DOI: 10.31357/jtfe.v16i01.9342

Nawarathne et.al.,/Journal of Tropical Forestry and Environment Vol. 16, No. 01 (2026) `39-50

Public Awareness, Perception, and Behavioral Intention toward E-Waste Recycling and Management: A Theory of Planned Behaviour-Based Analysis from the Western Province of Sri Lanka

Hashini Nawarathne[1], Ashani Ranasinghe[1], Chaamila Pathirana[1]*

[1]*Department of Forestry and Environmental Science, Faculty of Applied Sciences, University of Sri Jayewardenepura, Nugegoda, 10250, Sri Lanka*

Date Received: 2026-04-26 Date Accepted: 2026-06-23

Abstract

Electronic waste (e-waste) has emerged as a significant environmental challenge worldwide due to the rapid growth in electronic device consumption and inadequate waste management systems. In Sri Lanka, per capita e-waste generation increased from 4.2 kg in 2014 to 6.3 kg in 2019, underscoring the need for effective management strategies. Despite national regulations, public participation in proper e-waste disposal and recycling remains limited. This study investigated public awareness, perceptions, and behavioral intentions regarding e-waste management in the Western Province of Sri Lanka using the Theory of Planned Behavior (TPB). A structured questionnaire survey was conducted among 210 respondents from Colombo, Gampaha, and Kalutara districts. Independent-samples t-tests, one-way ANOVA, and chi-square analyses were employed to examine demographic influences and attitude–behavioral intention relationships. The findings showed that 63.3% of respondents could correctly identify e-waste, while 81.9% were unaware of existing laws and regulations. Significant differences in awareness, perception, and behavioral intention were observed across educational levels and districts, while gender significantly influenced subjective norms and behavioral intentions ($p < 0.05$). Furthermore, seven of the nine tested attitude–behavioral intention relationships were statistically significant, supporting TPB's applicability in explaining e-waste recycling behavior. Although 84.8% of respondents expressed willingness to hand over obsolete devices to authorized recyclers, fewer than 11% had participated in formal recycling programs, indicating a substantial intention–behavior gap. The findings highlight inadequate collection infrastructure as a key barrier and provide valuable insights for strengthening Extended Producer Responsibility (EPR) programs, public awareness initiatives, and formal e-waste collection systems in Sri Lanka.

Keywords: Perception, behavioral intention, e-waste, e-waste management, TPB

1. Introduction

Electronic waste (e-waste), which includes discarded electrical and electronic equipment (EEE), has become the fastest-growing waste stream in the world. According to the Global E-waste Monitor 2020, approximately 53.6 million metric tons (Mt) of e-waste were generated globally in 2019, equivalent to 7.3 kg per person, yet only 17.4% was formally collected and recycled (Forti et al., 2020). Global e-waste generation is expected to continue increasing, reaching nearly 75 Mt by 2030.

Despite rising e-waste generation and improved environmental awareness, formal recycling participation remains limited due to behavioral, institutional, infrastructural, and policy-related barriers, highlighting the need for integrated behavioral, technological, and regulatory interventions (Harafah et al., 2026).

Improper e-waste management poses significant environmental and public health risks. Recent behavioral research demonstrates that effective e-waste management requires integrating environmental education with accessible, user-centered collection systems that address behavioral barriers and encourage household participation in formal recycling (Harafah et al., 2026; Ansari et al., 2026). Electronic products contain a wide

**Corresponding author: chaamila@sjp.ac.lk*

range of hazardous substances, including heavy metals such as lead, mercury, cadmium, and chromium, as well as persistent organic pollutants and brominated flame retardants (Kiddee et al., 2013; Rautela et al., 2021). When e-waste is improperly disposed of or informally recycled, these substances can contaminate soil, water, and air, posing serious risks to ecosystems and human health (Song and Li, 2014; Tue et al., 2016; Pathirana et al., 2008).

South Asia generated approximately 4.0 Mt of e-waste in 2019, with India accounting for the largest share (Forti et al., 2020). Across the region, rapidly increasing consumption of electronic products has not been matched by the development of effective e-waste management systems (Borthakur and Govind, 2018; Ananno et al., 2021). In Sri Lanka, e-waste generation reached approximately 138 kilotonnes in 2019, equivalent to 6.3 kg per capita. The Western Province, which includes Colombo, Gampaha, and Kalutara districts, is the country's most economically active region and generates a substantial share of the nation's e-waste. Although the Central Environmental Authority (CEA) has established a formal e-waste collection and recycling network and Sri Lanka became a signatory to the Basel Convention in 1992 (Mallawarachchi and Karunasena, 2012), participation in formal recycling systems remains low. Many obsolete electronic devices are instead sold to scrap dealers, retained in households, traded through second-hand markets, or discarded with municipal solid waste (Gunarathne et al., 2019).

