LOCATION MATTERS: HOW RECYCLING SITE FEATURES INFLUENCE GENERATION X'S RECYCLING PRACTICES

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Abstract

According to generational theory, Generation X is characterized by pragmatism and flexibility. Members of this cohort are individuals who have experienced a socio-economic transition, marked by major social changes that have developed their critical thinking and personal autonomy. Unlike Generation Y and Generation Z, Generation X consumers show a much lower interest in adopting sustainable principles, with their concern for the environment being mostly declarative.

Based on these aspects, the article aims to outline a profile of Generation X, placing greater emphasis on their sustainable behavior and on the importance of the locations where the recycling process takes place.

Keywords: *Generation X, recycling site accessibility, recycling behaviour, sustainability*

Clasificare JEL: *Q01, Q56, M31*

1. Introduction and context of the study

Recycling remains a cornerstone of sustainable waste management, yet participation rates often hinge on the convenience and accessibility of recycling facilities. Recent studies emphasize that physical factors, such as proximity, ease of access, and site design, significantly influence recycling behavior, sometimes more than environmental attitudes themselves [26] [19].

For Generation X, a cohort characterized by pragmatism and time-consciousness, these situational factors may play a decisive role in shaping recycling practices. Evidence suggests that spatial positioning of bins and user-friendly infrastructure can increase recycling compliance by reducing perceived effort [4]. Moreover, convenience-related features, including clear signage and adequate facilities, have been shown to directly impact behavioral outcomes, particularly when combined with normative and gain-oriented motivations [27].

Although meta-analyses substantiate the simultaneous influence of individual and contextual determinants on recycling, an integrated focus on location and site features specific to Generation X remains underexplored. Extant research typically contrasts cohorts (Gen Z, Millennials, Gen X) at the level of attitudes and intentions, but rarely tests the effect of spatial proximity on correct

recycling within everyday environments frequented by Gen X, such as offices, community centers, and commuting corridors.

This study addresses that gap by examining how attributes of recycling sites predict recycling behaviors among Generation X, yielding design and accessibility-oriented implications for policymakers and urban planners seeking to enhance participation. The article's contribution lies in an integrated, Gen X-specific approach that tests how immediate access and the co-location of refuse and recycling receptacles (trash and recycling) interact with consumer characteristics to transform intentions into correct sorting.

Based on these elements, the research questions encompass two dimensions: the extent to which relative proximity and the co-location of recycling facilities influence recycling frequency and sorting accuracy among Generation X consumers, and the extent to which the visibility of recycling facilities shapes Gen X's recycling intentions.

2. Theoretical Framework

Scholarship on recycling behavior has expanded steadily, integrating psychological accounts with contextual determinants. Empirical evidence indicates that individual-level variables, such as attitudes, pro-environmental identity, and perceived behavioral control, alongside contextual factors, such as accessibility and infrastructure, are robustly associated with actual recycling practices. Converging findings support the view that effective interventions must combine informational components with targeted modifications to the physical environment [12].

Concurrently, emerging work foregrounds contamination within recycling streams, underscoring that increasing collection volumes alone is insufficient when point-of-collection signage fails to curb sorting errors. Under these conditions, proscriptive messaging („do not recycle these items") appears to reduce contamination more effectively than prescriptive lists („recycle these items"), consistent with evidence that individuals respond more readily to negation-based cues than to authority-driven exhortations [6].

At the policy and systems level, European trends in recent years show stagnating or declining recycling rates, notwithstanding a legislative architecture containing over thirty binding targets. This pattern points to the need for more ambitious policy instruments paired with localized behavioral interventions. In the United States, national strategies prioritize contamination reduction, measurement standardization, and infrastructure enhancement, reflecting a broad consensus that operational and informational barriers must be addressed in tandem [10] [11].

Interdisciplinary reviews published in 2024-2025 document the ascendance of green nudges, including default settings, salient social norms, and feedback loops, as mechanisms for translating pro-environmental intentions into observable behavior; simultaneously, they underscore the need for longitudinal designs and cross-cultural analyses to establish generalizability [2].

At the micro level, physical proximity and effort costs exert direct effects on recycling decisions. Controlled experiments report marked increases in the utilization of recycling receptacles when the trash bin is distanced or removed, and when instructions are procedural and specify cleanliness thresholds for materials [29].

Taken together, the literature converges on a shared premise: coupling site design with calibrated behavioral messaging and coherent policy frameworks is pivotal for converting pro-environmental intentions into sustained and correct recycling behavior [12] [6].

