental Behavior among Urban Millennial Workers: a Focus Group Discussions

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Abstract

Waste management has been a critical issue in Indonesia, demanding urgent attention for sustainability and public health. The lack of public awareness underscored the need to understand pro-environmental behaviors, particularly waste sorting. Indonesia's urban millennial workforce was expected to drive change in raising environmental awareness. This study explored the waste sorting behavior of urban millennial workers, influenced by work and family environments. Using Focus Group Discussions (FGDs) with 18 participants (8 in Jakarta, 10 in Surabaya), data was analyzed using NVIVO 14. The qualitative approach was chosen for its ability to provide in-depth insights into participants' behaviors and perspectives. Findings revealed that inadequate facilities, lack of social support, and weak regulation enforcement hindered waste sorting, despite positive attitudes toward sustainability. The study suggested improving infrastructure, enforcing regulations, and enhancing socialization to promote sustainable waste sorting among urban millennial workers. The findings emphasized the need for policy development and corporate responsibility and recommended further research on the long-term effects of education, socialization, and regulation enforcement.

Keywords: Waste sorting; work life; family life; millennial workers; urban.

Introduction

Environmental issues such as climate change, pollution, biodiversity loss, and waste management present significant global challenges (Arora et al., 2018). By 2050, global waste production is projected to increase by 73%, reaching 3.88 billion tons (Goh et al., 2022). According to SIPSN (*Sistem Informasi Pengelolaan Sampah Nasional*) data, Indonesia is facing a critical waste management crisis, with landfills reaching full capacity and causing environmental and public health problems (Indraswari, 2023). In 2024, waste generation in Indonesia reached 21.4 million tons, with approximately 57.9% of the total waste managed, while 42.1% remains inadequately managed. Households contribute 54.3% of the total waste generation, with food scraps (39.16%) and plastic (19.49%) being the most common types of waste. These findings highlight ongoing efforts in waste management, but significant improvements are still required (KLHK, 2024).

The waste management problem in Indonesia is exacerbated by a high level of public indifference, reflecting a lack of awareness, effort, and participation, similar to the situation in many other developing countries (Azevedo et al., 2021; Rousta et al., 2020). According to Law No. 18 of 2008 on Waste Management, direct waste disposal to landfills should have been discontinued since 2013. The law mandates a comprehensive waste management approach, incorporating upstream strategies such as waste reduction, reuse, and recycling, alongside downstream measures like sorting, collection, processing, and final treatment (Pemerintah Indonesia, 2008). In 2017, the IPKLH (*Indeks Perilaku Ketidakpedulian Lingkungan Hidup*) reached 0.51, with waste management scoring the highest

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at 0.72, highlighting the significant level of indifference among the Indonesian population toward proper waste management (BPS, 2018).

Therefore, behavioral change is necessary, both within households and workplaces, towards pro-environmental behaviors that play a crucial role in preventing and reducing environmental damage caused by waste and pollutants (Kollmuss & Agyeman, 2002). Such behavior is also considered an effective approach in maintaining environmental sustainability (Stern, 2000; Tian & Liu, 2022). In the context of waste management, sorting behavior can be considered a part of pro-environmental behavior. Waste sorting refers to the efforts of individuals or communities to separate various types of waste according to their categories, such as organic, inorganic (paper, plastic, metal, glass), hazardous, and others. This behavior serves as a crucial initial step in the recycling process and plays an important role in effective waste management in urban areas (Goh et al., 2022; Xia et al., 2021).

Previous research emphasizes the importance of community engagement and tailored interventions in promoting waste sorting behavior for sustainable waste management. Goh et al. (2022) found that community engagement, particularly through social support and an understanding of local social norms, serves as a key motivator for individuals to participate in waste sorting. He et al. (2020) highlighted the need for behavioral changes and public participation to foster environmentally conscious communities and mitigate the impact of waste. Additionally, Minelgaitė & Liobikienė (2019) observed that waste sorting contributes to a circular economy and sustainable development, driving economic growth, green technology innovation, and the recycling industry. These studies underscore the importance of cultural, psychological, and infrastructural approaches in enhancing participation in sustainable waste management.

In Indonesia, the government promotes waste sorting through *Bank Sampah* and *Rumah Kompos* (Andina, 2019), in line with Government Regulations No. 81/2012 and No. 27/2020 (Pemerintah Indonesia, 2012, 2020). These initiatives encourage responsible waste management, including reducing, collecting, reusing, and recycling. *Bank Sampah* educates communities and allows citizens to exchange sorted waste for savings. However, challenges such as time constraints, lack of awareness, and limited storage space hinder effective waste sorting (Indrawati et al., 2019; Probowati & Priyambudi, 2022; Sasoko & Mahrudi, 2023).

Additionally, private sector and NGO recycling schemes also engage the community in waste management, collaborating with informal waste collectors and local authorities (Rousta et al., 2020). Successful waste sorting is indicated by high recycling rates, with countries like Germany, Finland, South Korea, and Japan leading in recycling rates, while Indonesia's rate remains low at just 8.1% (Moh & Abd Manaf, 2017). According to BPS (2021), only 9% of Indonesians actively sort waste, highlighting the need to explore factors influencing waste sorting behavior to increase awareness and participation.