Despite growing concern over e-waste management, important research gaps remain. Recent TPB studies show that household e-waste recycling intentions are influenced by attitudes, subjective norms, perceived behavioral control, and context-specific factors (Ansari et al., 2026). Most behavioral studies in South Asia focus on India and Bangladesh, while evidence from Sri Lanka and other smaller developing economies remains limited. In addition, previous studies have often emphasized awareness without adequately examining how awareness translates into behavioral intention and actual recycling practices. Furthermore, variations in e-waste-related attitudes and behaviors across different demographic and geographic groups have received relatively little attention. Limited evidence from lower-middle-income countries underscores the need for context-specific studies to improve formal e-waste recycling and EPR policies (Promalessy, 2025; Omar et al., 2025).

To address these gaps, this study applies the Theory of Planned Behavior (TPB) to investigate public awareness, perceptions, and behavioral intentions regarding e-waste recycling in the Western Province of Sri Lanka. Specifically, the study aims to: (1) examine the influence of sociodemographic characteristics on TPB-related constructs associated with e-waste recycling; and (2) evaluate the relationship between attitudes and behavioral intentions toward e-waste management. Based on these objectives, the study tested a series of hypotheses relating gender, district, educational level, and attitude–behavioral intention relationships at a 5% significance level.

2. Methodology

2.1 Study Area

The Western Province encompasses Colombo, Gampaha, and Kalutara districts and has approximately 6.2 million residents, with the country's highest population density (>1,600 persons/km²). The province generates about 40% of national GDP and hosts the largest concentration of EEE retail, import, and consumption activity, as well as most CEA-certified e-waste collection infrastructure (Department of Census and Statistics, 2012). The three districts exhibit meaningful socioeconomic gradients: Colombo is the most urbanized, Gampaha peri-urban, and Kalutara relatively more rural, providing internal heterogeneity that supports sub-provincial demographic analysis.

2.2 Research Design and Sampling

A cross-sectional, questionnaire-based survey design was employed, grounded in a post-positivist philosophy using deductive reasoning to test a priori hypotheses. Sample sizes for each district were determined based on the population ratio among Colombo, Gampaha, and Kalutara. This resulted in a 2:2:1 allocation for Colombo: Gampaha: Kalutara. The study targeted a total of 300 samples. Convenience sampling targeted respondents aged 18–36 across three districts (Kelly *et al.*, 2002)The online survey was administered via Google Forms (2021–2022). The sample (n = 210) exceeded the Hair et al. (2010) minimum criterion of 5× questionnaire items (26 items × 5 = 130). District representation: Colombo 39.52%, Gampaha 36.19%, Kalutara 24.29%.

2.3 Questionnaire Design and TPB Operationalization

The questionnaire was developed based on the previously published survey studies related to e-waste and consumer behavioral intention for e-waste management conducted by Wang, Guo, and Wang (2016) and Cai et al. (2020). The structured questionnaire operationalized TPB constructs: attitude (A), subjective norms (SN), perceived behavioral control (PBC), and behavioral intention (BI), with items grounded in validated e-waste behavioral scales (Aboelmaged, 2021; Mak et al., 2019; Wang et al., 2018). Attitude was measured across three dimensions: A1 (attitude toward current programs), A2 (attitude toward e-waste disposal), and A3 (desire for greater awareness). Behavioral intention was operationalized across BI1 (willingness to surrender devices), BI2 (preferred disposal mode), and BI3 (interest in recycling initiatives). Respondents were asked to rate how much each statement related to them by using a five-point Likert-type scale. The labels used for the question were: "Strongly Disagree", "Disagree", "Neutral", "Satisfied", "Strongly Satisfied". Other questions used the following labels: "Does not care", "Is somewhat concerned", "Usually concerned", "Is concerned", and "Definitely cares". Those words were changed according to the measurements and research questions (Ryan and Garland, 1999; Li, 2013; Yin, Gao, and Xu, 2014). In addition, some questions addressing consumer perception and behavioral intention used different scaling parameters. Awareness was assessed at two levels: general concept recognition and regulatory knowledge.

2.4 Data analysis

All analyses were performed using IBM SPSS Statistics v.25. Normality was assessed using the Kolmogorov-Smirnov test; homogeneity of variance was assessed using Levene's test. Independent-samples t-tests (with Welch's test for violated homogeneity) tested gender differences across TPB constructs. One-way ANOVA (with Brown-Forsythe robust tests when homogeneity of variance was violated) assessed differences across districts and educational levels. Chi-square tests of independence (with Fisher's exact test when expected cell frequencies were < 5) examined pairwise relationships between attitude and behavioral intention. Significance threshold: $\alpha = 0.05$ throughout.

3. Results

3.1 Respondent Characteristics

A total of 210 valid survey responses were analyzed. By district: Colombo 39.52% (n = 83), Gampaha 36.19% (n = 76), Kalutara 24.29% (n = 51). Gender: 42.86% male, 57.14% female. Educational attainment: undergraduates 45.71%, graduates 23.33%, diploma 13.81%, G.C.E. A/L 14.76%, G.C.E. O/L 2.38%. The full sample was drawn from the 18–36 age cohort. Figure 1 summarizes the sample's sociodemographic profile.

3.2 E-Waste Awareness and Regulatory Knowledge

63.33% of respondents recognized e-waste as a concept; however, 21.80% of those who self-reported awareness selected an incorrect product combination, suggesting that genuine operational understanding is lower than self-reports indicate. Regulatory knowledge was markedly lower: 81.90% were unaware of applicable e-waste laws, and 54.29% did not know whether a formal collection point existed nearby. These findings establish a three-tier awareness deficit: conceptual, regulatory, and infrastructural, collectively constraining behavioral intention formation across all TPB pathways (Figure 2).