2.1. Influence of Location and Site Features on Recycling

Site-level attributes, including proximity, salience/visibility, co-location of refuse and recycling receptacles, point-of-disposal signage, and visual design, exert direct, measurable impacts on recycling choice [18] [22]. Experimental evidence indicates that increasing the distance to the trash receptacle can triple utilization of the recycling bin, while procedural cleanliness guidance reduces stream contamination. Normative dynamics further condition participation: local social

proximity (household peers, neighbors, neighborhood) strengthens the effects of descriptive and injunctive norms on intentions and self-reported recycling, implying that high-visibility community sites can catalyze normative compliance [25] [29].

In the realm of design and nudging, recent work shows that visual identity cues (color palettes, contrast) and calibrated messaging can enhance collection rates and sorting accuracy. However, overly prescriptive or normative frames risk backfire effects, including reduced participation or over-recycling [17]. Integrative reviews and meta-analyses conclude that physical environment modification remains underleveraged in policy, yet delivers robust effects when coupled with feedback mechanisms and social norm interventions [12] [20] [6].

Container design influences both visual attractiveness and operational ease. Research indicates that contrasting colors, standardized visual codes, and ergonomic openings reduce sorting errors and increase usage speed. Additionally, procedural instructions (e.g., how clean materials must be) are more effective than general messages (e.g., why recycle), as they reduce ambiguity and increase Perceived Behavioral Control [1] [33]. Empirical work indicates that point-of-decision placement, situating receptacles precisely where disposal choices occur (e.g., inside classrooms rather than adjacent corridors), consistently outperforms aesthetic changes or simple bin proliferation, foregrounding the importance of immediate access. In high-density urban contexts, public-commitment strategies coupled with neighborhood-level design coherence reduce illegal dumping and sustain effects over multiple months [24] [23] [30].

Generational patterns suggest that Generation Z exhibits the most predictable uptake of sustainable practices and preferentially supports firms aligned with such initiatives [3]. In Romania, engagement became particularly visible after 2023, following the launch of the national packaging recycling program RetuRo, which functions as a naturalistic impetus for sustained participation among younger cohorts.

Demographically, participation appears pronounced among youth and families with children, who leverage recycling as an educational opportunity and a step toward ecological responsibility, and among Generation X, whose community involvement often includes container reuse [14].

Design implications follow directly: for Generation X, easily accessible sites embedded along everyday travel routes, co-located with refuse receptacles, and augmented by concise proscriptive signage plus clear procedural guidance, are likely to maximize correct sorting while minimizing cognitive load at the decision point [29] [6].

2.2. Generation X and Environmental Practices

Generation X, defined here as individuals born 1960-1980 [8] [9], exhibits a nuanced ecological-behavioral profile relative to Millennials and Gen Z. Comparative evidence typically reveals modest or mixed cohort differences in environmental knowledge and concern; nevertheless, Gen X reports more frequent peer-to-peer discussions of global warming, even where aggregate levels of concern and knowledge approximate those of Gen Z.

Intervention research indicates that future-oriented altruism, priming care for „others in the future", can elevate recycling intentions and policy support, suggesting an intergenerational lever applicable to Gen X [15] [21]. Generational patterns, however, are domain and sampling-contingent: population-level analyses detect significant differences across behavior categories (e.g., climate-policy support versus household recycling), yet sample composition may constrain generalizability to Gen X.

In adjacent areas of sustainable consumption, multinational surveys consistently find higher willingness to pay among younger cohorts, while practical engagement and brand loyalty to responsible firms remain robust among older cohorts—implications that call for differentiated communication strategies [7] [31] [32].

For Gen X, convenience, clarity, and predictability, manifested through reliable schedules, legible signage, and ergonomic interfaces, are likely more persuasive than abstract moral appeals,

given the role demands typical of mid-life stages. This accords with the Theory of Planned Behavior [1], wherein Perceived Behavioral Control (PBC) functions as a strong predictor and moderator of attitude and normative influences, furnishing a focal mechanism for site-based interventions targeting Gen X [5] [16].

Finally, parity in knowledge and concern across Gen X and Gen Z does not preclude distinct communicative ecologies: Gen X's higher frequency of peer discussion suggests that recycling may operate as a socially scaffolded practice anchored in local norms and interpersonal exchange [15].

3. Methodology

For this study, a quantitative research design was employed among individuals belonging to Generation X. The decision underlying the selection of this cohort was informed by the generational profile in Romania. According to official information, members of Generation X are dominant in the country's demographic structure, with the gender distribution revealing a higher number of males [13].