One theory commonly used in pro-environmental behavior research, particularly waste sorting behavior, is the Theory of Planned Behavior (TPB) (Tian & Liu, 2022). TPB explains that attitudes, subjective norms, and perceived behavioral control influence an individual's intention to sort waste. As an extension of the Theory of Reasoned Action (TRA), TPB adds the perceived behavioral control variable. TPB assumes that individuals consider information rationally before taking action (Ajzen, 1991).

The Theory of Planned Behavior (TPB) has been effective in predicting pro-environmental behavior intentions (Octav-Ionut, 2015; Steg & Vlek, 2008) and offers advantages such as planned

behavior analysis, more accurate predictions in specific situations, and application in particular contexts (Ajzen, 1991; Amalia, 2019). However, research indicates the need for additional variables to strengthen the relationship between variables and intentions, enabling the extended TPB model to better explain waste sorting intentions. In this study, we integrate TPB with Expectancy Theory to understand how individual expectations influence their intentions. Expectancy Theory posits that individuals are more likely to engage in actions they expect will yield desired outcomes and avoid those anticipated to produce undesirable results. Expectations act as a mediating variable driving behavior intentions (Wang et al., 2021).

Various studies across management, economics, psychology, and sociology have analyzed factors influencing waste sorting behavior, showing a positive correlation between intention and behavior, though the relationship is not always consistent (Wang et al., 2021). A meta-analysis of 39 studies on household waste sorting in developing countries identified twelve key factors. The most significant include attitudes, moral norms, subjective norms, and perceived behavioral control, with public perception having the greatest influence on participation. Knowledge, physical conditions, and government incentives also affect participation, while sociodemographic factors have the weakest impact (Rousta et al., 2020).

This study focuses on Indonesian millennials (Generation Y), born between 1981 and 1996 (Dimock, 2019), who make up 25.87% of Indonesia's population (BPS, 2021a). Millennials display evolving characteristics as they age, from valuing group cooperation in youth to becoming resilient leaders in adulthood and contributing to society in later stages. Technological advancements greatly influence their interactions, values, and emotional management (W et al., 2020).

Research shows that the millennial generation, which currently dominates the workforce, possesses several advantages in shaping pro-environmental behavior, including waste management (Drozd & Trager, 2019). They tend to adapt their lifestyles in accordance with environmental sustainability, pay attention to collective interests, and have a higher awareness of the importance of environmental sustainability compared to previous generations. This generation has been connected to technology from a young age and uses social media to access information about eco-friendly behaviors. Additionally, they have significant opportunities to serve as role models and lead society, particularly Generation Z and Alpha, towards a sustainable future. Their involvement is crucial in efforts for waste management, especially in sorting and recycling (Drozd & Trager, 2019; Huang et al., 2022).

Research on waste sorting behavior among urban millennials workers remains scarce, despite evidence indicating their significant role in pro-environmental behaviors. While several studies have explored the factors influencing waste sorting behavior among youth, these are primarily limited to college students (Shen et al., 2019) and often lack a clearly defined age range (Ardhiyansyah et al., 2024; Huang et al., 2022).

In addition, Diniary et al. (2024) found that Indonesian millennials is more influenced by factors like anticipated guilt, sense of community, environmental knowledge, and religiosity than Generation Z. Their research, using the Theory of Interpersonal Behavior (TIB), focused on 3R (Reduce, Reuse, Recycle) behaviors among Muslim respondents from diverse backgrounds. Meanwhile, Ardi et al. (2024) demonstrated the influence of millennials' attitudes and social media use on food waste behavior, highlighting their importance in food waste reduction initiatives. This study, based on the Theory of Planned Behavior (TPB), focused on food waste reduction among Jakarta-based respondents.

Furthermore, research on the psychological and socio-cultural factors affecting waste sorting behavior among urban millennial workers in Indonesia remains particularly limited. This study addresses the gap in research by using an extended version of the Theory of Planned Behavior (TPB), incorporating Expectancy Theory to provide a more comprehensive understanding of the cognitive and motivational factors influencing waste sorting behavior. Moreover, the predominantly quantitative nature of existing research necessitates further exploration using qualitative approaches for a deeper understanding of this complex behavior.

This research addresses this gap by focusing on urban millennial workers in Jakarta and Surabaya. The urban focus is driven by growing concerns surrounding waste generation in rapidly expanding urban populations (Bappenas, 2023), making urban waste management a higher priority than rural waste management. Therefore, this study aims to: (1) understand waste sorting perceptions; (2) identify factors influencing waste sorting behavior; and (3) discuss strategies to enhance motivation and consistency in waste sorting practices among these urban millennial workers, both in the workplace and at home, in these two cities.

Method

Design
This study employed a qualitative approach conducted in two of Indonesia's largest cities, Jakarta and Surabaya, as representations of urban communities. Population census data shows that the working population in DKI Jakarta reaches 4,875,102 people, with millennials accounting for 26.66% or equivalent to 1,299,702 individuals (BPS, 2022a; DPPAPP, 2023). Meanwhile, the working population in Surabaya is 1.64 million people, with millennials making up 25.87% or equivalent to 424,268 individuals (BPS, 2022b; Waluyo, 2023). According to the Indonesian Youth Statistics Report, the percentage of youth in Indonesia who are married is 31.71%, including millennials (BPS, 2023).