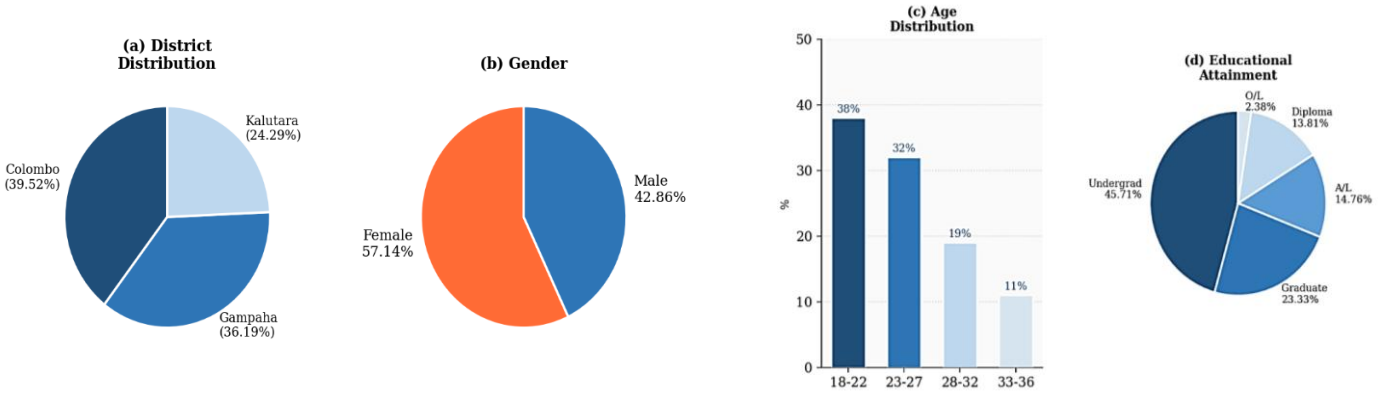

Figure 1: Sociodemographic Profile of Survey Respondents (n = 210): (a) district distribution, (b) gender, (c) age distribution, (d) educational attainment.

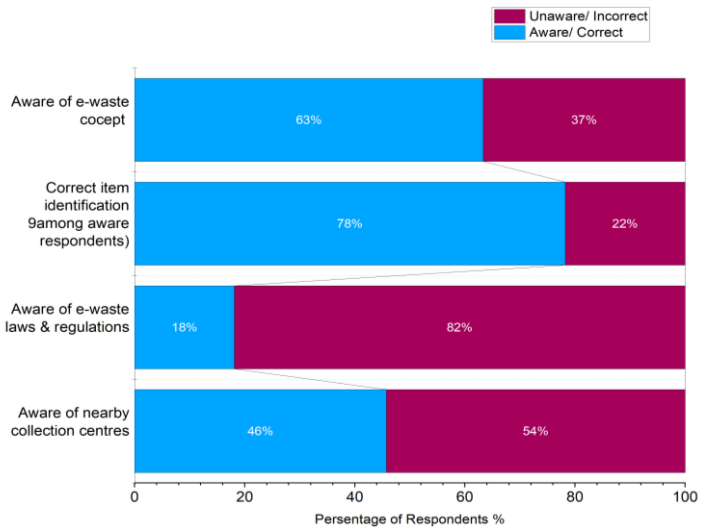

Figure 2: Three-Tier E-Waste Awareness Deficit Among Western Province Residents (n = 210). The regulatory knowledge gap (81.90% unaware) is the most critical barrier to engagement in formal recycling.

3.3 Attitudes, Satisfaction, and Disposal Behavior

Satisfaction with the existing e-waste management system was predominantly negative: 41.0% were dissatisfied and 13.3% strongly dissatisfied, while only 10.0% were satisfied. Convenience-dominated disposal decision-making: 39.5% reported usually prioritizing personal convenience when discarding e-waste, and 63.8% preferred home collection over drop-off at a recycling center.

Actual disposal behavior diverged markedly from stated intent. For functioning devices, the dominant pathways were resale (32.86%), sale to scrap metal dealers (29.52%), and reuse (15.24%), with formal recycling center transfer reported by only 9.52%. For broken equipment, scrap metal dealers dominated (31.90%), followed by technician repair (25.24%), home storage (16.67%), and general waste disposal (14.29%); only 10.95% chose formal recycling (Figure 3).