Likewise, we chose to administer the questionnaire among Generation X members in light of their recent involvement, as they have been an active part of the recycling process and the promotion of sustainable values in everyday life. Based on these arguments, the sample included 452 respondents.

From a geographical perspective, the research was conducted in urban areas, focusing exclusively on county capitals (county seats). The choice of urban respondents was grounded in the following rationale: driven by the desire for a better standard of living and enhanced professional opportunities, many members of Generation X have migrated from rural to urban areas, adopting a new perspective on everyday reality.

The questionnaire, consisting of two parts, included 28 items. The first part aimed at examining respondents' recycling behavior, with particular emphasis on access to designated collection points, the facilities used, and perceived convenience. Likewise, the questionnaire included questions grounded in the Theory of Planned Behavior, also highlighting respondents' behavioral intentions. The final part included identification (demographic) items, which enabled the delineation of a demographic profile of the respondents.

The questionnaire was administered across Romania between March and May 2025.

4. Results

Based on the responses collected through the questionnaire, the sample's income structure relative to respondents (Figure 1) reflects an income below the 2025 net average income. The respondents' financial situation is correlated with occupation, with 84% being full-time employees. Similarly, the results are correlated with gender, with 54% of respondents being women.

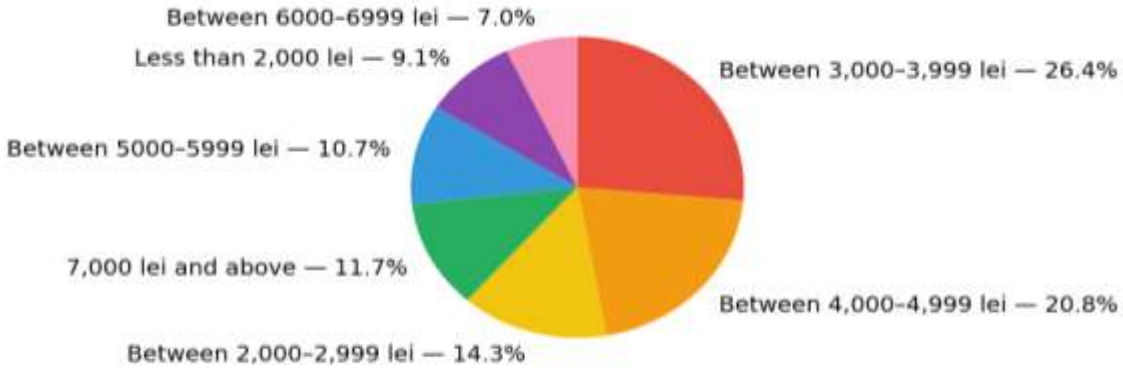

Figure 1: ***Respondents' income***
Source: made by the authors

From the perspective of residential background, most respondents come from the municipality of Bucharest (Table 1), which is understandable given the city's population and its status as the national capital.

Table 1: ***Residential Background***

City	Percent
Bucharest	26,4%
Iași	6,9
Cluj-Napoca	5,3%
Constanța	4,9%
Brașov	4,4%
Pitești	3,6%
Arad	3,1%
Ploiești	3,1%
Buzău	3,1%
Sibiu	2,9%
Others	36,2%

Source: made by the authors

Survey results show high engagement with household recycling: 88.7% of respondents report recycling plastic packaging, whereas 72.4% report recycling aluminum cans. The comparatively lower rate for cans likely reflects the prevailing packaging composition, with producers' continued preference for plastic formats on account of their versatility.

Program-level statistics are congruent with these patterns: RetuRo reports that in 2025 (January–October), 83% of plastic packaging and 83% of aluminum cans placed on the market were recycled, totaling over 4.4 billion units collected [28].

In terms of recycling location, Generation X respondents most commonly engage in selective collection at home (Figure 2), a preference plausibly driven by ease of use and time efficiency in routine household management.