The timing of this study is quite relevant to the topic being investigated, given the data from BPS (2021b) showing that only 8% of individuals in Jakarta and 7% in Surabaya actively sort waste. In Jakarta, 36% and in Surabaya, 32% of individuals sort waste inconsistently, while the majority, 56% in Jakarta and 61% in Surabaya, never sort waste. These figures indicate the urgent need to raise awareness and improve waste sorting practices in both cities, particularly among urban millennial workers. Given this situation, this study is significant in providing deeper insights into the factors influencing waste sorting behavior among this group, amidst efforts by the government and society to improve waste management, which has become an increasingly important issue.

Respondents
This study involved 18 participants who met the following criteria: millennials born between 1981 and 1996, working in Jakarta or Surabaya, married, and either environmentally conscious or practicing waste sorting. Eight participants were from Jakarta, and 10 participants were from Surabaya. They were employed in government sectors, companies, or as entrepreneurs. In terms of gender, there were 9 female and 9 male participants. The age distribution was as follows: 22.2% were between 28 and 32 years old, 38.9% were between 33 and 37 years old, and 38.9% were between 38 and 42 years old. All participants had formal education, with 33% having completed postgraduate studies, 50% holding undergraduate degrees, and 17% having diploma-level education (Table 1).

Data Collection
This study used Focus Group Discussion (FGD) as a qualitative data collection technique. FGD involves a guided discussion among a group of participants who are deliberately selected, aiming to explore their views, experiences, and understanding related to the research topic, which is waste sorting behavior. The FGD process includes preparation of meeting facilities, recruitment of participants, conducting the FGDs, as well as data analysis and reporting. The FGD method is used to gain in-depth insights that are often difficult to uncover through surveys or closed-ended questionnaires.

Two Focus Group Discussions (FGDs) were conducted on August 23, 2024, in Jakarta and September 5, 2024, in Surabaya. The FGD in Jakarta was held in a rented meeting room, while the FGD in Surabaya took place at the company where the participants worked. Each FGD lasted between 45 and 60 minutes. During the FGDs, participants were provided with refreshments to ensure their comfort, and small souvenirs were given as tokens of appreciation after the discussions.

The research team used a pre-prepared FGD guide for data collection. Before the FGD began, participants were informed about the research topic by the researchers. Participants were also ensured that they had filled out personal data forms and provided informed consent. To assure confidentiality, the identities of all participants were kept anonymous. Participation in the FGDs was entirely voluntary, and participants had the right to withdraw from the discussion at any time without explanation. All FGDs were documented using written notes, audio recordings, and video, with participants' consent. After the FGDs were completed, the collected data were analyzed to identify patterns, themes, and perspectives that emerged during the discussions.

FGD Questions
The Focus Group Discussion (FGD) in this study was guided by a structured discussion protocol developed based on the extended Theory of Planned Behavior (TPB) (Ajzen, 1991; Wang et al., 2021). This protocol included open-ended and follow-up questions designed to explore participants' perceptions, psychological factors influencing behavior, as well as strategies for motivation and consistency related to waste sorting. The discussion guide was adapted from the study by Wang et al. (2021), ensuring alignment with the research objectives. Additionally, the questions and discussion flow were developed following qualitative research best practices as outlined by Krueger & Casey (2014) to ensure a comprehensive exploration of the topic. Some of the questions posed during the FGD addressed both family and work environments, including:
1. Do you sort waste?
2. How do you carry out the waste sorting process?
3. Why do you sort waste?
4. Who influences you in your waste sorting efforts?
5. What role does your family play in waste sorting?
6. What role does your organization or company play in waste sorting?
7. What challenges do you encounter when sorting waste?
8. How can you effectively overcome waste sorting challenges?
9. How do local facilities support or hinder waste sorting?
10. How knowledgeable and skilled are you in waste sorting?
11. How do you obtain information on how to sort waste correctly?
12. What do you hope to achieve with your waste sorting abilities?

Data Analysis

The Focus Group Discussions (FGDs) were conducted in Indonesian. After data collection, we transcribed the discussions and re-read the transcripts to familiarize ourselves with the content. The transcripts were then analyzed line by line and coded using the extended Theory of Planned Behavior (TPB) framework, which posits that attitude, subjective norms, and perceived behavioral control shape individuals' intentions to sort waste. This theory assumes that people act rationally by considering information and the implications of their actions, while expectations of outcomes further influence their intentions (Ajzen, 1991; Kiatkawsin & Han, 2017; Wang et al., 2021). Following the coding process, the data was analyzed to develop themes and interpret them comprehensively (Sahoo et al., 2022). NVIVO 14 was employed for data analysis due to its ability to manage FGD results effectively, perform quick and accurate coding, support in-depth thematic analysis, and present findings in an engaging and informative manner (Allsop et al., 2022).

Result

The demographic data of the study participants (Table 1) revealed an equal distribution of males and females, with each gender comprising 50% of the sample. In terms of age, participants were divided into three groups: 22.2% were aged 28-32 years, while 38.9% fell into the 33-37 years category, and another 38.9% were aged 38-42 years. Regarding occupation, the majority of participants were private employees (55.6%), followed by civil servants (33.3%), and entrepreneurs (11.1%). Most participants were based in Surabaya (55.5%), while the remaining 44.4% worked in Jakarta. In terms of education level, 50% of participants held a bachelor's degree (S1), 33% had a master's degree (S2), and 17% held a diploma.