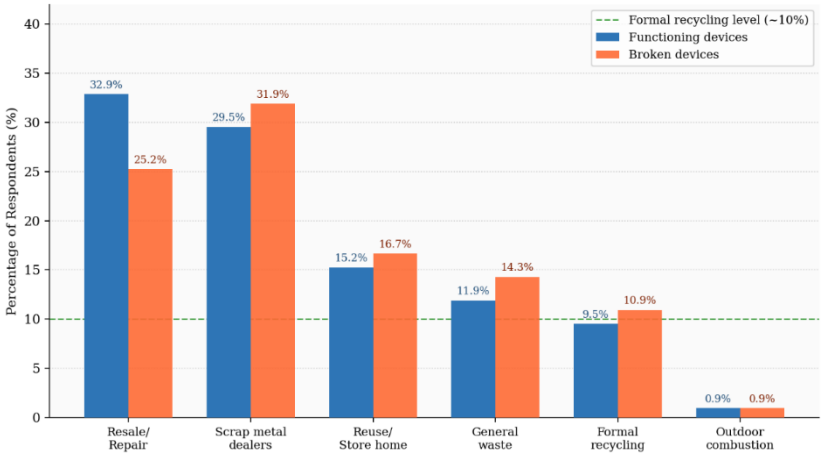

Figure 3: Actual E-Waste Disposal Pathways for Functioning and Broken Devices (n = 210). The dashed reference line at 10% highlights the critically low formal recycling participation rate relative to dominant informal pathways.

3.4 The Intention–Behavior Gap

While 84.8% of respondents said they were willing to surrender devices to formal recyclers, actual participation in formal recycling remained below 11%. Similarly, 63.8% preferred home collection, and only 42.9% were willing to pay a recycling fee. This stark behavioral paradox, high stated intention versus negligible actual formal participation, is visualized in Figure 4 and constitutes the study's most policy-critical finding.

3.5 Demographic Influences on TPB Constructs

3.5.1 Gender Differences

Independent-samples t-tests and Welch's tests revealed statistically significant gender differences in three of the five TPB constructs: subjective norms ($p = 0.006$), perceived behavioral control ($p = 0.006$), and behavioral intention ($p = 0.002$). Awareness ($p = 0.349$) and perceived behavioral control ($p = 0.725$) did not differ significantly by gender. The radar chart in Figure 5 visualizes the construct-level gender differentiation, with female respondents scoring systematically higher on normative and intentional dimensions.

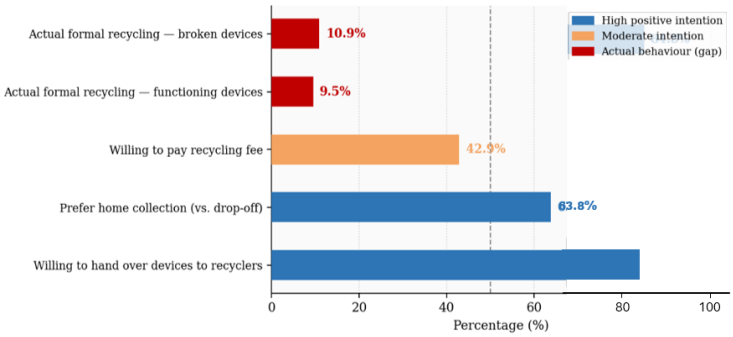

Figure 4: The Intention-Behaviour Gap in E-Waste Recycling (n = 210). Bars in red represent actual disposal behaviour, revealing a critical gap relative to stated willingness to engage with formal recycling systems.

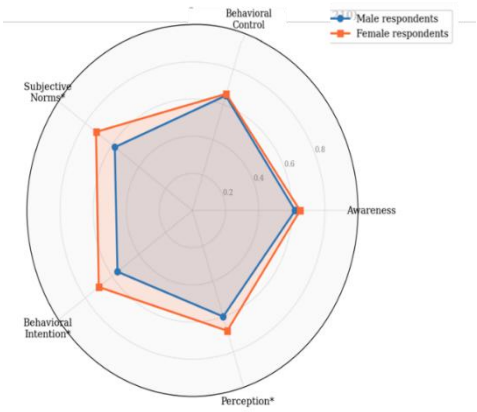

Figure 5: Gender-Differentiated TPB Construct Profiles (n = 210). Constructs marked with asterisks (*) show statistically significant gender differences ($p < 0.05$). Scores are normalized (0-1 scale) for comparative visualization.

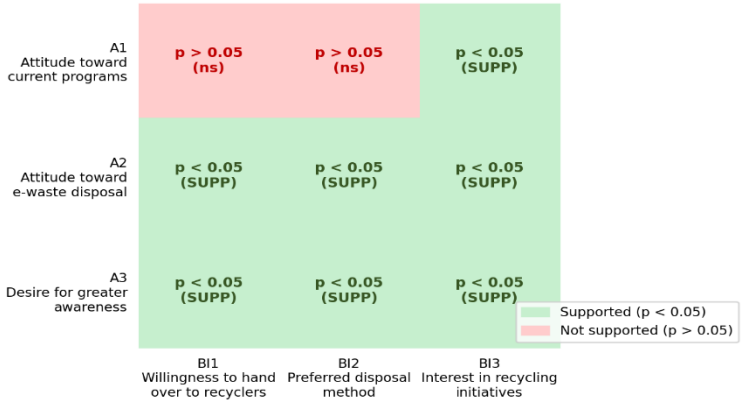

Figure 6: Statistical Significance of Demographic Group Differences across TPB Constructs (One-way ANOVA/Brown-Forsythe, alpha = 0.05).