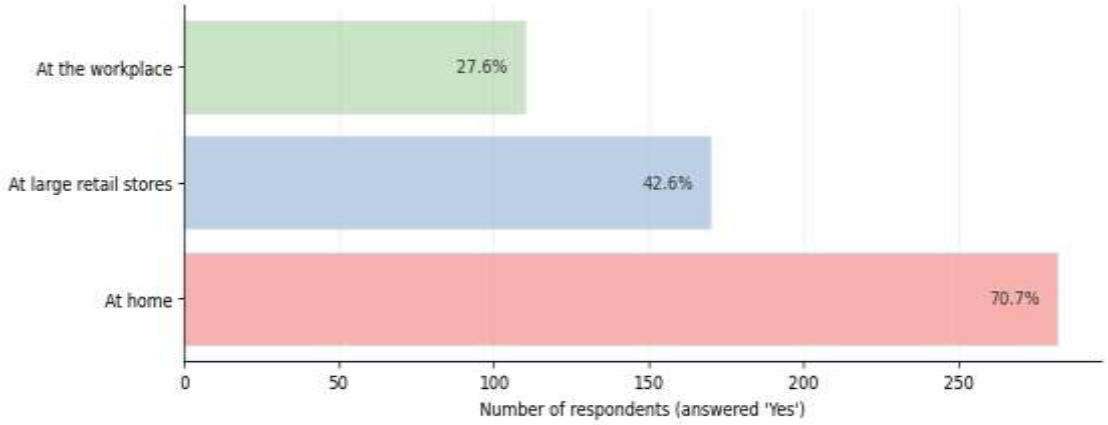

Figure 2: ***Recycling of plastic packaging***
Source: made by the authors

For aluminum packaging, 39.6% of respondents consider stores their second preferred recycling location (Figure 3).

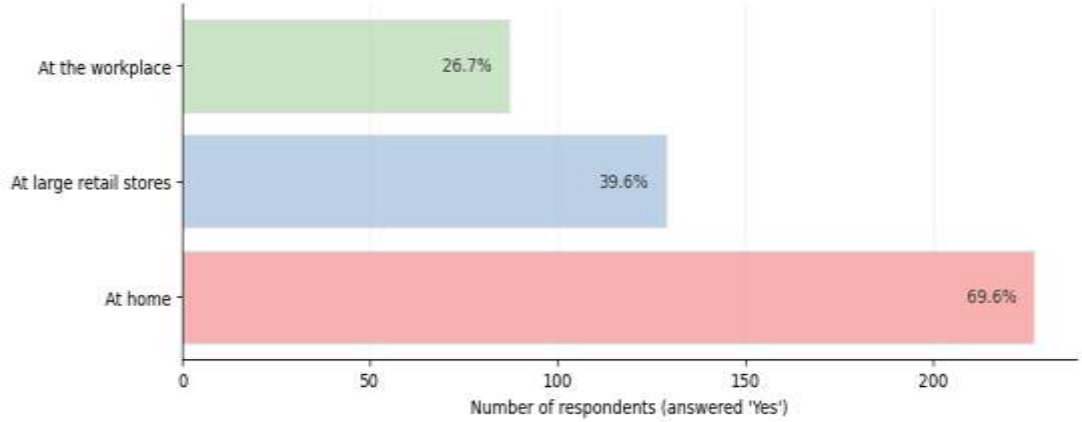

Figure 3: ***Recycling aluminium packaging***
Source: made by the authors

Findings align with prior research, indicating that convenience and familiarity are salient drivers of consumers' recycling choices [34].

In the Romanian context, respondents report a preference for home-based sorting primarily due to time efficiency, whereas workplace recycling is typically limited to items generated during the workday.

Consistent with this logic, a majority adopt pre-sorting practices, storing packaging in separate containers, to streamline subsequent separation and disposal (Figure 4).