After conducting the analysis in NVIVO14, several themes emerged. These include Waste Sorting Practices, Reasons for Sorting Waste, Influential Parties in Waste Sorting, Challenges and Solutions in Waste Sorting, and Expectations of Waste Sorting Abilities. These themes provide a comprehensive understanding of the factors influencing waste sorting behavior, the motivations behind it, the roles of various stakeholders, the barriers encountered, and the strategies to address them.

Table 1

Demographic Data (N=18)

Demographic	Category	Frequency	Percentage (%)
Gender	Male	9	50%
	Female	9	50%
Age	28-32 years	4	22,2%
	33-37 years	7	38,9%
	38-42 years	7	38,9%
Occupation	Civil Servant	6	33,3%
	Private Employee	10	55,6%
	Entrepreneur	2	11,1%
Work Location	Jakarta	8	44,4%
	Surabaya	10	55,5%

Demographic	Category	Frequency	Percentage (%)
	Diploma	3	17%
Level of Education	Bachelor's Degree (S1)	9	50%
	Master's Degree (S2)	6	33%

Waste Sorting Practices

In general, participants from both cities demonstrated awareness and an understanding of the importance of waste sorting, although its implementation varied. In the household setting, some participants had begun to sort waste in a simple way, mainly separating kitchen waste (organic) from non-kitchen waste (non-organic). However, there were also those who mentioned that at home, all types of waste were still mixed together without further sorting.

> *"At home, at least in my case, we separate kitchen waste from non-kitchen waste, classifying it as organic or non-organic." (INT-5, Female, Jakarta)*
> *"We already sort the waste at home, separating wet waste from dry waste like bottles and paper." (INT-4, Female, Surabaya)*
> *"At home, all the waste is mixed together." (INT-1, Male, Surabaya)*

Meanwhile, in the workplace setting, some participants admitted that they have not implemented waste sorting at the office. Only a few individuals sort waste on their own initiative. For the majority, waste sorting at work tends to be more limited, where participants only separate bottle waste without further sorting for other types of waste. Additionally, some respondents acknowledged that they have not practiced waste sorting at all, either at home or at work.

> *"Overall, we haven't started sorting waste at the office yet." (INT-4, Female, Jakarta)*
> *"While not yet a widespread practice, I have personally begun sorting waste at the office." (INT-7, Female, Jakarta)*
> *"At the office, we separate only bottles." (INT-1, Male, Surabaya)*
> *"I haven't sorted anything yet." (INT-3, Male, Jakarta)*

Seasons for Sorting Waste

From the FGD results, several factors emerged influencing why participants either sort or do not sort waste at home and in the office. The primary concern was waste mixing, as many participants felt that their efforts would ultimately be in vain if the waste were later combined. This issue arose from inadequate facilities and waste management systems, including poorly designed waste bin locations and the complexity associated with diverse waste types. Furthermore, social support played a significant role, with participants feeling more motivated to sort waste when encouraged by family members or colleagues.

> *"It all gets mixed together because even when the garbage collectors pick it up, they just throw everything into the same truck." (INT-1, Male, Surabaya)*
> *"For now, I am trying to make the effort on my own. But there is no support from the neighborhood, or even the garbage collectors. I want to try sorting the waste, but it's just not possible without any support." (INT-5, Female, Jakarta)*

Habits significantly form how individuals perceive waste separation. Participants' knowledge, understanding, and prior education also influence their decisions to sort waste properly. Other

important considerations include educational initiatives, socialization efforts, and the existence of regulations. Financial incentives further encourage individuals to engage in waste sorting. Moreover, majority opinions and community norms are often factored into decision-making. Helping scavengers and experiences of living abroad also contribute to shaping waste-sorting behavior. However, some participants expressed reluctance, hoping that others would take on the responsibility of sorting waste instead.

> *"While we need proper facilities, the office currently only provides for bottle sorting, as they can be sold and recycled." (INT-1, Male, Surabaya)*
> *"For me, it is because my neighbor is a scavenger. So, I intentionally separate plastic waste and bottles. I put the sorted plastic waste aside for him, so he does not have to rummage through my trash." (INT-7, Female, Jakarta)*

Influential Parties in Waste Sorting
The results of the FGD indicate that people around the participants play a role in influencing their decision to sort waste at home. Support from family members, such as parents, siblings, spouses, and children, encourages participants and reinforces the habit of waste sorting. The philosophy of the parents in choosing a house design that naturally separates the kitchen area and dry waste also aids the sorting process. The mother's habit of managing waste also shapes this behavior. In addition, one participant became interested in waste management, including biopores, composting, and sorting, after learning from their child at a nature school.

On the other hand, the lack of support or disapproval from a partner or in-laws becomes a barrier to the implementation of sorting. Additionally, the surrounding environment has a significant influence. Support from neighbors or friends who actively sort waste can act as a source of motivation. However, the lack of socialization from the local community (RT/RW) often poses a challenge.

> *"I learned from my child, who attends an environmental school, about sorting and managing waste." (INT-8, Female, Jakarta)*
> *"I tried it, but my husband scolded me when I got home. He said, 'You're just making things difficult. The garbage collectors combine everything anyway." (INT-5, Female, Jakarta)*
> *"Support is really important, especially for those who live at home. In my case, the lack of it— from my mother-in-law—makes me feel lazy." (INT-6, Male, Jakarta)*

In the office environment, supervisors play an important role in encouraging waste sorting. However, based on the FGD results, the role of the organization/company in supporting waste sorting is still limited. One of the main obstacles is inadequate facilities, such as having only one trash bin for all types of waste in each room. Although some areas already sort waste, many employees are confused about how to sort according to the 3R principles (reduce, reuse, recycle). The lack of understanding about how to separate types of waste like plastic, paper, or glass leads them to mix all types of waste into one bin. Additionally, some employees' non-compliance with cleanliness, such as discarding cigarette butts carelessly, also poses a challenge. Finally, the office management's lack of focus on prioritizing waste sorting further worsens the situation.