3.5.2 District and Educational Level

One-way ANOVA and robust tests identified statistically significant inter-district differences in awareness ($p = 0.005$), behavioral intention ($p = 0.002$), and perception ($p < 0.001$), but not in behavioral control ($p = 0.261$) or subjective norms ($p = 0.247$). For educational levels, significant effects emerged for subjective norms ($p = 0.004$) and behavioral intention ($p < 0.001$). Figure 6 provides a comparative significance map across both demographic dimensions.

3.6 Attitude–Behavioral Intention Relationships

Chi-square and Fisher's Exact Tests were applied to nine pairwise attitude–behavioral intention combinations. The results matrix (Figure 7) shows that seven of nine hypotheses were supported ($p < 0.05$). Only A1→BI1 and A1→BI2 (attitude toward current programs predicting device handover willingness and disposal preference) were non-significant, a theoretically meaningful dissociation discussed below.

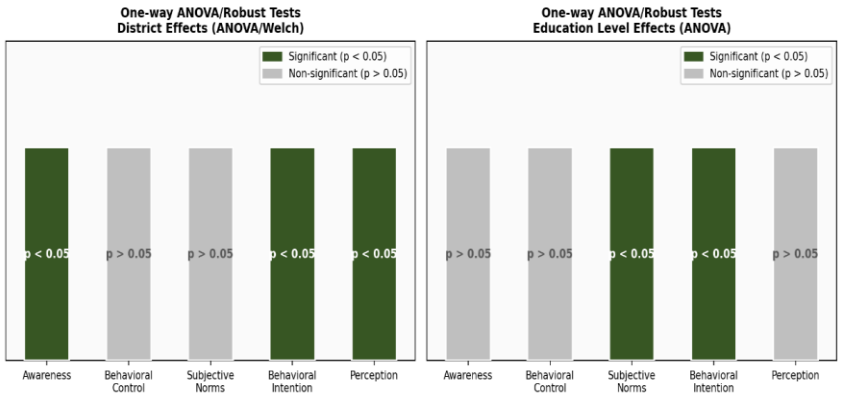

Figure 7: Chi-Square Test Results: Attitude x Behavioral Intention Hypothesis Matrix (n = 210). 7 of 9 hypotheses supported ($p < 0.05$)

4. Discussion

4.1 The Awareness–Regulation Gap: A Structural Policy Communication Failure

The finding that 63.33% recognized e-waste as a concept, while 81.90% were unaware of governing regulations, reveals a structural discontinuity between general environmental literacy and regulatory knowledge. This pattern is more pronounced in Sri Lanka than in comparable studies: Ananno et al. (2021) found comparable regulatory knowledge deficits in Bangladesh, while Miner et al. (2020) documented similar gaps in Nigeria. However, the magnitude here is particularly concerning given that the country enacted specific e-waste provisions and established a CEA-certified recycling network. This gap suggests that regulatory communication channels are fundamentally disconnected from public information access, in contrast to the Chinese experience, where government-led mass communication campaigns substantially increased e-waste regulatory awareness ahead of the 2011 fund legislation (Wang et al., 2011; Yu et al., 2014; Meetiyagoda et al., 2017).

The erroneous product identification among 21.80% of self-reporting "aware" respondents further underscores the superficiality of awareness. Informational campaigns that assume concept familiarity without reinforcing operational knowledge will fail to change disposal behavior.

4.2 Sociodemographic Heterogeneity and Behavioral Implications

The significant gender differences in subjective norms, perception, and behavioral intention, while awareness and behavioral control did not differ, align with the broader environmental behavior literature, which shows that women report stronger pro-environmental norms and intention (Wang et al., 2016; Clark et al., 2003). The absence of gender differences in perceived behavioural control suggests that normative predisposition does not translate into greater perceived agency, reflecting uniform infrastructural constraints regardless of gender.

District-level heterogeneity in awareness, perception, and behavioral intention, with behavioral control and subjective norms invariant across districts, reveals a spatial dimension of e-waste behavioral inequality within the province. This spatial stratification echoes Indian studies documenting urban–rural gradients in e-waste awareness (Bhat and Patil, 2014; Premarathna et al., 2023) and directly argues against uniform provincial policy instruments in Favor of geographically differentiated outreach. Educational gradients in subjective norms and behavioral intention without corresponding effects on behavioral control are theoretically coherent: higher educational attainment amplifies normative peer effects and pro-environmental value internalization without necessarily improving perceived access to recycling infrastructure (Mak et al., 2019; Tonglet et al., 2004).

4.3 The Attitude–Behavioral Intention Nexus: Selective TPB Validation

Seven of nine confirmed attitude–behavioral intention relationships provide robust empirical support for TPB's predictive validity in the Sri Lankan context. Attitude toward disposal (A2) predicted all three behavioral intention dimensions, positioning it as the strongest attitudinal lever for intervention. The desire for greater awareness (A3) similarly predicted all three, suggesting that meta-cognitive openness to learning translates into dispositional readiness across all behavioral pathways, consistent with Aboelmaged (2021), who found attitude and information-seeking disposition among the strongest TPB predictors of e-waste recycling intention.