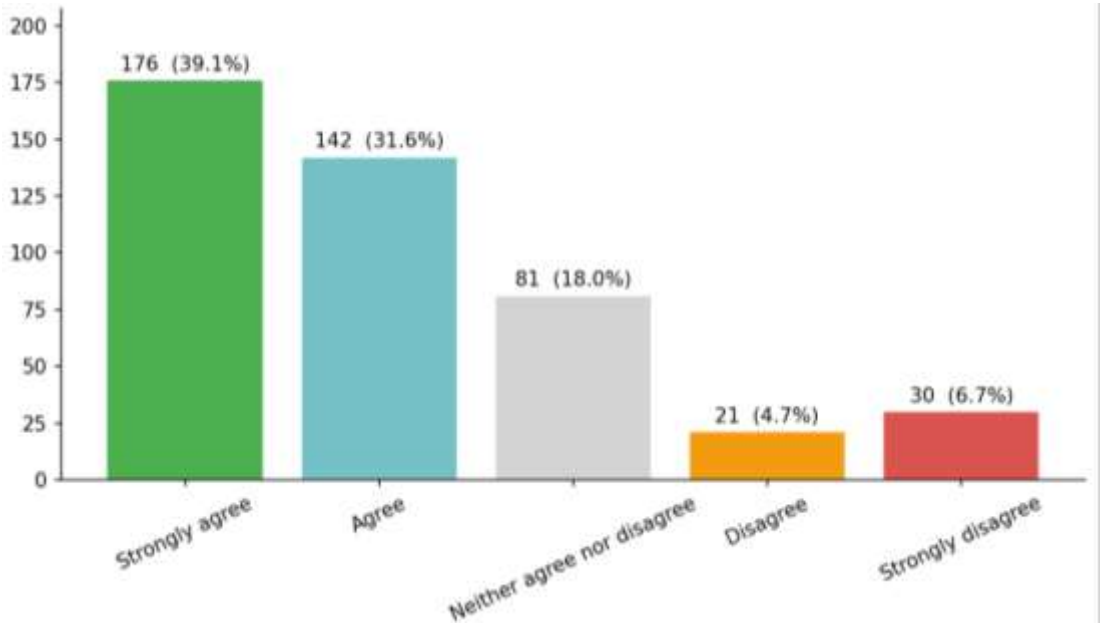

Figure 4: ***Storing packaging in separate containers***
Source: made by the authors

In contrast to Gen Z [3], Gen X respondents are less inclined to regard waste sorting as a task to be delegated or avoided; rather, they tend to accept personal responsibility for sorting (Figure 5).

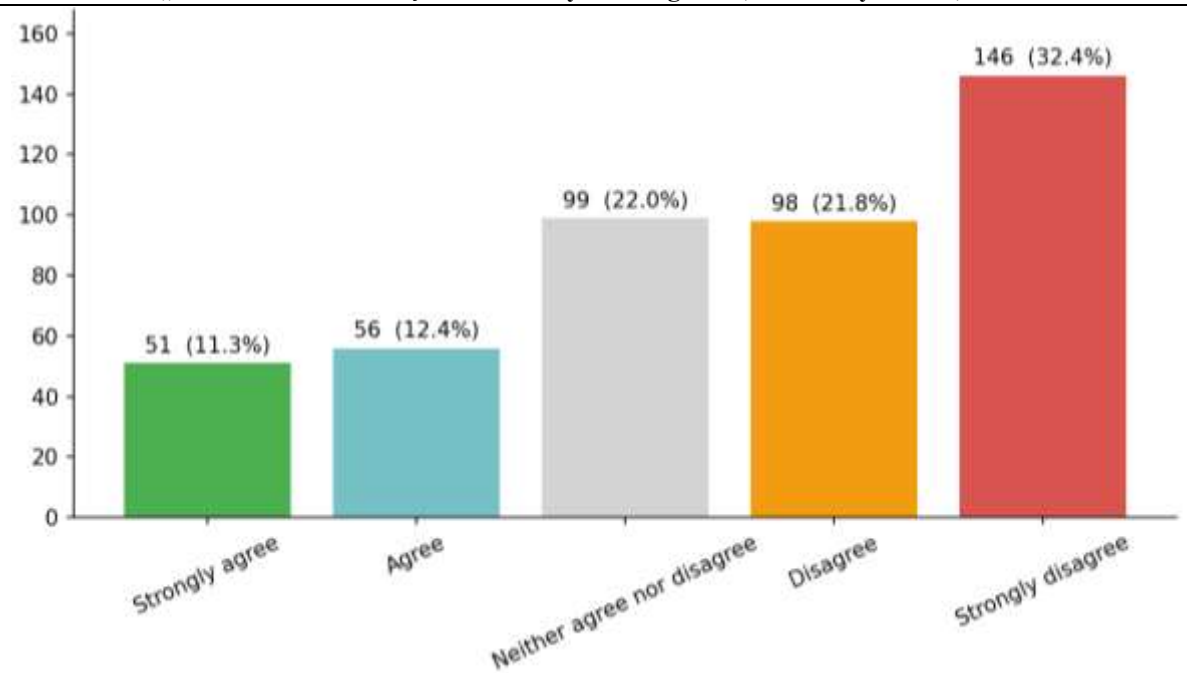

Figure 5: ***Waste sorting should be done by other members of my household***
Source: made by the authors

In practice, the separation of plastic, aluminum, and glass packaging occurs predominantly at dedicated in-store collection points (Figure 6).