Challenges and Solutions in Waste Sorting
The challenges in waste sorting faced by the participants can be categorized into several main areas. One of the primary challenges is the inadequate facilities and poorly designed waste bin locations, which were frequently highlighted by the participants. For instance, uncovered waste bins often attract animals and unwanted scavengers, disrupting the sorting process. This makes it

difficult for them to carry out effective waste sorting. Additionally, the ineffectiveness of the waste management system, where waste is often mixed again, shows that despite sorting efforts, waste is not being properly managed.

Inconsistency in waste sorting is also a common challenge, caused by busyness, forgetfulness, differences in values, as well as limited energy and time. Low awareness of the issue, combined with the character and mindset of Indonesian society, which tends to prioritize practicality and instant solutions, also hinders the waste sorting process. Meanwhile, a lack of understanding about waste types and inadequate sorting guidelines also poses obstacles. Participants also feel the lack of information, education, and socialization regarding waste sorting, which is seen as necessary to strengthen the habit of sorting. In relation to this, weak supportive rules and policies, along with insufficient supervision and enforcement of regulations, are frequently cited as barriers.

> *"Because there are not any strict rules. I mean, there might be some rules, but they are probably not strictly enforced. There are no fines or anything." (INT-4, Female, Jakarta)*
> *"I think there should be rules, especially in our neighborhoods, but there is a lack of enforcement and awareness campaigns regarding waste sorting. In my area, it is more of a periodic task without any strict regulations to encourage residents to participate." (INT-8, Male, Surabaya)*

Other challenges include a lack of trust in the waste management system, which makes it difficult for participants to feel confident that the waste they sort will be properly managed. Some more specific challenges, such as the absence of social sanctions and lack of social support, also worsen the waste sorting process.

> *"There used to be a movement where skincare products were returned to the store. I used to collect and clean them, but I later found out they ended up in the mall's trash with everything else. I felt disappointed and lost trust in the system, thinking, 'Why bother cleaning them if they're just going to end up in the trash anyway?'" (INT-5, Female, Surabaya)*

The solutions proposed by participants for waste sorting can be grouped into several categories. The most frequently suggested solution is the implementation of stricter regulations and enforcement related to waste sorting. This includes a firm system of rewards and punishments, which is considered essential to encourage, or even compelling compliance.

> *"If there is enforcement, we can definitely do it. Awareness is more personal, but rules that enforce compliance make everyone follow, whether they like it or not. It is different from relying on awareness, which often leads to laziness. But with clear rules, like having to dispose of bottles in a designated spot with consequences, it becomes more effective." (INT-7, Female, Jakarta)*

Additionally, participants emphasized the importance of more effective information dissemination, education, and socialization regarding the value of waste, types of waste, and proper sorting methods, as well as visual experiences that can enhance public awareness and understanding. Utilizing social media for spreading this information was also recommended. Educating children about waste sorting from an early age is recognized as a crucial step in establishing good habits early on. Community-level programs, such as *Bank Sampah* at the neighborhood (RT/RW) level, are seen as solutions that can boost community participation.

Other suggested solutions include improving and innovating waste sorting facilities, such as providing adequate trash bins. Participants also recommended enhancing waste management systems, adopting best practices from other countries, starting waste sorting from the smallest

areas (like workspaces), and partnering with informal workers like waste pickers to support the success of sorting programs. Furthermore, increasing transparency and public trust in existing waste management systems are necessary. Lastly, some participants proposed financial incentives to encourage waste sorting habits. These efforts are believed not only to help reduce the amount of waste ending up in landfills but also to add value for institutions, companies, and communities committed to more effective waste management.

Expectations of Waste Sorting Abilities
Participants described their knowledge and skills in waste sorting as basic. While they can separate items like bottles and paper, they often fail to practice sorting consistently. They believe that infrequent practice keeps their knowledge and skills at a basic level, highlighting the importance of consistency in building habits. Other FGD participants rated their knowledge of waste sorting at an average of 8, while their practical ability was rated only at 5. They acknowledged a gap between their knowledge and actions, such as teaching their children about waste sorting but not fully implementing it themselves.

> *"Let us assume there are three categories: basic, intermediate, and advanced. Well, I consider myself to be at the basic level, even though I have knowledge about waste sorting. I have known about it for a while, but since I rarely practice it, I always end up falling back to the basics."*
> (INT-4, Female, Jakarta)
> *"Knowledge is 8, but the ability is 5. We can tell the kids, 'This is how it (waste sorting) should be,' but we have not practiced it ourselves. So, the ability is 5 because of the lack of action."*
> (INT-6, Female, Surabaya)

Participants receive information about waste sorting from several main sources. Social media is the most commonly used source due to its easy accessibility. Additionally, some participants gain knowledge about waste sorting from their daily work related to the environment. PKK (Family Welfare Empowerment or *Pembinaan Kesejahteraan Keluarga*) activities also serve as an educational platform, especially for housewives, through regular meetings that provide guidance on waste management in their communities.