The failure of attitude toward current programs (A1) to predict device handover willingness or disposal preference is the study's most theoretically provocative finding. It implies that institutional trust and program satisfaction are decoupled from behavioral disposition, paralleling the intention–behavior gap documented in Brazil by Echegaray and Hansstein (2017). The home-collection preference (63.8%) confirms that convenience, not attitude, is the binding constraint on recycling behavior.

4.4 Informal E-Waste Flows and Their Behavioral Drivers

The dominance of scrap metal dealer channels (29.52% for functioning devices; 31.90% for broken equipment) reflects the informal recycling economy's structural role in South Asian e-waste governance. Scrap metal dealers provide door-to-door collection, immediate financial compensation, and cultural familiarity, effectively out-competing formal recyclers on the convenience and incentive dimensions identified as primary behavioral determinants. This pattern is well-documented across China (Chi et al., 2011), India (Borthakur and Govind, 2018), and Malaysia (Afroz et al., 2013), representing a pan-South-Asian behavioral equilibrium that formal recycling systems must disrupt through infrastructure redesign.

5. Policy implications

5.1 Regulatory Communication Infrastructure

The 81.90% regulatory unawareness rate demands a multi-channel, institutionally coordinated regulatory literacy campaign. The CEA should develop a provincial public communication strategy combining digital media targeting the 18–36 demographic, university and school curriculum integration, and mass media engagement. Messaging must be spatially differentiated. Gampaha and Kalutara districts require higher communication intensity because awareness levels are lower than in Colombo. India's 2016 E-Waste Management Rules, which mandated EPR reporting and producer-funded awareness obligations, provide a transferable regulatory communication model.

5.2 Collection Infrastructure Redesign

The preference for home collection (63.8%), combined with sub-11% formal recycling, provides actionable evidence for a fundamental redesign of collection infrastructure. The CEA and licensed recyclers should pilot scheduled kerbside e-waste collection in the Western Province, modelled on municipal solid waste collection systems and potentially implemented through a public-private partnership with existing certified recyclers. Financial incentive mechanisms, such as deposit-refund schemes and recycling vouchers, should be piloted to offset income barriers identified as the primary obstacle to accepting recycling fees.

5.3 Extended Producer Responsibility Implementation

Sri Lanka's existing legal foundation under the National Environmental Act and Basel Convention ratification provides the basis for operationalizing EPR. The finding that a significant proportion of respondents attributed recycling fee responsibility to the government or manufacturers reveals a latent public expectation of producer-financed take-back systems. The CEA should mandate EPR registration, take-back targets, and consumer-facing collection points at EEE retail locations, following the European WEEE Directive architecture adapted to Sri Lanka's import-dominated EEE market structure.

5.4 Gender- and Education-Targeted Interventions

Community-based normative messaging strategies will be differentially effective given the stronger normative recycling orientation among female respondents. Prioritize women's community organizations and

educational institutions as intervention delivery channels. University campuses in the Western Province represent high-density, educationally receptive communities for piloting integrated e-waste awareness and collection programs, given the established relationship between educational attainment and pro-recycling behavioral intention.

6. Conclusions

This study provides the first multi-district, TPB-grounded quantitative assessment of e-waste behavioral intention in Sri Lanka, establishing an empirical baseline at a critical juncture in the country's e-waste governance evolution. Three findings carry particular scientific and policy significance. First, Sri Lanka exhibits a three-tier awareness deficit: conceptual (36.67% unaware of e-waste), regulatory (81.90% unaware of applicable laws), and infrastructural (54.29% unaware of proximate collection points) that collectively deactivates all three TPB pathways through which attitude, norms, and behavioral control would otherwise translate into pro-recycling behavioral intention. Second, the behavioral paradox of high stated willingness (84.8%) coexisting with low actual formal recycling participation (below 11%) identifies collection convenience, not attitudinal resistance, as the primary behavioral bottleneck. Formal recycling systems that fail to match the convenience proposition of the informal scrap dealer economy will continue to lose the material-capture competition, regardless of awareness campaign investment. Third, the TPB framework showed strong explanatory power in this context, with seven of nine attitude–behavioral intention relationships confirmed. The non-significance of institutional attitude (A1) as a predictor of dispositional recycling willingness reveals that institutional trust rehabilitation is not a prerequisite for behavioral change, simplifying the intervention challenge by enabling infrastructure investment to proceed independently of public perception management. Future research should employ probability-based sampling for national extrapolation, integrate contingent valuation to quantify willingness-to-pay for formal recycling services, and use longitudinal designs to examine intention–behavior gaps directly. Comparative studies across South Asian economies would enable regional behavioral benchmarking and inform harmonized EPR policy frameworks.

Acknowledgment

Special thanks go to Dr. Sandun M. Dassanayake, Senior Lecturer, Department of Decision Science, University of Moratuwa, and Mr. Oshada Weerasinghe, General Manager, N.S Green Links Lanka (Pvt) Ltd., Ms. Hansamali Prasangika, Department of Statistics and Computer Science, Faculty of Science, University of Peradeniya (Temporary Lecturer of Statistics, Faculty of Dental Science, University of Peradeniya), for their support and facilitation throughout this study.