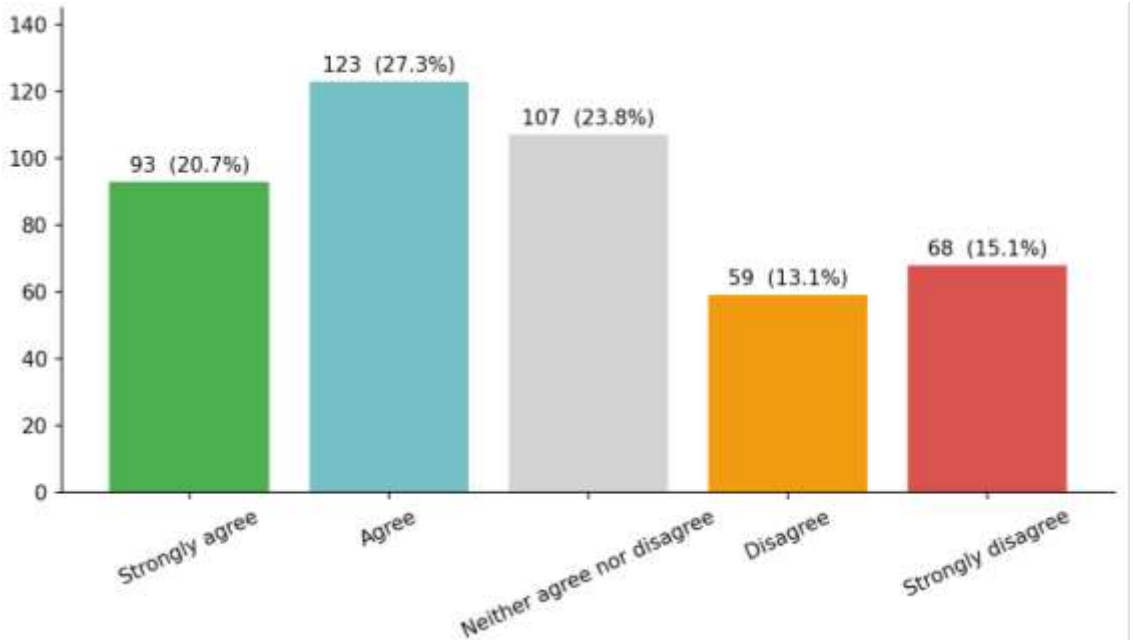

Figure 6: ***„I sort the packaging when I arrive at the designated collection areas"***
Source: made by the authors

Within this context, the configuration of the recycling site is consequential. Respondents indicate that adequate illumination enhances perceived safety across all times of day, thereby facilitating engagement with recycling activities. In parallel, baseline amenities, such as proximate parking and protection from inclement weather, emerge as salient determinants of site preference and use, reinforcing the importance of comfort-oriented design in encouraging correct recycling.

5. Conclusions

This study aimed to explain how location and site features influence recycling practices among Generation X, advancing an integrated, cohort-specific perspective that extends beyond attitudes and intentions to the situational determinants of correct sorting, namely, immediate access, co-location of trash and recycling, and visibility at the point of decision. By centering everyday spaces frequented by Gen X (e.g., homes, offices, retail environments, commuting corridors), the analysis demonstrates that design and accessibility are decisive levers for participation.

Empirically, the survey reveals high engagement with plastic packaging recycling (88.7%) compared to aluminum cans (72.4%), a disparity that is plausibly linked to the prevailing packaging mix in the market. Preferences are anchored in home-based selective collection, while stores emerge as the second-choice location for aluminum (39.6%), and designated in-store points are frequently used for separating plastic, aluminum, and glass. These patterns are congruent with program-level statistics (RetuRo: 83% of plastic and 83% of aluminum placed on the market recycled; over 4.4 billion units collected in January-October 2025). Participants also report pre-sorting (storing packaging in separate containers) to streamline later separation, and Gen X respondents are less inclined to delegate sorting to other household members, indicating personal responsibility orientations.

Practical implications follow directly for urban planners, retailers, and employers. At the site level, designs should co-locate refuse and recycling receptacles along daily travel routes, deploy concise proscriptive signage with clear procedural guidance, standardize visual codes (contrasting colors, legible labels) and ergonomic openings to minimize sorting errors, and ensure lighting, weather protection, and parking to lower access frictions. Across neighborhoods and workplaces, design coherence and public-commitment cues can sustain participation over time, while targeted visibility at community hubs catalyzes norm-consistent behavior.

The study's limitations warrant caution in generalization: results derive from a cross-sectional, self-reported survey of Generation X residents in urban county capitals during March-May 2025; cohort and setting specificity may not extrapolate to rural contexts or other age groups without reservation. Future research should respond to the literature's call for longitudinal and cross-cultural designs, incorporate objective performance metrics (e.g., observed contamination rates, bin usage telemetry), and test randomized site-level interventions (placement, signage framing, ergonomic features) to isolate causal effects across home, work, and retail environments.