The types of waste are most frequently mentioned by participants in waste sorting span various categories. Organic or wet waste, particularly from kitchens, is the most commonly referenced. Additionally, plastic waste is the most highlighted category, reflecting its prevalence in daily life. Bottles, both plastic and glass, are also frequently mentioned. Other types of waste include used cooking oil, cartridges, diapers, paper waste, and cigarette waste, though with lower frequency.

Some participants have not yet expressed a desire to be role models or examples in waste sorting. Although there are colleagues at the office who serve as role models, no one has shown an intention to follow their example. One participant is trying to make the best effort in waste sorting but feels the need for support from government facilities and the surrounding environment to ensure their efforts are not in vain. Another participant is currently serving as a role model for children by demonstrating proper waste disposal first, as many people still fail to dispose of waste properly. Waste sorting follows this behavior.

> *"However, we have not put these (waste sorting) practices into action yet. While we have shared the information, no one has truly become a 'student' by following in Ms. X's footsteps."*
> (INT-2, Male, Jakarta)
> *"Many people still litter, so I set an example for children by properly disposing of trash is an important first step. Once this habit is established, the next goal is to teach them about waste*

sorting and its potential value, such as turning waste into money." (INT-1, Male, Surabaya)

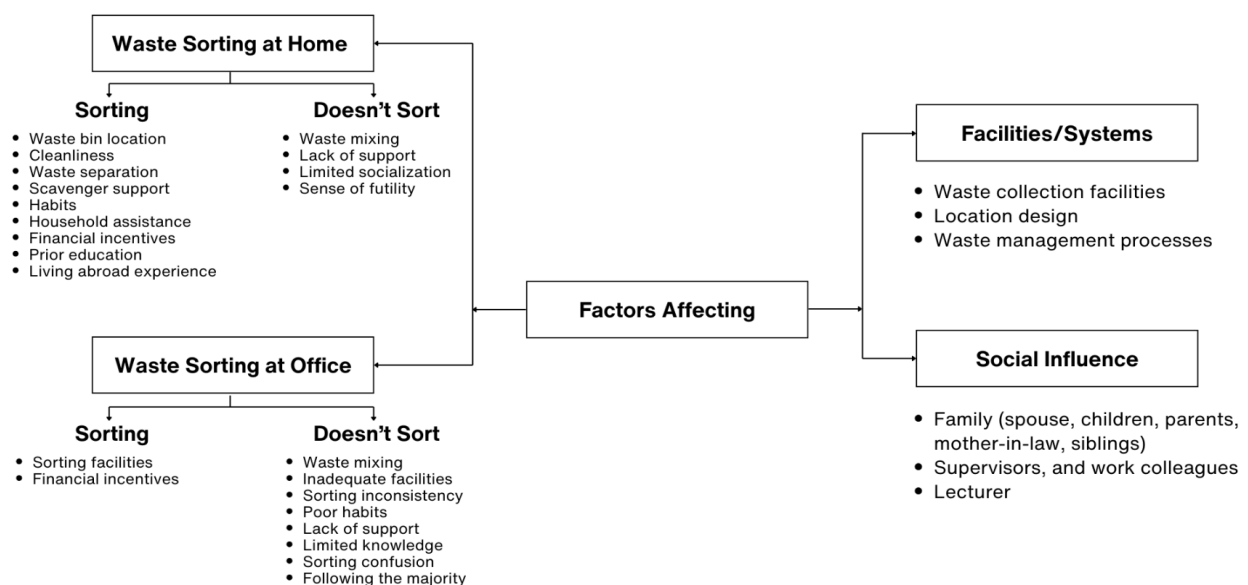Table 2 and Figure 1 below summarize the results of the FGD.

Table 2
Focus Group Discussion results

Category	Subcategory	Details
Home	Factors affecting	- Facilities/Systems: Waste collection facilities, location design, waste management processes, waste pickers - Family: Spouse, children, parents, mother-in-law, siblings (brothers/sisters)
	Waste sorting practices	- Sorting waste: Waste bin location design, cleanliness and ease of disposal, preventing waste mixing, helping scavengers, habits, household assistant support, financial benefits or incentives, previous education, experience living abroad - Not sorting waste: waste eventually being mixed again, lack of social support, limited RT/RW socialization, sense of futility
Work	Factors affecting	- Facilities/Systems: Waste collection facilities, location design at work, waste management process, cleaning staff - Support from supervisors and work colleagues
	Waste sorting practices	- Sorting waste: Availability of sorting facilities, financial benefits - Not sorting waste: Waste eventually being mixed again, inadequate facilities, inconsistency in the types of waste sorted and their locations, inappropriate habits, lack of social support and building manager, insufficient knowledge of the sorting process, confusion in sorting, following the majority (feeling like a minority)
Types of waste	Organic waste	Used cooking oil, food waste
	Non-organic waste	Plastic, bottles, cans, cardboard, cartridges, diapers, cigarette
Awareness of waste sorting		Office regulation, information from social media, daily tasks, previous education, experience with landfills (TPA), neighbourhood environmental programs (RT/RW), children's school lessons
Encouraging actions to motivate waste sorting behavior		- Provide direct examples - Encourage waste sorting - Teach and provide simple instructions - Distribute material through social media
Challenges		- Ineffective waste management system - Inadequate infrastructure or facilities - Waste bin location design - Animal disturbances - Sorting inconsistencies (busy schedules, forgetfulness, value differences, laziness) - Low environmental awareness - Character and mindset of Indonesians - Insufficient understanding, education, and socialization - No social sanctions