References

Aboelmaged, M., 2021. E-waste recycling behaviour: An integration of recycling habits into the theory of planned behaviour. Journal of Cleaner Production, 278, 124182. https://doi.org/10.1016/j.jclepro.2020.124182

Afroz, R., et al., 2013. Survey and analysis of public knowledge, awareness, and willingness to pay in Kuala Lumpur, Malaysia. Journal of Cleaner Production, 52, 185–193. https://doi.org/10.1016/j.jclepro.2013.02.004

Ajzen, I., 1991. The theory of planned behaviour. Organizational Behaviour and Human Decision Processes, 50(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Akhtar, R., Masud, M.M., & Afroz, R., 2014. Household perception and recycling behaviour on electronic waste management: Kuala Lumpur, Malaysia. Malaysian Journal of Science, 33(1), 32–41. https://doi.org/10.22452/mjs.vol33no1.5

Ananno, A.A., et al., 2021. Survey and analysis of consumers' behaviour for electronic waste management in Bangladesh. Journal of Environmental Management, 282, 111943. https://doi.org/10.1016/j.jenvman.2021.111943

Ansari, B., Sameer, A., Izhar, S., Ali, M., et al., 2026. Antecedents of mobile e-waste recycling behaviour: A study of planned intentions and direct behavioural triggers among adolescents and young Indian adults. Waste Management & Research. Advance online publication. https://doi.org/10.1177/0734242X261416438

Arain, A.L., et al., 2020. Analysis of e-waste recycling behaviour at a Midwestern US University. Waste Management, 105, 119–127. https://doi.org/10.1016/j.wasman.2020.02.002

Baldé, C.P., et al., 2017. The global e-waste monitor 2017: Quantities, flows and resources. United Nations University. [No DOI available — UNU/ITU/ISWA report]

Bhat, V., & Patil, Y., 2014. E-waste consciousness and disposal practices among residents of Pune city. Procedia – Social and Behavioural Sciences, 133, 491–498. https://doi.org/10.1016/j.sbspro.2014.04.216

Borthakur, A., & Govind, M., 2018. Public understandings of e-waste and its disposal in urban India. Journal of Cleaner Production, 172, 1053–1066. https://doi.org/10.1016/j.jclepro.2017.10.218

Cai, K., et al., 2020. Uncovering residents' behaviours, attitudes, and WTP for recycling e-waste: Zhuhai city, China. Environmental Science and Pollution Research, 27(2), 2386–2399. https://doi.org/10.1007/s11356-019-06917-x

Cheah, I., & Phau, I., 2011. Attitudes towards environmentally friendly products. Marketing Intelligence & Planning, 29(5), 452–472. https://doi.org/10.1108/02634501111153674

Chi, X., et al., 2011. Informal electronic waste recycling: A sector review with a focus on China. Waste Management, 31(4), 731–742. https://doi.org/10.1016/j.wasman.2010.11.006

Clark, C.F., Kotchen, M.J., & Moore, M.R., 2003. Internal and external influences on pro-environmental behaviour. Journal of Environmental Psychology, 23(3), 237–246. https://doi.org/10.1016/S0272-4944(02)00105-6

Department of Census and Statistics, 2012. Census of Population and Housing 2012 — Final Report, Sri Lanka. [No DOI available — government report]

Echegaray, F., & Hansstein, F.V., 2017. Assessing the intention-behaviour gap in electronic waste recycling: Brazil. Journal of Cleaner Production, 142, 180–190. https://doi.org/10.1016/j.jclepro.2016.05.064

Forti, V., et al., 2020. The global e-waste monitor 2020: Quantities, flows, and the circular economy potential. United Nations University / UNITAR. [No DOI available — UNU/UNITAR/ITU/ISWA report]

Gunarathne, N., Alwis, A.D., & Alahakoon, Y., 2019. Challenges facing sustainable urban mining in the e-waste recycling industry in Sri Lanka. Journal of Cleaner Production, 251, 119641. https://doi.org/10.1016/j.jclepro.2019.119641

Guerin, D., Crete, J., & Mercier, J., 2001. A multilevel analysis of the determinants of recycling behaviour in the European countries. Social Science Research, 30(2), 195–218. https://doi.org/10.1006/ssre.2000.0694

Hair, J., et al., 2010. Multivariate Data Analysis (7th ed.). Pearson Prentice Hall. [No DOI available — textbook]

Harafah, W. O. U. M. P., et al., 2026. Environmental behaviour driving household e-waste recycling. Environments, 13(4), 206. https://doi.org/10.3390/environments13040206

Ikhlayel, M., 2018. An integrated approach to establishing e-waste management systems for developing countries. Journal of Cleaner Production, 170, 119–130. https://doi.org/10.1016/j.jclepro.2017.09.137

Kiddee, P., Naidu, R., & Wong, M.H., 2013. Electronic waste management approaches: An overview. Waste Management, 33(5), 1237–1250. https://doi.org/10.1016/j.wasman.2013.01.006

Kumar, A., et al., 2017. E-waste: An overview of generation, collection, legislation and recycling practices. Resources, Conservation and Recycling, 122, 32–42. https://doi.org/10.1016/j.resconrec.2017.01.018