Taken together, the study reframes recycling participation for Generation X as a design and access problem rather than a purely attitudinal one. By bringing bins to the decision point, making correct sorting the easy default, and supporting users with clear, actionable cues, stakeholders can translate intentions into correct, sustained practice, advancing both behavioral effectiveness and systems performance.

6. Bibliography

[1] **Ajzen, I.** (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211. doi:10.1016/0749-5978(91)90020-T

[2] **Amiri, B., Jafarian, A., & Abdi, Z.** (2024). Nudging towards sustainability: a comprehensive review of behavioral approaches to eco-friendly choice. *Discover Sustainability, 5*, 444.

[3] **Bejan, B., & Pop, C.** (2024). Differences between Generations: The Sustainable Characteristics of Generation Z. *Annals of the „Constantin Brâncuşi" University of Târgu-Jiu, Economy Series*(6/2024), 191-198.

[4] **Berck, P., Blundell, M., Englander, G., & Gold, S.** (2023). Recycling behaviour and convenience. În D. Zillberman, J. Peloff, & C. Berck, *Sustainable Resource Development in the 21st Century* (pg. 213-230). Springer.

[5] **Botetzagias, I., Malesios, C., & Dina, A**. (2015). Extending the Theory of Planned Behavior in the context of recycling: The role of moral norms and of demographic predictors. *Resources, Conservation & Recycling, 95*, 58-67. doi:10.1016/j.resconrec.2014.12.004

[6] **Cakanlar, A., Hunter, M., & Nenkov, G**. (2025). Recycle right: How to decrease recycling contamination with informational point-of-disposal signage. *Journal of the Academy of Marketing Science, 53*, 781-803. doi:10.1007/s11747-024-01058-1

[7] **Cline, S., Truelove, H., & Nicholson, J**. (2020, May 15). *Ok, Boomers: Generational Differences in Pro-Environmental Behavior*. Preluat de pe Digital Commons: https://digitalcommons.unf.edu/soars/2020/spring_2020/89/

[8] **Doster, L**. (2013). Millennial Teens Design and Redesign Themselves in Online Social Networks. *Journal of Consumer Behaviour, 12*, 267-279.

[9] **Eastman, J., Iyer, R., Liao-Troth, S., Williams, D., & Griffin, M.** (2014). The Role of Involvement on Millennials' Mobile Technology Behaviors: The Moderating Impact of Status Consumption, Innovation, and Opinion Leadership. *Journal of Marketing Theory and Practice, 22*(4), 455-470.

[10] **EPA.** (2021). *National Recycling Strategy - Part One of a Series on Building a Circular Economy for All.*

[11] **European Environment Agency**. (2025, 12 03). *Waste recycling in Europe*. Preluat de pe European Environment Agency: https://www.eea.europa.eu/en/analysis/indicators/waste-recycling-in-europe

[12] **Geiger, J., Steg, L., van der Werff, E., & Unal, A.** (2019). A meta-analysis of factors related to recycling. *Journal of Environmental Psychology, 64*, 78-97. doi:10.1016-j.jenvp.2019.05.004

[13] **Gyenge, E.** (2022, 08 17). *România generațiilor*. Preluat de pe Panorama - Business of Tomorrow: https://panorama.ro/romania-generatiilor-puterea-demografica-politica-si-economica-a-fiecarei-categorii-de-varsta-din-populatia-tarii/

[14] **Istudor, N., Davidescu, A., Marcu, N., Stamule, T., Strat, V., Anagnoste, S., … Stanomir, R.** (2025). *Socio-Economic Impact of Returo.* București.

[15] **Kgomo, T., & Modley, L.-A. S**. (2022). Do younger generations care more about environmental issues? A comparison of perceptions between Gen Z and Gen X in Johannesburg, South Africa. *South African Geographical Journal, 105*(3), 402-421. doi:10.1080/03736245.2022.2150283

[16] **La Barbera, F., & Ajzen, I.** (2021). Moderating role of perceived behavioral control in the theory of planned behavior: A preregistered study. *Journal of Theoretical Social Psychology, 5*, 35-45. doi:10.1002/jts5.83

[17] **Li, C., Guo, H., Yin, M., Zhou, X., Zhang, X., & Ji, Q.** (2023). A Systematic Review of Factors Influencing Signage Salience in Indoor Environments. *Sustainability, 15*(18), 13658. doi:10.3390/su151813658

[18] **Li, C., Zhang, Y., Nouvellet, P., Okoro, J., Xiao, W., & Harder, M.** (2020). Distance is a barrier to recycling - or is it? Surprises from a clean test. *Waste Management, 108*, 183-188. doi:10.1016/j.wasman.2020.04.022

[19] **Linder, N., Rosenthal, S., Sörqvist, P., & Barthel, S.** (2021). Internal and external factors' influence on recycling: Insights from a laboratory experiment with observed behavior. *Frontiers in Psychology, 12*, 699410.