Category	Subcategory	Details
		- Unsupportive policies and regulations - Lack of supervision and law enforcement - Lack of trust in the waste management system
Solutions		- Raising awareness and encouragement to sort waste - Habit formation - Early environmental education - Information, education, and socialization (variety of waste types and sorting instructions, use of personal containers) - Recycling knowledge (end product) and waste value - Neighbourhood programs (*Bank Sampah, Rumah Kompos*) - Utilization of social media - Direct visual experience - Facility innovation and improvement - Waste sorting from the smallest areas - Effective waste management implementation - Partnership with informal workers - Modelling waste management from abroad - Financial benefits or incentives - Entrepreneurial mission value - Building trust in waste management - Waste management transparency - Law enforcement
Expectations of Waste Sorting Abilities		- Basic knowledge and inconsistent practice - Gap between knowledge and practical ability - Teach children but lack full implementation - Lack of interest in being role models - Efforts hindered by insufficient facilities and social support

Note: RT/RW (*Rukun Tetangga / Rukun Warga*) : Neighborhood associations

Figure 1. Focus Group Discussion results

The demographic data suggests potential differences in waste sorting behavior among participants, which may be influenced by factors such as education level, occupation, and work location. These variations will be explored further in the discussion chapter to understand how demographic characteristics shape waste sorting practices.

Discussion

The study highlighted the perceptions of urban millennial workers regarding waste sorting in both cities. Participants demonstrated a basic understanding of waste sorting, although actual practice varied depending on their environments. At home, some participants sorted waste between organic and non-organic types, but inconsistencies were noted, particularly at work. The findings indicate that although awareness exists, there are barriers such as insufficient facilities, poor waste management systems, and lack of social support that hinder consistent behavior. These barriers reflect those identified in previous studies, such as those by Rousta et al. (2020), who found that waste management facilities and societal norms play a critical role in shaping sorting behavior.

Furthermore, the factors influencing waste sorting are examined, highlighting that convenience, social norms, and environmental education play a crucial role in improving sorting behavior. The role of family and work support systems, as mentioned by participants, aligns with the findings of Sahoo et al. (2022), who highlighted the importance of social support in encouraging pro-environmental behaviors. Additionally, government regulations and educational initiatives can provide the necessary push for millennials to actively engage in waste sorting (Ardhiyansyah et al., 2024; Wang & Mangmeechai, 2021).

Participants' attitudes toward waste sorting were generally positive, influenced by their understanding of the importance of waste management for environmental sustainability (Goh et al., 2022; Xia et al., 2021). However, attitudes were not always translated into consistent behavior, as participants mentioned the challenges of inadequate facilities and conflicting social norms. These findings align with the extended Theory of Planned Behaviour (TPB) (Ajzen, 1991), where subjective norms such as societal expectations play a significant role in shaping intentions to engage in waste sorting. In this study, significant others, particularly the younger generation (children), often acted as change agents, encouraging waste sorting, whereas older generations (e.g., parents, in-laws) were seen as dominant figures who, in some cases, hindered the adoption of pro-environmental behaviors. This reflects the dual influence of social norms, where support from younger individuals facilitates behavior change, while disapproval or lack of engagement from older generations poses barriers.

Perceived Behavioral Control (PBC) refers to the perception of how easy or difficult it is for individuals to perform a behavior, in this case, waste sorting. Participants identified several barriers to waste sorting that directly impacted their perceived control over the process. These factors suggest that PBC among participants was significantly hindered by both environmental constraints (e.g., inadequate infrastructure) and social barriers (e.g., lack of support and weak enforcement). Meanwhile, expectations played a critical role in shaping participants' intentions to sort waste. The participants often considered the expected outcomes of their actions, such as environmental benefits or financial incentives, which aligned with the concept of Expectancy Theory (Wang et al., 2021). When participants anticipated positive results, they were more likely to engage in consistent waste sorting behavior. This expectation reinforces their intention to sort waste. However, some participants expressed frustration when their efforts seemed futile due to the lack of waste management system and social support, which diminished their motivation to continue sorting waste.

This study also reveals that factors such as age, location, and education influence waste sorting behavior among urban millennial workers in Indonesia. The findings indicate that millennials, aged between 27 and 42 years, have varying degrees of awareness and practice when it comes to waste sorting. While younger millennials may exhibit more innovative approaches, such as utilizing social media to share eco-friendly practices, older millennials tend to display more practical knowledge but may be hindered by inconsistent sorting habits. These differences reflect the evolving values and priorities within this age group, which are shaped by experiences in both youth and adulthood (W et al., 2020).

The location of residence, particularly in urban settings like Jakarta and Surabaya, influences waste sorting behaviors. Participants from Jakarta reported higher challenges due to overcrowding and less effective waste management systems compared to Surabaya, where community-based programs like *Bank Sampah* are more established. This aligns with prior research highlighting the increased complexity of waste management in densely populated urban areas (Lou et al., 2020).