Low, M. P., Teh, W. Q., & Hwang, H., 2026. Understanding e-waste recycling behavior: A GSCA approach integrating the Theory of Planned Behavior and habit formation. Environmental Quality Management, 35(3), e70320. https://doi.org/10.1002/tqem.70320

Mak, T.M.W., et al., 2019. Extended theory of planned behaviour for promoting construction waste recycling in Hong Kong. Waste Management, 83, 161–170. https://doi.org/10.1016/j.wasman.2018.11.016

Mallawarachchi, H., & Karunasena, G., 2012. Electronic and electrical waste management in Sri Lanka. Resources, Conservation and Recycling, 68, 44–53. https://doi.org/10.1016/j.resconrec.2012.08.003

Meetiyagoda, T.A.O.K., Bandara, N.J.G.J. and Jinadasa, K.B.S.N., 2017. Performance of tropical vertical subsurface flow constructed wetlands for leachate treatment at different hydraulic loading rates.

Miner, K.J., et al., 2020. Survey on household awareness and willingness to participate in e-waste management in Nigeria. Sustainability, 12(3), 1047. https://doi.org/10.3390/su12031047

Niaura, A., 2013. Using the theory of planned behaviour to investigate environmental behaviour among youth. Environmental Research, Engineering and Management, 63(1), 74–81. https://doi.org/10.5755/j01.erem.63.1.2901

Omar, M., et al., 2025. Social and behavioral factors influencing e-waste recycling. Selected Issues on Governance, Communication and Sustainability (SIGCS Proceedings), 2, 126–133. [No DOI available — conference proceedings]

Pathirana, C. and Bandara, N.J., 2008. Analysis of water quality on Maha Oya (Srilanka). *J. Environ. Res. Develop*, *3*(1), pp.1-8.

Promalessy, R., Hadi, T. S., & Alwie, A. F., 2025. Exploring electronic waste recycling intentions: The role of environmental concern, perceived benefit and attitude within the TPB framework. Selodang Mayang, 11(1), 91–104. https://doi.org/10.47521/selodangmayang.v11i1.454

Premarathna, K.S.D., Gayara Degamboda, N., Fernando, B.H.R. *et al.* Plastics and plastic-bound toxic metals in municipal solid waste compost from Sri Lanka. *Environ Geochem Health* **46**, 306 (2024). https://doi.org/10.1007/s10653-024-02081-5

Ranasinghe, W.W., & Athapattu, B.C.L., 2020. Challenges in e-waste management in Sri Lanka. In Handbook of Electronic Waste Management. Elsevier, pp. 283–322. https://doi.org/10.1016/B978-0-12-817030-4.00011-5

Rautela, R., et al., 2021. E-waste management and its effects on the environment and human health. Science of the Total Environment, 773, 145623. https://doi.org/10.1016/j.scitotenv.2021.145623

Song, Q., & Li, J., 2014. Environmental effects of heavy metals from e-waste recycling in China. Waste Management, 34(12), 2587–2594. https://doi.org/10.1016/j.wasman.2014.08.012

Thavalingam, V., & Karunasena, G., 2016. Mobile phone waste management in Sri Lanka. Resources, Conservation and Recycling, 109, 34–43. https://doi.org/10.1016/j.resconrec.2016.01.017

Tonglet, M., Phillips, P.S., & Read, A.D., 2004. Using TPB to investigate recycling behaviour determinants. Resources, Conservation and Recycling, 41(3), 191–214. https://doi.org/10.1016/j.resconrec.2003.11.001

Tue, N.M., et al., 2016. Release of halogenated dioxin-related compounds from open burning of e-waste in Ghana. Journal of Hazardous Materials, 302, 151–157. https://doi.org/10.1016/j.jhazmat.2015.09.062

Uhunamure, S.E., et al., 2021. Appraisal of households' knowledge and perception towards e-waste management in South Africa. Recycling, 6(2), 39. https://doi.org/10.3390/recycling6020039

Wang, Z., et al., 2011. Willingness and behaviour towards e-waste recycling in Beijing. Journal of Cleaner Production, 19(9–10), 977–984. https://doi.org/10.1016/j.jclepro.2010.09.016

Wang, Z., et al., 2018. How does information publicity influence e-waste recycling behaviour intentions? Resources, Conservation and Recycling, 133, 1–9. https://doi.org/10.1016/j.resconrec.2018.01.014

Wang, Z., Guo, D., & Wang, X., 2016. Determinants of residents' e-waste recycling behaviour intentions: Evidence from China. Journal of Cleaner Production, 137, 850–860. https://doi.org/10.1016/j.jclepro.2016.07.155

Yu, L., et al., 2014. The development of WEEE management and the effects of fund policy in China. Waste Management, 34(9), 1705–1714. https://doi.org/10.1016/j.wasman.2014.05.012

Yu, S., et al., 2018. Behavioural intention analysis of waste separation in Hangzhou using TPB. International Review for Spatial Planning and Sustainable Development, 6(3), 63–77. https://doi.org/10.14246/IRSPSD.6.3_63

Yin, J., Gao, Y., & Xu, H., 2014. Survey of consumers' waste mobile phone recycling behaviour in China. Journal of Cleaner Production, 65, 517–525. https://doi.org/10.1016/j.jclepro.2013.10.006