[20] **Linder, N., Sörqvist, P., Lindahl, T., & Ljung, R.** (2023). Managing waste behaviour by manipulating the normative appeal of trash bins: Lessons from an urban field experiment. *Resources, Conservation & Recycling Advances, 19*, 200186.

[21] **Liu, X., Chen, J., Tao, R., Li, S., & Zheng, R.** (2024). Bridging the intergenerational gap: boosting recycling behavior and policy support through eliciting concerns for future others. *Behavioral Public Policy*, 1-22. doi:10.1017/bpp.2024.45

[22] **Liu, Z., Clark, S., Shelly, M., & Yang, J**. (2022). Recycling as a planned behavior: the moderating role of perceived behavioral control. *Environment Development and Sustainability, 24*(2), 11011-11026. doi:10.1007/s10668-021-01894-z

[23] **Merkelbach, I., Dewies, M., & Denktas, S.** (2021). Committing to Keep Clean: Nudging Complements Standard Policy Measures to Reduce Illegal Urban Garbage Disposal in a Neighborhood with High Levels of Social Cohesion. *Frontiers in Psychology, 12*, 660410. doi:10.3389/fpsyg.2021.660410

[24] **O'Connor, R., Lerman, D., Fritz, J., & Hodde, H.** (2010). Effects of Number and Location of Bins on Plastic Recycling at a University. *Journal of Applied Behavior Analysis, 43*(4 (Winter 2010), 711-715. doi:10.1901/JABA.2010.43-711

[25] **Passafaro, P., Livi, S., & Kosic, A.** (2019). Local norms and the theory of planned behavior: Understanding the effects of spatial proximity on recycling intentions and self-reported behavior. *Frontiers in Psychology, 10 Article 744*, 1-11.

[26] **Phulwani, P., Kumar, D., & Goyal, P.** (2020). A Systematic Literature Review and Bibliometric Analysis of Recycling Behavior. *Journal of Global Marketing, 33*(5), 354-376. doi:10.1080/08911762.2020.1765444.

[27] **Puzzo, G., & Prati, G.** (2025). Unraveling the influence of convenience situational factors on e-waste recycling behaviors: A goal-framing theory approach. *Sustainable Development, 33*, 1174-1191.

[28] **RetuRO.** (2025). *Rezultate SGR ianuarie - octombrie 2025*. Preluat de pe RetuRO: https://returosgr.ro/

[29] **Rosenthal, S., & Linder, N.** (2021). Effects of bin proximity and informational prompts on recycling and contamination. *Resources, Conservation & Recycling, 168*, 105430. doi:10.1016/j.resconrec.2021.105430

[30] **Schultz, P.** (2014). Strategies for Promoting Proenvironmental Behavior. *European Psychologist, 19*(2), 107-117. doi:10.1027/1016-9040/a000163

[31] **Segal, M.** (2025, May 15). *70% of Gen Z, Millennials Consider Environmental Sustainability Important in Choosing Employers: Deloitte Survey*. Preluat de pe ESG Today: https://www.esgtoday.com/70-of-gen-z-millennials-consider-environmental-sustainability-important-in-choosing-employers-deloitte-survey/

[32] **Stoica-Ungureanu, A.** (2025). Bibliometric Analysis of the Relationship Between Employability, Sustainable Development, and Ethnicity. *Annals of the „Constantin Brâncuşi" University of Târgu Jiu, Economy Series*(5/2025), 168-181.

[33] **White, K., Habib, R., & Hardisty, D.** (2019). How to SHIFT Consumer Behaviors to be More Sustainable: A Literature Review and Guiding Framework. *Journal of Marketing, 83*(6), 002224291982564. doi:10.1177/0022242919825649

[34] **Whitmarsh, L., Haggar, P., & Thomas, M.** (2018). Waste Reduction Behaviors at Home, at Work, and on Holiday: What Influences Behavioral Consistency Across Contexts? *Frontiers in Psychology, 9*(Article 2447), 1-13.