Disparities in waste sorting practices between these two cities underscore the profound impact of local waste management infrastructure and community support systems on individual behaviors. However, it is important to acknowledge the influence of Indonesia's collectivist culture, where individuals often conform to group norms for a sense of belonging. Programs like *Bank Sampah* can effectively capitalize on this cultural aspect by fostering habitual waste sorting practices through repeated community engagement. Furthermore, the implementation of incentive-based systems, such as the deposit-refund system used in Germany for beverage containers, can significantly encourage waste sorting behavior. These systems provide tangible rewards for responsible waste disposal, further motivating individuals to participate (Marbun et al., 2024).

Educational background emerged as another key factor in shaping waste sorting behavior. Participants with higher education levels, such as those with postgraduate degrees, demonstrated a greater understanding of waste sorting principles, aligning with the findings of (Rousta et al., 2020), who noted that education plays a critical role in fostering environmental awareness. However, despite this knowledge, the inconsistency in waste sorting practice across various demographics suggests that education alone is insufficient without adequate support from policies, facilities, and social norms.

Strategies for increasing the motivation of millennial workers were also examined in this research. Families can foster pro-environmental behaviors by integrating waste sorting habits into daily routines and encouraging children to participate from a young age. Family support has been shown to enhance motivation for waste sorting, especially when multiple members are involved in the process, particularly when supported by the head of the household or a more dominant figure in the family. Companies can also play a pivotal role by implementing clear waste sorting policies, providing proper facilities, and organizing educational programs to raise awareness about waste management. For instance, placing designated bins for various waste types in appropriate locations, including in individual workspaces, and offering financial incentives to employees who consistently sort waste can encourage them to adopt these behaviors.

Moreover, strategies such as stricter regulations and law enforcement, improved facilities, and enhanced socialization programs can be implemented. These suggestions align with previous research, which advocates educational programs and financial incentives to reinforce consistent waste sorting practices (He et al., 2020; Jafarzadeh et al., 2023). Additionally, social media has

emerged as an effective tool for promoting waste sorting and educating younger generations about environmental issues. The potential for social media to engage a wider audience, particularly millennials, in sustainable practices cannot be overlooked, as it provides an accessible platform for spreading awareness.

Building these strategies, both governmental and private sector interventions are essential. For example, municipal regulations could impose penalties for non-compliance while rewarding households and businesses that adhere to waste sorting guidelines. Furthermore, the integration of waste sorting into organizational policies, supported by management, could create a neighborhood and workplace culture that prioritizes environmental responsibility. Implementing these strategies could bridge the current gap in waste sorting participation, especially as the population continues to grow, leading to more waste generation in urban areas.

Additionally, at the community level, local government programs such as RT/RW (neighborhood associations) initiatives could further strengthen waste sorting efforts. These programs can promote local engagement by organizing awareness campaigns, providing sorting bins, and establishing recycling points within the neighborhood (*Bank Sampah*). Encouraging collective action at the neighborhood level can create a more sustainable culture of waste management. Another crucial element is rebuilding public trust in the waste management system. Mistrust, often due to past inefficiencies or lack of transparency, needs to be addressed by improving waste management infrastructure, ensuring that waste is properly processed, and involving the community in monitoring and improving the system. Transparent reporting, accountability, and visible outcomes from waste sorting efforts can help restore faith in the system.

Conclusion

This study has identified several key challenges related to waste sorting behavior among urban millennial workers in Indonesia, including inadequate facilities, poor waste management systems, lack of social support, and insufficient enforcement of regulations. Despite these barriers, the millennial generation presents significant potential to drive pro-environmental behavior change, particularly in waste management. Their high level of technological engagement, adaptability, and increasing environmental awareness position them as key agents of change, capable of influencing both work and family environments toward more sustainable practices.

Based on the findings, several practical recommendations can be made for government, companies, and society. For the government, it is essential to strengthen waste sorting regulations and enforcement mechanisms, ensuring that penalties for non-compliance are in place while also offering incentives for consistent sorting practices. Additionally, improving waste management infrastructure and transparency is necessary to rebuild public trust. Companies can contribute by implementing clear waste sorting policies, providing adequate sorting facilities, and organizing educational and socialization programs for employees. Community-based programs, such as *Bank Sampah*, led by RT/RW (neighborhood associations), can be expanded to foster collective action and provide localized solutions for waste sorting. Lastly, society should continue to embrace the use of social media and educational platforms to raise awareness and promote sustainable practices among younger generations.

While this study provides valuable insights into waste sorting behavior among urban millennials, it has limitations. The research focused only on two cities in Indonesia, which may not fully capture the diversity of urban waste sorting behaviors across the country. Future research could explore a larger, more diverse sample, incorporating both urban and rural communities to gain a broader

understanding of waste sorting behaviors. Additionally, future studies could examine the long-term impact of educational programs, social media campaigns, and stricter regulations on waste sorting consistency. Further research could also explore how other psychological and socio-cultural factors, beyond those identified in this study, influence waste sorting behavior.

Ethical Clearance
The Institutional Ethical Committee of the University of Surabaya approved the ethical clearance for this study, as stated in certificate No. 427/KE/IX/2024. All participants in this study provided informed consent.

Conflict of Interest
The researchers declare that this paper has no conflicts of interest.

Author Contribution
All authors have contributed equally to the study's conceptualization, interpreting data, reviewing, and editing the manuscript.

Data Availability
Data can be provided upon request to the author.

Declarations Ethical Statement
The study followed the guidelines of the Declaration of Helsinki.

Informed Consent Statement
Informed consent was obtained from all persons involved in the study.

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